



Winter 2019

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Recommended Citation

Katrina M. Wyman, *Second Generation Property Rights Issues*, 59 Nat. Resources J. 215 (2019).
Available at: <https://digitalrepository.unm.edu/nrj/vol59/iss1/9>

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Katrina M. Wyman*

SECOND GENERATION PROPERTY RIGHTS ISSUES

INTRODUCTION

Almost six decades ago, Ronald Coase suggested the potential for property rights and markets to address environmental problems in *The Problem of Social Cost*.¹ Today, there are many examples of property-based policy instruments, such as cap and trade programs, dealing with issues ranging from conventional air pollution to greenhouse gas emissions, overfishing, habitat protection, and allocating scarce freshwater.² These examples come not only from the U.S. and other developed countries, but also from emerging powers such as China which is piloting water trading and carbon cap and trade regimes.³

For decades, Coasean-inspired scholarship, advocating greater use of property rights and markets, has focused on important “first generation” issues related to establishing property rights. These first generation issues include: the *ideal characteristics* of environmental property rights (e.g., must they be perpetual or will time-limited rights suffice to eliminate the tragedy of the commons?⁴), how property rights should be *initially allocated* (through auctions, grandfathering or some other method), and the *external pre-conditions* that are necessary to establish rights (e.g., how important is it to have a sovereign authority enforcing the rights,

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1. Ronald H. Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1 (1960).

2. For examples of the use of “private property” to address environmental problems, see, e.g., JASON A. SCHWARTZ, MARKETABLE PERMITS: RECOMMENDATIONS ON APPLICATIONS AND MANAGEMENT 7-14 (2017). Schwartz disclaims use of the “property rights” label, preferring to use the term “permits” and “licenses.” *Id.* at 6. I use the terms “property” and “private property” loosely in this article to refer to legal instruments that provide individuals with an exclusive right to something; not all of the interests I am labeling property are legally treated like private property, many are more like licenses and permits. See *infra* note 77 (prior appropriation water rights can be protected by the Takings Clause, while grazing permits are not, and individual transferable quotas likely are not protected by the Takings Clause); Bryan Leonard et al., *Water Market Design, Transaction Costs, and the Political Economy of Property Rights to Natural Resources*, REV. ENVTL. ECON. & POL’Y (forthcoming) (citations are to Sept. 21, 2017 draft, available online.).

3. Chris Buckley, *Xi Jinping Is Set for a Big Gamble With China’s Carbon Trading Market*, N.Y. TIMES, June 23, 2017; Duston Garrick & Jesper Svensson, *The Political Economy of Water Markets: 40 Years of Debates, Experiments and Lessons Learned*, in THE OXFORD HANDBOOK OF WATER POLITICS AND POLICY 376, 394-97 (2017); David Lewis & Hang Zheng, *How Could Water Markets Like Australia’s Work in China?*, 34 INT’L J. WATER RESOURCES DEV. (2018).

4. Corbett A. Grainger & Dominic P. Parker, *The Political Economy of Fishery Reform*, 5 ANN. REV. RESOURCE ECON. 369, 380-81 (2013) (resource economists advocate perpetual rights).

or can they be implemented in areas like the high seas without such an enforcement authority?⁵ Is it easier to establish rights in small or large number situations?⁶

With property rights now established as a tool for addressing environmental problems, the time is ripe to think about what might be called “second generation” environmental property rights issues. Second generation issues are the issues that arise after tradable property rights have been established in a resource. Foremost among these is the risk that property rights get stuck in the hands of owners who are not using the underlying resource for a highly socially valuable purpose. For example, many grazing permits are now held by ranchers who use the permits to graze on federal lands. Yet, little meat comes from the animals that they graze and the grazing further degrades the already depleted federal lands. From a societal perspective, it would be preferable if grazing permits were retired so that federal lands could be allowed to regenerate, but conservationists have not been able to buy up many permits in order to retire them.⁷ Another risk is that a group of “rentiers” come to own many of the property rights in a resource, and profit from leasing out those rights to others who do the physical work of extracting the resource, such as harvesting fish.⁸ While leasing may be economically efficient, resource users may see it as unfair that they have to pay rent to extract a resource, especially if the property owners that the users are paying initially acquired the rights for free, as in many fisheries with catch shares.⁹

This article makes two main points. First, it highlights the potential for things to go awry after property rights have been established in environmental resources. It is not enough to establish property rights in water, marine fisheries, or grazing on federal lands because, once established, rights can become inefficiently or inequitably allocated over time, even if the rights are legally alienable. In emphasizing that property rights may become misallocated, this article draws on the theoretical arguments recently advanced by Eric Posner, Glen Weyl, and Lee Fennell that private property can lead to allocative inefficiency.¹⁰ Although there are problems with their critiques of private property and reform proposals, there is no doubt that they are correct that there are instances where property rights are misallocated.¹¹ Second, this article highlights three categories of explanations for why environmental property rights are not sufficient to promote socially desirable

5. Compare Christopher Costello et al., *Conservation Science: A Market Proposal to Saving the Whales*, 481 NATURE 139 (2012), with Holly Doremus, *Why International Catch Shares Won't Save Ocean Biodiversity*, 2 MICH. J. ENVTL. & ADMIN. L. 385 (2013).

6. GARY D. LIBECAP, CONTRACTING FOR RIGHTS 21-22 (1990).

7. See *infra* notes 49-51 and accompanying text (citing John D. Leshy & Molly S. McUSIC, *Where's the Beef – Facilitating Voluntary Retirement of Federal Lands from Livestock Grazing*, 17 N.Y.U. ENVTL. L.J. 368 (2008)).

8. *Rentier*, OXFORD ENGLISH DICTIONARY (3d ed. 2009), <http://www.oed.com/view/Entry/162547?redirectedFrom=rentier#eid> (defining a rentier as “[a] person who derives his or her income from property or investment.”).

9. See *infra* note 43 and accompanying text.

10. ERIC A. POSNER & E. GLEN WEYL, *RADICAL MARKETS: UPROOTING CAPITALISM AND DEMOCRACY FOR A JUST SOCIETY* (2018) [hereinafter POSNER & WEYL, *RADICAL MARKETS*]; Eric A. Posner & E. Glen Weyl, *Property is Only Another Name for Monopoly*, 9 J. LEGAL ANALYSIS 51 (2017); Lee Anne Fennell, *Fee Simple Obsolete*, 91 N.Y.U. L. REV. 1457 (2016).

11. Katrina M. Wyman, *In Defense of the Fee Simple*, 93 NOTRE DAME L. REV. 1 (2017).

outcomes, with a view towards stimulating more thought on ways that misallocations might be addressed. These three categories of explanations are the incompleteness of environmental property rights, the transaction costs that complicate trading them, and government subsidies for resource extraction. Underlying all of these explanations are the political difficulties of reform and the characteristics of environmental resources that make them hard to propertize as completely as land. The article concludes briefly by emphasizing the need to move beyond advocating more property rights to identifying options for addressing the problems with the environmental property rights that now exist.

After decades of advocacy urging the establishment of environmental property rights, it is an opportune time for scholars to holistically take stock of the second generation problems encountered in existing environmental property rights. To be sure, natural resource economists, legal experts, and others have previously taken note of inefficiencies, and to some extent inequities, in the distribution of property rights in water,¹² grazing permits,¹³ and fisheries catch shares,¹⁴ and this article draws on this existing scholarship. However, the existing analyses of problematic misallocations of property rights tend to focus on the misallocations of water rights, fisheries catch shares, or grazing permits, specifically, and not on environmental property rights generally. They do not tend to recognize, as Posner & Weyl have recently highlighted, that ensuring that property rights remain efficiently and equitably allocated over time is a generic challenge for all property rights, and accordingly, one that applies to environmental property rights like other forms of property rights.¹⁵ The “ongoing allocative challenge” of preserving dynamic efficiency and fairness is an issue that deserves more systematic attention in the literature on environmental property rights.

1. THE PROBLEM OF MISALLOCATIONS

Private property is an age-old tool for allocating responsibility for resources such as land. In the 1960s and 1970s, influenced by the work of Coase, economists began promoting the use of property rights and markets as an alternative to command and control government regulation to protect the environment.¹⁶ For many environmentalists in the 1970s and 1980s, the idea of

12. See, e.g., Peter W. Culp et al., *Shopping for Water: How the Market Can Mitigate Water Shortages in the American West* 10-12 (The Hamilton Project & Stanford Woods Institute for the Environment, Discussion Paper No. 2014-052014, 2014); Leonard et al., *supra* note 2, at 3-4; Gary D. Libecap, *Water Rights and Markets in the U.S. Semiarid West*, in DANIEL H. COLE & ELINOR OSTROM EDS., *PROPERTY IN LAND AND OTHER RESOURCES* 389, 396, 398-99 (2012).

13. Leshy & McUsic, *supra* note 7, at 378.

14. There is considerable evidence of the economic benefits of fishery catch shares, and some evidence that they have environmental benefits. See, e.g., Christopher Costello et al., *Can Catch Shares Prevent Fisheries Collapse?*, 321 *SCI.* 1678, 1678 (2008). For an example of a critique of a Canadian catch share program, see Evelyn Pinkerton & Danielle N. Edwards, *The Elephant in the Room: The Hidden Costs of Leasing Individual Transferable Fishing Quotas*, 33 *MARINE POL'Y* 707, 708 (2009).

15. There are exceptions. See, e.g., Leonard et al., *supra* note 2 (analyzing the obstacles to surface water markets in the U.S. west, drawing “parallels” with markets “for fishing rights, air pollution abatement, and water quality”). For Posner & Weyl’s views, see POSNER & WEYL, *RADICAL MARKETS*, *supra* note 10; Posner & Weyl, *supra* note 10.

16. Garrick & Svensson, *supra* note 3, at 379.

using private property to achieve environmental goals was anathema because modern environmental law was often thought to require curtailing private property rights in order to advance the greater good.¹⁷ However, starting roughly in the 1990s, “free market environmentalists” sought to popularize the value of using property rights and markets to achieve environmental goals, arguing that these tools would improve environmental outcomes while avoiding the problems of agency capture and rent-seeking to which government regulation is prone.¹⁸ Several decades later, many environmentalists have become more open to using property rights and markets to achieve environmental ends and many innovative approaches have been implemented to address issues as diverse as overfishing, wildlife protection, and air pollution.¹⁹

A standard argument for creating private property in environmental resources is that it will incentivize people to invest in caring for these resources.²⁰ According to this line of argument, individuals act in their own self-interest and no one will invest in maintaining resources such as ocean fish, clean air, or open grazing land unless they have the right to exclude others from accessing the resource.²¹ Without the right to exclude, there is no guarantee that one will reap the rewards of one’s investment. Someone else can easily come along and take the fish, pollute the air, or graze the pasture that one has tended. Thus, private property creates an incentive to safeguard the resource by providing the right holder with a right to exclude others. The incentive to invest is even stronger if the right holder can transfer their right through sale, lease, or gift because presumably rights will be more valuable if the underlying resource is healthy and plentiful. The ability to transfer should also ensure that the rights are held by someone who is making the highest and best use of the right, and the accompanying resource, because more productive users will be able to purchase rights from less productive users.²²

17. See, e.g., RICHARD J. LAZARUS, *THE MAKING OF MODERN ENVIRONMENTAL LAW* 39-40 (2004) (“The premise of much environmental law is that private bargain and exchange in property rights in the marketplace cannot be safely relied upon as a guard against excessive ecological damageThe government . . . may need to limit the exercise of private property rights in certain natural resources.”).

18. Garrick & Svensson, *supra* note 3, at 379-80; see also TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM* 61-76, 121-32, 165-67 (1991) (advocating the use of property rights to combat automobile emissions, acid rain, water pollution, overfishing, and to protect wildlife and their habitat); VANESSA CASADO PÉREZ, *THE ROLE OF GOVERNMENT IN WATER MARKETS* 31-33 (2017) (surveying free market environmentalist literature advocating the use of water markets).

19. LAZARUS, *supra* note 17, at 183-84.

20. See, e.g., ANDERSON & LEAL, *supra* note 18, at 3; TERRY L. ANDERSON & GARY D. LIBECAP, *ENVIRONMENTAL MARKETS: A PROPERTY RIGHTS APPROACH* 1, 86, 91 (2014); Grainger & Parker, *supra* note 4, at 371.

21. TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM* 12 (rev. ed. 2001); Garrett Hardin, *The Tragedy of the Commons*, 162 *SCI.* 1243 (1968).

22. In legal literature, an article by economist Harold Demsetz is often cited for this argument for creating private property. See generally Harold Demsetz, *Toward a Theory of Private Property*, 57 *AM. ECON. REV.* 347 (1967). There are notable critiques of the argument, including Elinor Ostrom’s that communities can safeguard resources in some circumstances without creating private property rights. See ELINOR OSTROM, *GOVERNING THE COMMONS* (1990). There also are other arguments for creating private property or private property right-like instruments to address environmental problems, such as the argument that tradeable rights are a cheaper way of achieving a given level of environmental quality

It is understandable that the environmental property rights literature has been concerned with promoting instruments that will induce better care of environmental resources.²³ Degradation of resources such as ocean fisheries and endangered species habitats is the backdrop to proposals to establish tradable property rights in these resources.²⁴ However, providing individuals with rights to a resource like a share of an ocean fish species or a quantity of water is not enough to lead to those rights being used efficiently or fairly over time. The efficient use of these resources means putting them to their highest and best use. There are different understandings of fairness; fairness is often thought to entail distributing rights equally or in accordance with criteria such as effort or contribution.²⁵ Much of the literature advocating environmental property rights has been concerned with promoting efficiency.²⁶ However, equity should also be a relevant criterion for assessing the workings of the resulting rights because equity is important in itself, and instrumentally for rights to be perceived as legitimate by rights holders and non-rights holders alike.²⁷ Although equity is often contrasted with efficiency,²⁸ equity actually may be necessary to achieve efficiency, as people may not support property rights and markets if people believe that they produce unfair outcomes.²⁹

(such as a pollution reduction objective) than traditional prescriptive regulation. See SCHWARTZ, *supra* note 2, at ii.

23. See generally ANDERSON & LEAL, *supra* note 18; ANDERSON & LIBECAP, *supra* note 20; ANDERSON & LEAL, *supra* note 21.

24. See, e.g., ANDERSON & LEAL, *supra* note 21, at 107-21; ANDERSON & LEAL, *supra* note 18, at 149-51, 167.

25. For a well-known effort to elaborate on the meaning of “fairness” in the allocation of land, see Vicki Been, *What’s Fairness Got to Do With It? Environmental Justice and the Siting of Locally Undesirable Land Uses*, 78 CORNELL L. REV. 1001, 1027-68 (1993).

26. See generally ANDERSON & LEAL, *supra* note 18; ANDERSON & LIBECAP, *supra* note 20; ANDERSON & LEAL, *supra* note 21.

27. Garrick & Svensson, *supra* note 3, at 392 (“perceptions of inequity among entitlement holders can feed resistance to reforms”).

28. Libecap, *supra* note 12, at 390, 408 (contrasting efficiency and equity in discussing water); Grainger & Parker, *supra* note 4, at 373 (contrasting equity and efficiency in discussing fishery policy). There is a tendency among the advocates of environmental property rights and markets to argue that policies introduced to address concerns about equity lead to inefficient allocations of property rights. While this may be true, it is also the case that without addressing equity, there may not be sufficient political support for creating or maintaining markets.

29. While recognizing the importance of the distribution of income to welfare economics, Louis Kaplow and Steven Shavell argue from an economic perspective for ignoring distributive consequences in formulating legal rules and using the tax and transfer system to achieve distributional ends. LOUIS KAPLOW & STEVEN SHAVELL, *FAIRNESS VERSUS WELFARE* 28-38 (2002). However, others offer economic arguments for considering distributional issues in formulating legal rules, at least in certain circumstances. See, e.g., Christine Jolls, *Behavioral Economic Analysis of Redistributive Legal Rules*, 51 VAND. L. REV. 1653 (1998); Kyle D. Logue & Ronen Avraham, *Redistributing Optimally: Of Tax Rules, Legal Rules, and Insurance*, 56 TAX L. REV. 157 (2003); Ronen Avraham et al., *Revisiting the Roles of Legal Rules and Tax Rules in Income Redistribution: A Response to Kaplow & Shavell*, 89 IOWA L. REV. 1125 (2004); Zachary Liscow, *Reducing Inequality on the Cheap: When Legal Rule Design Should Incorporate Equity as Well as Efficiency*, 123 YALE L.J. 2482 (2014); Chris William Sanchirico, *Taxes Versus Legal Rules as Instruments for Equity: A More Equitable View*, 29 J. LEGAL STUD. 797 (2000); Chris William Sanchirico, *Deconstructing the New Efficiency Rationale*, 86 CORNELL L. REV. 1003 (2001); Lee Anne Fennell & Richard McAdams, *The Distributive Deficit in Law and Economics*, 100 MINN. L. REV. 1051 (2016).

Consider three examples where environmental resources – specifically, water, federal lands, and ocean fisheries – are the subject of some form of property rights, but misallocations remain.

Western Water Rights

Starting in the nineteenth century, private property rights were created in the right to divert and use freshwater across the American West.³⁰ Most of these prior appropriation rights have been legally transferable since they were created.³¹ Since the 1970s, economists and others have advocated greater use of market transfers to shift water rights from agricultural to urban and environmental uses and to adjust to variability in the supply of water.³² While there are some sales and leases of water rights in western states, there are still few active markets, and there is a widespread consensus that western water rights – and water – remain inefficiently allocated.³³ Agriculture is still, by far, the dominant user of water, even though demands for urban and environmental uses are increasing.³⁴ Economists, such as Gary Libecap, argue that there would be significant welfare gains from re-allocating water through market sales and leases.³⁵ As evidence, they point to the much higher price of water when it is sold from agricultural users to urban users, compared with sales of water from one agricultural user to another agricultural user.³⁶

Fisheries Catch Shares

Economists and others began advocating for the use of catch shares to manage ocean fisheries in the 1970s.³⁷ Catch shares provide their owners with

30. Garrick & Svensson, *supra* note 3, at 387. Water rights were formalized in the twentieth century in some places; they remain to be adjudicated in others, which complicates trading water rights. *Id.* at 392.

31. Mark Squillace, *The Water Marketing Solution*, 42 ENVTL. L. REP. 10800, 10801 (2012).

32. Garrick & Svensson, *supra* note 3, at 379; Squillace, *supra* note 31, at 10801.

33. Libecap, *supra* note 12, at 389, 390, 396, 398, 399; Squillace, *supra* note 31, at 10805-06.

34. Libecap, *supra* note 12, at 391; Culp et al., *supra* note 12, at 10.

35. Libecap, *supra* note 12, at 389, 390, 398; Culp et al., *supra* note 12, at 10-12; Leonard et al., *supra* note 2, at 3-4.

36. Gary D. Libecap, *The West Needs Water Markets*, DEFINING IDEAS, (Feb. 7, 2018); Gary D. Libecap, *Institutional Path Dependence in Climate Adaptation: Coman's "Some Unsettled Problems of Irrigation,"* 101 AM. ECON. REV. 64, 65 (2011) [hereinafter Libecap, *Institutional Path Dependence*].

37. Katrina M. Wyman, *From Fur to Fish: Reconsidering the Evolution of Private Property*, 80 N.Y.U. L. REV. 117, 155 n.94 (2005) (tracing the history of the idea of individual transferable quotas to a 1973 paper by economist Francis Christy, while noting doubts about this origins story). Individual transferable quotas (ITQs) are a form of catch share. The National Oceanic and Atmospheric Administration defines "Catch Share" as follows:

"'Catch share' is a general term for several fishery management strategies that allocate a specific portion of the total allowable fishery catch to individuals, cooperatives, communities, or other entities. Each recipient of a catch share is directly accountable to stop fishing when its exclusive allocation is reached. The term includes specific programs defined in law such as "limited access privilege" (LAP) and "individual fishing quota" (IFQ) programs, and other exclusive allocative measures such as Territorial Use Rights Fisheries (TURFs) that grant an exclusive privilege to fish in a geographically designated fishing ground."

shares of the total allowable catch that can be bought and sold, and therefore, in theory, a stake in the ongoing health of the fishery. Catch shares now exist in many ocean fisheries in the United States and other countries.³⁸ One of the most well-known catch share fisheries is the British Columbia, Canada halibut fishery; individual transferable quotas, which are a form of catch shares, were introduced in this fishery in the 1990s.³⁹ In a co-authored article, anthropologist Evelyn Pinkerton argues that many halibut fishing vessels are leasing individual quotas, rather than owning them outright, from a class of “absentee owners” sometimes called “armchair fishermen.”⁴⁰ For the lessees, “leasing is by far the largest fishing cost and . . . operations become increasingly less profitable, the more of their quota they must lease.”⁴¹ Indeed, Pinkerton & Edwards argue that “many of these lessees are barely making a profit,” with “at least a third of operations . . . either not financially viable or marginally so.”⁴² Compounding matters, many of the armchair fishermen or their relatives appear to have acquired their individual quotas for free during the initial allocation of individual transferable quotas, giving rise to a perception that the allocation of the quotas is inequitable because the armchair fishermen are benefitting from a windfall.⁴³ The situation could also be inefficient because without a long-term stake in the fishery, lessees may “act differently than” quota owners and generate more externalities than the owners.⁴⁴ The lessees might be more likely to “have higher bycatch rates, . . . to discard and misreport catch” or perhaps to push regulators for higher levels of total allowable catch because they need income to pay the cost of leasing quota shares and do not have a stake in the long-term health of the fishery.⁴⁵ The British Columbia fishery

Nat'l Oceanic and Atmospheric Admin., *Catch Shares*, <https://www.fisheries.noaa.gov/national/laws-and-policies/catch-shares> (last visited Jan. 27, 2019).

38. Christopher Costello, *Tomorrow's Catch: A Proposal to Strengthen the Economic Sustainability of U.S. Fisheries* 14, 17 (The Hamilton Project & Stanford Woods Institute for the Environment, Discussion Paper No. 2014-04, 2014); see also Katrina M. Wyman, *The Recovery in U.S. Fisheries*, 31 J. LAND USE & ENVTL. L. 149, 173-74 (2016) (referring to various estimates of fish caught under catch shares in the U.S.); Corbett Grainger & Christopher J. Costello, *Capitalizing Property Rights Insecurity in Natural Resource Assets*, 67 J. ENVTL. ECON. MGMT. 224, 229 (2014).

39. Pinkerton & Edwards, *supra* note 14, at 708.

40. *Id.* at 710, 712.

41. *Id.* at 710.

42. *Id.* Cf. Bruce Turriss disputes many of the conclusions of Pinkerton & Edwards, including their point about the profitability of halibut fishers, and criticizes Pinkerton & Edwards for not identifying the bases of their conclusions. Bruce R. Turriss, *A Rejoinder to E. Pinkerton et al., The Elephant in the Room: The Hidden Costs of Leasing Individual Transferable Fishing Quotas*, 34 MARINE POL'Y 431, 433-35 (2010) (disputing many of the arguments of Pinkerton & Edwards, including their argument about the profitability of halibut fishers, and criticizing Pinkerton & Edwards for not identifying the bases of their arguments).

43. Turriss, *supra* note 42, at 435. See Corey Mintz, *Seeking an Elusive, Expensive Catch: Quotas*, GLOBE & MAIL, Mar. 6, 2018; Pinkerton & Edwards, *supra* note 14, at 708-09 (referring to “large wealth effects” from initial allocation method); SCHWARTZ, *supra* note 2, at 39 (“grandfathering can be inequitable”).

44. Turriss, *supra* note 42, at 435.

45. *Id.* at 435 (arguing that mechanisms are in place to reduce the likelihood that lessees are imposing greater externalities in the halibut fishery). Turriss does not identify the possibility that quota lessees might seek higher total allowable catches. Pinkerton & Edwards argue that there are

is not the only catch share fishery where a significant number of fishermen lease quota from quota owners who initially acquired their quota for free during the initial allocation and no longer fish. Another example is the U.S. Gulf of Mexico red snapper fishery, in which absentee quota owners are known as “sea lords.”⁴⁶

The concerns with the current allocations of fisheries catch shares differ somewhat from the concerns about the allocation of western water rights. In the case of the latter, the main issue is that rights are inefficiently allocated because urban and environmental interests are likely higher value uses of some of the rights that are currently owned by agricultural interests. In the fisheries context, the concern is that some fishery catch shares have become inequitably concentrated over time in the hands of a class of rentiers that actively fished when catch shares were first introduced, but have stopped fishing and are now merely collecting rent from lessees who are doing the physical work of fishing. The emergence of such a rentier class also may be generating inefficiencies to the extent that the lessees do not have the same incentives as catch shareowners to preserve the fish because the lessees have a shorter-term interest in the catch shares than the owners.

Federal Grazing Permits

As a result of the Taylor Grazing Act passed in 1934, permits have been allocated to graze quantities of cattle and sheep on federal lands in the American West since the 1960s.⁴⁷ These permits are transferable and treated like property by ranchers and others.⁴⁸ Economists have been advocating “grazing buyouts” for decades and for roughly two decades conservationists have been seeking to acquire grazing permits to end grazing on the associated federal lands that are harmed by grazing.⁴⁹ However, the free market conservationist buy-out strategy has not succeeded.⁵⁰ Most of the permits – and the associated lands – remain inefficiently used for livestock grazing. As John Leshy and Molly McUsic pointed out in 2008, millions of acres of federal lands are grazed by livestock even though this forage

inefficiencies in the halibut fishery stemming from the leasing of individual quotas from quota owners who received their quotas for free in the initial allocation. Pinkerton & Edwards, *supra* note 14, at 710.

46. SCHWARTZ, *supra* note 2, at 41 (quoting NAT'L MARINE FISHERIES SERV., RED SNAPPER IFQ FIVE-YEAR REVIEW (2013)); *see also* Brad Gentner, *Gentner: It's Time to Rethink 'Catch Shares,'* HOUSTON CHRON. (July 7, 2017), <https://www.houstonchronicle.com/opinion/outlook/article/Gentner-It-s-time-to-rethink-catch-shares-11274014.php> (referring to “quota barons”).

47. Hilary M. Hoffman, *Demand Management, Climate Change, and the Livestock Grazing Crisis in the Great Basin*, 6 GEO. WASH. J. ENERGY & ENVTL. L. 14, 21 (2016) (“After Congress passed the Taylor Grazing Act, it took the federal government until the early 1960s to formally adjudicate the grazing rights to all of the federal lands—that is, to apportion grazing allotments to the nearby landowners and water rights holders in the manner that the statute required.”).

48. Leshy & McUsic, *supra* note 7, at 374. As explained further below, legally, grazing permits are not private property protected by the Takings Clause. *See infra* note 77.

49. Leshy & McUsic, *supra* note 7, at 370; Robert H. Nelson, *How to Reform Grazing Policy: Creating Forage Rights on Federal Rangelands*, 8 FORDHAM ENVTL. L.J. 645, 649-59, 667-72 (1997).

50. Leshy & McUsic, *supra* note 7. *But see* Tom Ribe, *Rancher Buyouts Are a Big Step Forward in Preserving Public Lands*, ALBUQUERQUE J. (Jan. 1, 2016), <https://www.abjournal.com/699237/rancher-buyouts-are-a-big-step-forward-in-preserving-public-lands.html> (describing promising development in Idaho that will allow a “localized buyout” of grazing permits).

generates little meat or employment and harms the ecology of public lands.⁵¹ The misallocation of grazing permits is reminiscent of the misallocation of water rights. In both instances, urbanization, environmental change, and increased environmental consciousness point to the need to alter the existing uses of resources. There are property rights in place but the rights are not being transferred to facilitate the newer uses.

This article now turns to the reasons why property rights in water, fisheries, grazing, and other resources are misallocated, even though they are transferable, and should, in theory, be able to shift through market exchanges to more efficient and equitable uses.

2. EXPLANATIONS

In *Radical Markets* and *Property Is Only Another Name for Monopoly*, Posner & Weyl boldly criticize the existing concept of private property writ large, as it is applied to land, intellectual property, and other assets.⁵² They draw on the ideas of Henry George and the work of economists such as William Vickrey, Roger Myerson, and Mark Satterthwaite, which are more skeptical of private property than the Coasean-inspired advocacy for environmental property rights.⁵³ Posner & Weyl argue that private property as it now exists gives rise to massive and socially costly misallocations of resources because private property owners have the right to decide whether to sell a resource and at what price.⁵⁴ This “right to exclude” enables owners to thwart transfers of property rights to higher value uses.⁵⁵ When an owner has a unique asset, such as a strategically located parcel of land needed for a new building in midtown Manhattan, that owner has monopoly power and can use it to hold out and block the transfer of assets to higher value uses.⁵⁶ Posner & Weyl maintain that the problem of monopoly power is so pervasive that private property needs to be jettisoned in favor of an arrangement where no one has a right to exclude others willing to pay valuation of “their” resources.⁵⁷ Under Posner & Weyl’s new way of allocating resources, everybody would be required to place a value on all “their” assets and transfer any of their assets to a buyer willing to pay that value.⁵⁸ To avoid people placing exorbitant values on their assets to deter transfers, people would pay a tax based on their self-assessed valuations, which Posner & Weyl call the “common ownership self-assessed tax” (COST).⁵⁹ Fennell offers a specific critique of the fee simple, the dominant form of land ownership, which resembles Posner & Weyl’s critique of private property.⁶⁰ Similar to Posner

51. Leshy & McUsic, *supra* note 7, at 369 (the forage generates “about 2 percent . . . of national meat production”).

52. See generally POSNER & WEYL, *RADICAL MARKETS*, *supra* note 10; Posner & Weyl, *supra* note 10.

53. POSNER & WEYL, *RADICAL MARKETS*, *supra* note 10, at 34-52.

54. *Id.* at 38.

55. *Id.* at 62 (referring to the “right to exclude” provided by private property).

56. *Id.* at 32-34.

57. *Id.* at 38; Posner & Weyl, *supra* note 10, at 51-52.

58. POSNER & WEYL, *RADICAL MARKETS*, *supra* note 10, at 57.

59. *Id.* at 61.

60. See Fennell, *supra* note 10.

& Weyl, she argues that the fee simple gives landowners the endless right to refuse to transfer their land to new uses, which gives rise to a misallocation of land that is especially problematic in urban areas.⁶¹ She points out that land needs to be repurposed in these areas, but adaptation to new uses is made more difficult by the monopoly power of landowners to decide whether to sell and at what price.⁶²

Posner & Weyl suggest in passing that environmental resources, such as fish and grazing lands, are currently misallocated and recommend that these resources, along with land and other assets, should be subject to common ownership and the COST to improve their allocative efficiency.⁶³ In their world, “ranchers would effectively ‘buy’ grazing rights from each other at self-assessed prices.”⁶⁴ Presumably, the owners of catch shares and water rights would also have to value them subject to a tax, and transfer them to anyone willing to pay the self-assessed value.

While there is considerable evidence that resources such as freshwater in the West, grazing land, and ocean fisheries are misallocated, there is little evidence that the misallocations are due to monopoly power on the part of the owners of water rights, grazing permits, or fishery catch shares. Indeed, a 2017 report for the Administrative Conference of the United States on marketable permits concluded that “market power has not been a significant issue in most permit markets.”⁶⁵ In establishing some environmental markets, policymakers have included provisions that limit the potential for monopolies to arise. For example, in “[m]ost” catch share programs there are limits on the shares that a single catch share owner can acquire of the total allowable catch.⁶⁶ Even without such mechanisms for limiting concentration of ownership, environmental property rights may not be as vulnerable to the monopoly problem that Posner & Weyl highlight because these rights and the resources to which they attach may be quite fungible – one ton of fish is unlikely to be able to acquire unique value akin to a vacant parcel of land located in midtown Manhattan next to the Empire State Building.⁶⁷ Conversely,

61. *Id.*

62. *Id.*

63. POSNER & WEYL, *RADICAL MARKETS*, *supra* note 10, at 72, 273.

64. *Id.* at 72.

65. SCHWARTZ, *supra* note 2, at 81. In the environmental realm, Schwartz’s report focuses to a considerable degree on marketable permits in air and water pollution and fisheries. In contrast to Schwartz’s conclusion that market power is not generally an issue in catch share markets, Pinkerton & Edwards argue that processors have market power in the British Columbia halibut fishery, in part because they act as brokers for many individual quota leases, finance leases, and purchase the fish caught under the leased quota. Pinkerton & Edwards, *supra* note 14, at 709-10. (Turris contests the idea that processors have market power. Turris, *supra* note 42, at 434.)

66. DEP’T OF COMMERCE OFFICE OF INSPECTOR GEN., *OIG-14-019-1, REVIEW OF NOAA CATCH SHARE PROGRAM 2-3* (2014). *See also id.* at 4, tbl.1 (listing accumulation limits in 6 U.S. catch share programs); SCHWARTZ, *supra* note 2, at 41, 82. *See also id.* at 82 (“most fisheries score low on the Herfindahl-Hirschmann Index for market concentration: the red snapper fishery’s scores were all below 190 (. . . anything under 1500 suggests no market power)”) (citing NAT’L MARINE FISHERIES SERV., *supra* note 46).

67. SCHWARTZ, *supra* note 2, at 74 (“marketable allowances and credits are more uniform and easily transferable than many other commodities”); *id.* at 81-82. However, regulations might make some catch shares uniquely valuable, by requiring different types of catch shares for a fish, depending on where it is harvested. Daniel S. Holland et al., *US Catch Share Markets: A Review of Data Availability*

water markets are one type of environmental market that may be susceptible to the monopoly problem. As discussed below, prior appropriation water rights are often not fungible as they specify a right to divert a certain amount of water at a particular place and for a specific use, and changes in use are not allowed if they will harm other appropriators.⁶⁸ Thus, owners of some kinds of water rights could have market power, for example, if they have the only rights that an actor could use to accomplish its objectives.⁶⁹ Outside of these situations, however, Posner & Weyl may be correct that environmental resources are misallocated, but they may be wrong about the underlying causes of the misallocations and the solutions needed to address them.

Setting aside Posner & Weyl's focus on the monopoly problem, it is possible to draw out from existing scholarship on different types of environmental markets three broad categories of explanations for the misallocations of environmental property rights: the incompleteness of environmental property rights, the transaction costs that interfere with transferring them, and government policies such as subsidies that reduce incentives to trade rights in resources. This section analyzes these three categories of explanations and then turns to the political considerations that ultimately may account for these obstacles to socially desirable allocations of property rights. Because many of the misallocations of environmental property likely are rooted in the political clout of incumbent rights holders, their suppliers and their representatives, changing the status quo requires persuading the incumbents that reforms are in their interest – or the emergence of new interest groups demanding the same resources that have the economic and political capital to marginalize the incumbents.

and Impediments to Transparent Markets, 57 MARINE POL'Y 103, 104 (2015) (“Sanchirico et al. note that restrictions on quota ownership in the North Pacific halibut and sablefish fishery result in 55 different unique types of halibut [Quota Shares (QS)] . . . and 36 unique types of sablefish QS, each of which is likely to have its own market.”); *id.* at 108 (markets may be thin “[w]hen there are area restrictions or other quota use restrictions on QS or” Quota Pounds, as in the North Pacific Halibut and Sablefish fishery).

68. CASADO PÉREZ, *supra* note 18, at 43 (“In the western US states, prior appropriation rights are defined across the following characteristics: source of supply, amount, location of the point of diversion, use, location of the place of use, timing, and point of return flow.”); Garrick & Svensson, *supra* note 3, at 384-85; Squillace, *supra* note 31, at 10804 (water rights are often not fungible; “[t]he real obstacle to fungibility . . . seems to be the uncertainty that the no injury rule brings to the transfer”); C. Carter Ruml, *The Coase Theorem and Western U.S. Appropriative Water Rights*, 45 NAT. RESOURCES J. 169, 196 n.133 (2005) (“There is an opportunism problem in the prior appropriation system as a whole because there are small-numbers conditions; empirically there is not a ‘rivalry among large numbers of bidders’ to buy or sell water that will ‘render opportunistic inclinations ineffectual.’”) (quoting OLIVER WILLIAMSON, *MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS* 26-29 (1975)).

69. Squillace, *supra* note 31, at 10804 (explaining that the uncertainty about whether a transfer will injure other water appropriators is “[t]he real obstacle to the fungibility of water rights”). Large institutional owners of water rights, such as large irrigation districts, also may be able to exercise market power and block welfare-enhancing trades because they own significant volumes of water rights in the West. See CASADO PÉREZ, *supra* note 18, at 50-51; Culp et al., *supra* note 12, at 16-17; Libecap, *Institutional Path Dependence*, *supra* note 36, at 64, 74-77; Barton H. Thompson, Jr. *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671, 728-31 (1993).

2.1 Three Categories of Explanations

2.1.1 *The Incompleteness of Environmental Property Rights*

The structure of environmental property rights is likely one important reason why they are misallocated.⁷⁰ It is a basic tenet of Coasean-influenced economic thinking “that the more defined property rights are, the more transactions will take place.”⁷¹ Consistent with this, there is a pervasive ethos in the literature advocating environmental property rights that the rights should be clear, complete, and “secure” property rights.⁷² It is not easy to define what a clear, complete, and secure property right is. However, environmental property rights certainly lack many of the incidents of the fee simple interest in land, which is often regarded as the ultimate in property rights.⁷³

The prototypical fee simple landowner has a perpetual property right in a parcel of land whose borders are reasonably well defined through fences and other tangible markers or are knowable through land registry searches and surveys.⁷⁴ In addition, the landowner usually has broad rights to decide how to use the land to which the right attaches.⁷⁵ To be sure, the landowner’s right to use their land may be circumscribed by land use regulation such as zoning, but constitutional provisions impose outer boundaries on government regulation;⁷⁶ governments cannot take property rights in land either directly through expropriation or indirectly through regulation without paying market value compensation.⁷⁷

70. See, e.g., Culp et al., *supra* note 12, at 13 (explaining that “the nature of water rights themselves” is partly to blame for the under-use of water markets in U.S. western states).

71. CASADO PÉREZ, *supra* note 18, at 44. See also Culp et al., *supra* note 12, at 13 (identifying three requirements for “an efficient system of property rights”: “(1) a complete definition so buyers and sellers know what is being exchanged; (2) exclusivity, meaning the right to exercise control over the asset; and (3) transferability, or the ability to sell or bequeath ownership”) (internal citations omitted).

72. ANDERSON & LIBECAP, *supra* note 20, at 75. See also Culp et al., *supra* note 12, at 29; Ruml, *supra* note 68, at 169, 171-73, 183.

73. See also Libecap, *Institutional Path Dependence*, *supra* note 36, at 398, 400-01, 406 (comparing water rights to rights in land and ocean fisheries).

74. Wyman, *supra* note 11, at 6-7 (referring to the perpetual duration of the fee simple); THOMAS W. MERRILL & HENRY E. SMITH, *PROPERTY: PRINCIPLES AND POLICIES* 13 (3d ed. 2017) (“Deeds to land nearly always are stated in terms of some measurement of the surface area.”). *But see* Stewart E. Sterk, *Property Rules, Liability Rules, and Uncertainty About Property Rights*, 106 MICH. L. REV. 1285, 1296-97 (2008) (arguing that it can be costly to obtain surveys and other tools for identifying land boundaries).

75. Wyman, *supra* note 11, at 6.

76. *Id.* at 6, 8.

77. Prior appropriation water rights can be private property protected under the Takings Clause, although it is not easy to establish a taking of water rights requiring just compensation. Squillace, *supra* note 31, at 10803; Brian E. Gray, *The Property Right in Water*, 9 HASTINGS W-NW J. ENVTL. L. & POL’Y 1, 26 (2002). Grazing permits are not considered private property constitutionally protected under the Takings Clause. See *United States v. Fuller*, 93 S.Ct. 801 (1973); 43 U.S.C. § 315(b) (1976) (“the issuance of a permit . . . shall not create any right, title, interest, or estate in or to the lands”); Leshy & McUsic, *supra* note 7, at 374, 389 n.64, 391. Research did not reveal any case law on whether catch shares are private property protected by the Takings Clause; law review scholarship suggests that they are unlikely to be considered private property protected under the Takings Clause. Mark Fina & Tyson Kade, *Legal and Policy Implications of the Perception of Property Rights in Catch Shares*, 2 WASH. J. ENVTL. L. & POL’Y 283, 288 (2012). The Magnuson-Stevens Act includes language that seems intended

In contrast, property rights to environmental resources such as water, ocean fisheries, and federal grazing land are much less complete than rights to land along the three dimensions of duration, definition, and breadth of use.⁷⁸ First, environmental property rights are often impermanent and/or conditional. Legally, grazing permits and catch shares are time limited to ten years and revocable, although renewal is standard and revocation is rare.⁷⁹ Water rights can be extinguished based on abandonment or forfeiture if the associated water is not put to beneficial use.⁸⁰

Second, the borders of the resources to which environmental rights attach are often not as easily knowable as land borders. This leads to uncertainty about the volume of the resource to which the right attaches that may discourage the buying and selling of rights. Catch shares grant a share of the total allowable catch of a given species in a given fishery; that catch level is often set annually by regulators and can vary, making it hard to know far in advance the volume of a species to which the catch share will translate in a given year.⁸¹ Grazing permits authorize grazing of a certain number of livestock in a designated area on federal lands during specified times of the year.⁸² However, the number of cows and sheep

to deter the courts from finding that catch shares are private property protected by the Takings Clause, as it describes a quota share as a “permit” that “shall not confer any right of compensation” in case of modification or revocation, and “shall be considered a grant of permission to the holder . . . to engage in activities permitted by such . . . quota share.” 16 U.S.C. §§ 1853a(b)(1), (3) & (5) (2007).

78. The limitations on water rights are a major theme in the literature advocating greater use of water markets in particular to address scarcity and variability of freshwater supply. *See, e.g.,* Culp et al., *supra* note 12, at 13-17; Ruml, *supra* note 68, at 170, 182; Garrick & Svensson, *supra* note 3, at 384-85 (“property rights to water are never complete”).

79. On grazing permits, *see* 43 U.S.C. § 1752(a) (2014); 36 C.F.R. § 222.3(c)(1) (1981); U.S. DEP’T OF THE INTERIOR, BUREAU OF LAND MGMT., LIVESTOCK GRAZING ON PUBLIC LANDS, <https://www.blm.gov/programs/natural-resources/rangelands-and-grazing/livestock-grazing> (last visited Nov. 10, 2018) (“Permits and leases generally cover a 10-year period and are renewable if the BLM determines that the terms and conditions of the expiring permit or lease are being met.”); *see also* Leshy & McUsic, *supra* note 7, at 381 n.43. On catch shares, *see* 16 U.S.C. §§ 1853a(b), (f)(1)-(3); Fina & Kade, *supra* note 77, at 286; SCHWARTZ, *supra* note 2, at 25; Grainger & Costello, *supra* note 38, at 229, 233. The lack of legal permanence has economic consequences; research indicates that New Zealand catch shares, which are permanent rights, are more valuable than catch shares in Canada and the United States, where catch shares are subject to revocation. Grainger & Costello, *supra* note 38, at 224-25. *See also* SCHWARTZ, *supra* note 2, at 23 (citing Richard Newell et al., *Asset Pricing in Created Markets for Fishing Quotas* (Resources for the Future, Discussion Paper No. 05-46, 2005)).

80. Ruml, *supra* note 68, at 172. For example, in California, water rights can be forfeited after a mere five years of non-use. Culp et al., *supra* note 12, at 16. In Chile, water rights are more complete, and there is no requirement that water rights owners beneficially use the water for which they hold rights. However, in 2005, Chile began requiring water rights owners to pay a fee if they do not use their water rights. CARL BAUER, THE EVOLVING WATER MARKET IN CHILE’S MAIPO RIVER BASIN: A CASE STUDY FOR THE POLITICAL ECONOMY OF WATER MARKETS PROJECT 4-5 (2016).

81. Nat’l Oceanic Atmospheric Admin., *Annual Catch Share Limit Monitoring: Frequently Asked Questions* 2-3 (2015), https://sero.nmfs.noaa.gov/sustainable_fisheries/acl_monitoring/documents/pdfs/acl_monitoring_faqs_jan15.pdf (explaining that total allowable catches are established annually and describing how they are enforced in individual transferable quota fisheries).

82. Technically, the permit is denominated in terms of “Animal Unit Months” which is a proxy for the number of livestock. Leshy & McUsic, *supra* note 7, at 368. “An AUM is the amount of forage eaten by one cow, or five sheep or goats, grazing for one month – or about 750-800 pounds of grass.”

actually allowed on federal lands in a given year may be less than the number permitted, “because lack of precipitation may restrict forage in some places.”⁸³ Drought and variability in water supply also lead to uncertainty about the amount of water to which the holder of a prior appropriation water right is entitled. Prior appropriation rights include the date of the initial diversion or the accepted application, or the priority date; more senior (older) water rights have higher priority to have their claims fulfilled in times of scarcity than more junior (newer) claims.⁸⁴ The actual volume of water that can be diverted in a given year will depend on hydrological conditions and the seniority of the right. Moreover, trading in water rights might be further chilled by uncertainty about how much water a right holder can trade. The amount that can be traded may be less than the amount that can be diverted because the “no-injury rule” prevents a right holder from making trades that will harm other water right holders.⁸⁵

Third, there may be less of an incentive to buy environmental rights compared with land rights because right holders tend to have less leeway to choose how to use their rights than the paradigmatic fee simple landowner. A prior appropriation right authorizes the diversion of a specified volume of water from a

Leshy & McUsic, *supra* note 7, at 369 n.2. Robert Nelson explains, “The rancher’s permit specifies how many livestock are allowed to graze the allotment and the precise times the livestock can be on the federal rangeland. For example, a rancher in a northern state might have a permit to graze 200 head of cattle on a particular allotment of BLM land between June 1 and July 15.” Nelson, *supra* note 49, at 663-64.

83. Leshy & McUsic, *supra* note 7, at 376-77 n.30.

84. Libecap, *supra* note 12, at 399; *see also* Libecap, *Institutional Path Dependence*, *supra* note 36, at 69 (“Appropriative water rights grant usufructuary or possessory rights to a fixed quantity or flow of water, usually measured in cubic feet per second, cfs, for diversion from a stream, based on the date of the original claim.”).

85. Squillace, *supra* note 31, at 10804. Depending on how the right holder is using the water, a good amount of the water diverted may be returning to the stream and thus be available to other downstream users. A given proposal to transfer a water right to a new owner located elsewhere may reduce the return flow available to downstream water rights holders by shifting the place, time, and purpose of the water use.

Transfers by water rights holders may be chilled not only by the no-injury rule but also because water rights holders in some jurisdictions may fear that proposing to transfer some of their water may raise questions about the volume of the water that they are entitled to divert. Other water rights holders in the same stream may try to argue that a farmer who is proposing to sell some water that they conserved by installing a more efficient irrigation system was never entitled to that conserved water in the first place because the farmer was not beneficially using the water when they were irrigating inefficiently. Ruml, *supra* note 68, at 180-81, 189-90; Leonard et al., *supra* note 2, at 4, 10. California has addressed this concern by specifying in a statute that conserved water “is not subject to the forfeiture rule” and can “be sold, leased, or exchanged.” Culp et al., *supra* note 12, at 16. However, not all western states have done so, thus potentially chilling water rights trading in some areas. *Id.*

Some proponents of water markets also argue that the public trust doctrine is a source of uncertainty about water rights that undermines the incentive to trade water. To protect public trust resources such as navigable waterways, state governments may seek to reduce the amount of water that a right holder can divert; because the public trust is an inherent limitation on water (and land) rights governments do not have to pay compensation when they reduce rights to protect public trust resources. In theory, actors (such as conservationists) might be discouraged from buying water rights if they can persuade state governments to shift water for free to the waterways that the actors want to protect, by invoking the public trust. Libecap, *supra* note 12, at 406; Leonard et al., *supra* note 2, at 4, 9-10.

specific location for use in a particular location.⁸⁶ Changing the use of the water, even without selling the water right, may require prior regulatory or judicial approval because a change in use cannot harm the rights of other water rights holders under the no-injury rule.⁸⁷ Historically, the beneficial use, abandonment, and forfeiture doctrines may also have discouraged some market transactions because they circumscribed the authority of a conservationist-oriented water right holder to leave water in the stream to protect the environment or secure it for recreational activities such as boating.⁸⁸ More recently, many western states have taken steps to allow public agencies, and sometimes private actors, to own water rights to protect instream flows, thus overcoming the historical problem that passive uses were not considered beneficial uses.⁸⁹ Grazing permits continue to embody a “use-it-or-lose-it philosophy” because they must be used to graze livestock.⁹⁰ Generally, conservationists cannot buy the permits in order to protect the permit’s associated land from further grazing because the permits cannot legally be held and not used for grazing.⁹¹

In sum, by comparison with the fee simple interest in land, many environmental property rights are incomplete along the dimensions of duration,

86. CASADO PÉREZ, *supra* note 18, at 43 (“In the western US states, prior appropriation rights are defined across the following characteristics: source of supply, amount, location of the point of diversion, use, location of the place of use, timing, and point of return flow.”); *see also* CAL. ENVTL. PROTECTION AGENCY, STATE WATER RES. CONTROL BD., DIV. OF WATER RIGHTS, A GUIDE TO WATER TRANSFERS 3-2 (1999).

87. *See, e.g.*, CAL. WATER CODE §§ 1700-1701; Squillace, *supra* note 31, at 10801-02 (the no-injury rule “helps to ensure that priorities among water users on a given stream are not upset by changes to the system instigated by an existing user or her successor”). *But see* Squillace, *supra* note 31, at 10805 (“farmers need no approval to change to crops that could cause far greater injuries to existing users”).

88. Historically, the beneficial use requirement was linked with a desire to limit the ability of speculators to hold water rights. *See* David B. Schorr, *Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights*, 32 *ECOLOGY L.Q.* 3, 20-22, 45-47 (2005) (analyzing the history of the beneficial use requirement in Colorado water law).

89. JAMES RASBAND ET AL., *NATURAL RESOURCES LAW AND POLICY* 791, 793 (2d ed. 2009); CASADO PÉREZ, *supra* note 18, at 57.

90. Nelson, *supra* note 49, at 664. Grazing permittees must own livestock. 43 U.S.C. § 315(b) (1976); Leshy & McUsic, *supra* note 7, at 382 n.46.

91. Leshy & McUsic, *supra* note 7. In other words, outside of a few areas for which Congress has passed special legislation, there is no ability to buy up grazing permits to protect the land and enable it to regenerate comparable to the legal authority in some western states allowing private actors to buy up water rights to protect in-stream flows. Leshy & McUsic, *supra* note 7, at 387-88 (describing “exceptional” situations where “[t]he purchase and retirement strategy has worked”); Ribe, *supra* note 50 (describing support for purchase and retirement in Idaho). Indeed, one conservationist group established “a livestock-owning subsidiary to hold the permits” in order to satisfy the requirement that permit holders own livestock. Leshy & McUsic, *supra* note 7, at 382 n.46 (referring to The Grand Canyon Trust); *see also* Nelson, *supra* note 49, at 657-58 (Nature Conservancy acquired option to purchase a ranch in Utah).

The National Marine Fisheries Service appears to take the view that catch shares must be owned by fishing industry participants. SCHWARTZ, *supra* note 2, at 52. Catch share programs differ on whether catch share holders must participate in fisheries. *Id.* at 41, 83. There is a prohibition on nonuse of catch shares for fishing in at least one catch share fishery, although many U.S. catch share programs do not expressly require that catch shares be used for fishing. Grainger & Parker, *supra* note 4, at 378, 383.

definition, and breadth of use. That incompleteness may discourage the buying and selling of these rights, and thus contribute to their misallocation.

2.1.2 Transaction Costs

The transaction costs involved in transferring environmental property rights are another possible explanation for the misallocation of these rights.⁹² Some, though not all, of these transaction costs are related to the incomplete nature of the rights.

Trading is more likely where property rights are identifiable, buyers and sellers can easily link up, and prices of past transactions are available to guide pricing of proposed exchanges. One persistent theme in the literature on environmental property rights is the lack of publicly accessible registries and clearinghouses comprehensively identifying the property rights, their owners, as well as sales, leases and their prices. The 2017 report for the Administrative Conference of the United States on marketable permits described “[t]ransaction data for fish catch shares” as “spotty.”⁹³ The National Marine Fisheries Service apparently has not honored its own commitment to develop “a source of authoritative market information and an exclusive central registry for permits”; such a central registry also was supposed to have been established under the federal Magnuson-Stevens Act “by 1997.”⁹⁴ Holland et al. emphasize that the lack of publicly available information about the prices of quota trades in catch share markets is hampering the efficiency of U.S. catch share programs.⁹⁵

The absence of registries of water rights and trades is also an obstacle to re-allocating these rights through markets.⁹⁶ Culp et al. recommended in 2014 that

92. For a useful definition of transaction costs, see CASADO PÉREZ, *supra* note 18, at 84 (“Three types of transaction costs are distinguished: ‘(a) the costs of locating and attracting potential trading partners and of pre-sale inspection; (b) contracting and fulfillment costs; (c) policing and enforcement costs.’”) (excerpting M. Klaes, *History of Transaction Costs*, in THE NEW PALGRAVE DICTIONARY OF ECONOMICS (2008)).

93. SCHWARTZ, *supra* note 2, at 87 (providing examples of spotty data from the grouper, tilefish, and snapper programs in the Southeast, and the Alaska halibut and sablefish programs). See also Holland et al., *supra* note 67, at 103.

94. SCHWARTZ, *supra* note 2, at 88.

95. Holland et al. suggest that there is generally a lack of publicly available information about prices in the 14 U.S. “catch share programs” that they analyze, and that this may be contributing to transaction costs and inefficiencies in the catch share markets. Holland et al., *supra* note 67, at 105, 109. Pinkerton & Edwards argue that British Columbia halibut catch share owners and halibut processors have superior information about the price of leasing catch shares and that this “asymmetric information” problem harms quota lessees, contributing to their marginal profitability. Pinkerton & Edwards, *supra* note 14, at 709. However, Turriss contests their description of the halibut lease market, arguing that there are “independent quota brokerage firms” and that “information on lease rates is readily available.” Turriss, *supra* note 42, at 434. According to Pinkerton & Edwards, halibut processors act as brokers for catch share leases, finance lease payments for lessees, and purchase fish from lessees. Pinkerton & Edwards, *supra* note 14, at 709.

96. See, e.g., CASADO PÉREZ, *supra* note 18, at 85-87 (analyzing the importance of registries for promoting water trading); Leonard et al., *supra* note 2, at 16 (recommending “exchanges and clearinghouses for water rights”). The following statement on the website of the California State Water Resources Control Board provides an indication of the difficulty of obtaining information about water rights holders: “We index our water rights by the name of the last known owner. However, we are not informed by the county recorder, county tax assessor, or title company when property is transferred.

states create registries of water rights that identify owners of the rights, and provide information about the rights (such as the waterbody with which they are associated, their priority, the water's use, and the amount diverted) and recent transactions involving the rights (including sale prices).⁹⁷ These proposals for registries would reduce transaction costs by making it easier to access information about potential sellers and buyers and recent transactions.⁹⁸

Another factor that complicates trading environmental property rights is the need for regulatory or judicial approval of transactions, which increases transaction costs.⁹⁹ The literature on water markets, in particular, emphasizes the significant costs, and impediments, to trades that are added by state law requirements for ex-ante regulatory or judicial approval for rights to be exchanged.¹⁰⁰

The need for ex-ante regulatory or judicial approval of water rights trades is linked with the limitations on water rights described above, in particular, the no-injury rule; ex-ante approval is required to ensure that no other water rights holder

Instead, water right owners are required to notify the Division of Water Rights when they transfer their rights. This frequently does not occur. If a previous owner has not notified us that he or she sold the property, there is a chance that the water right will still be shown under the name of the old owner." Cal. Water Boards, State Water Res. Control Bd., *Water Rights, Frequently Asked Questions*, https://www.waterboards.ca.gov/waterrights/board_info/faqs.html#toc178761095 (last modified Jan. 15, 2019).

97. Culp et al., *supra* note 12, at 18 ("[S]tates should develop a central registry of water rights that includes characteristics such as location (watershed), designation of surface or ground, priority, type of use (agricultural or municipal), list of rights holders, diversion amounts, historical consumptive uses, and recent exchanges, including amounts, duration, and prices paid."). *But see* Squillace, *supra* note 31, at 10804 (the information problem is not the complete absence of information about prices for water rights, but that price information is "skewed by the limited number of transfers and the dominant influence of the Colorado-Bit Thompson (CBT) market in the transfer picture").

98. Culp et al., *supra* note 12, at 18. There has been litigation in the past about the disclosure of the identities of grazing permittees. In 2009, environmental groups sued the BLM for violating the Freedom of Information Act for refusing to disclose information about the holders of federal grazing permits. *Western Watersheds Project & Wildearth Guardians v. Bureau of Land Management*, No. CV 09-482-CWD, 2010 WL 3735710 (D. Idaho. Sept. 13, 2010); Kristen Lombardi, *BLM Fights to Keep Secret Names of Ranchers With Grazing Permits*, SUNLIGHT FOUNDATION (Apr. 21, 2010), <https://sunlightfoundation.com/2010/04/21/blm-fights-keep-secret-names-ranchers-grazing-permits/>.

99. CASADO PÉREZ, *supra* note 18, at 63.

100. *See, e.g.,* Ruml, *supra* note 68, at 176-82; *see also* CASADO PÉREZ, *supra* note 18, at 65-66 ("The prototypical review scheme is as follows: the parties to the transaction file for approval with the competent agency and it reviews the documents filed by the parties, which may include engineering and hydrological studies. The burden of proof lies on the applicant.") (internal citations omitted); Libecap, *supra* note 12, at 404 (briefly describing transfer approval process in California). Bonnie Colby labels the costs of obtaining regulatory or judicial approval for water trades "policy-induced transactions cost" ("PITCs"). Bonnie G. Colby, *Transactions Costs and Efficiency in Western Water Allocation*, 72 AM. J. AGRIC. ECON. 1184 (1990). Contrary to many economists, she argues that these PITCs may serve a socially valuable purpose. In particular, they may internalize some of the social costs of trading water rights that the parties to a transaction might otherwise ignore. *Id.* at 1184, 1186, 1190.

The text says that regulatory or judicial approval is required because Colorado, an important prior appropriation state, administers water law through specialized water courts. RASBAND ET AL., *supra* note 89, at 790-91.

is harmed from a transfer.¹⁰¹ State law also may require that transfers be reviewed for impacts on fish and wildlife, and/or harms to the public interest or third parties.¹⁰² “[M]any states” put the burden of satisfying the no-injury rule or other standard “on the proponent of the transfer.”¹⁰³ Because there are “uncertainties about the scope and extent of injuries from a proposed transfer . . . parties on both sides . . . hire experts to predict an outcome that favors the legal position of their clients,”¹⁰⁴ which adds to the costs of obtaining approval for transfers. The process of satisfying the no-injury rule or other standard may also be protracted, thus extending the timeline for the transaction, and potentially discouraging the use of the market to reallocate water rights.¹⁰⁵

Some of the transaction costs just discussed should be technically easy to reduce. With the development of modern communication technologies, online databases of price information and trading platforms could emerge – and to some extent already are emerging – to facilitate transfers of assets such as catch shares and water rights.¹⁰⁶ To diminish search costs, online platforms could provide information about right holders, their rights, and the prices of past transactions. Stringent regulatory approval requirements, such as those that apply to trading water rights, reflect political as well as economic concerns and therefore, are likely harder to address.

101. In California, ex-ante approval is required to transfer post-1914 appropriative rights, but not pre-1914 appropriative rights. CAL. WATER CODE § 1706; CAL. ENVTL. PROTECTION AGENCY, *supra* note 86, at 3-4, 3-7.

102. RASBAND ET AL., *supra* note 89, at 791; *see also* CASADO PÉREZ, *supra* note 18, at 73-74; Leonard et al., *supra* note 2, at 5, 12-13; Garrick & Svensson, *supra* note 3, at 387-88, 393; Libecap, *supra* note 12, at 405-06; CAL. ENVTL. PROTECTION AGENCY, *supra* note 86, at 3-7-3-10.

103. Squillace, *supra* note 31, at 10801. *See also* CASADO PÉREZ, *supra* note 18, at 66.

104. Squillace, *supra* note 31, at 10802.

105. *Id.* at 10802; Colby, *supra* note 100, at 1188 (including data on the amount of time it takes to obtain state approval). In some states, such as California, the approval process for temporary transfers is less stringent than for permanent transfers. CASADO PÉREZ, *supra* note 18, at 68.

There is not much criticism that a regulatory approval process inhibits trades in grazing permits or catch shares, but some form of regulatory approval presumably is needed for transfers to enforce the use and ownership limitations. The process for transferring grazing permits appears to be relatively straightforward, except when the purchaser is a conservationist and the regulatory restrictions mentioned earlier apply. For scattered references to the approval process for transferring grazing permits, *see, e.g.*, Leshy & McUsic, *supra* note 7, at 374 (referring to “federal approval” of transfers of grazing permits between ranchers); Nelson, *supra* note 49, at 663 (“When the “base” ranch to which the permit is attached has been sold, the BLM has almost always transferred the permit to the new owner, although the agency is not legally required to do so.”). There may not be much concern about approval processes for trading catch shares because the trades can be done online through a system that automates regulatory requirements, at least in some catch share fisheries. For example, in the Pacific groundfish trawl fishery, catch shares and the poundage into which they translate are traded through online accounts. PAC. FISHERY MGMT. COUNCIL & NAT’L MARINE FISHERIES SERV., WEST COAST GROUND FISH TRAWL CATCH SHARE PROGRAM FIVE-YEAR REVIEW 427-428 (2017), https://www.pcouncil.org/wp-content/uploads/2018/12/Trawl_CSR_2017_MainDoc_Final.pdf.

106. *See supra* note 105 (discussing online trading of catch shares in Pacific groundfish trawl fishery); WATER EXCHANGE, *Water Market Price Data Now Available Through Acrevalue Westwater Partnership* (Aug. 24, 2017), <http://www.waterexchange.com/market-insight/> (announcing new database with sale and leasing information about western water rights that is partly available online); Lewis & Zheng, *supra* note 3, at 9 (discussing automation of approval of water rights trades in Victoria, Australia).

2.1.3 Government Subsidies for Resource Extraction

The lack of publicly available information about rights holders and past transactions were presented above as increasing transaction costs. But the lack of information might also be regarded as an instance of government failure, given that governments are often well-positioned to develop registries of this information because they approve transfers,¹⁰⁷ and in the case of the catch share programs, the National Marine Fisheries Service explicitly committed to developing a central registry.

Governments may not only undermine markets in environmental property rights by not creating registries of rights, but also through other policies that are not directly related to establishing and facilitating the operation of the markets.¹⁰⁸ In particular, government subsidies for resource use may encourage the holders of environmental property rights to continue to engage in extractive activities such as farming, fishing, and grazing when it might be more beneficial from a societal perspective for them to stop and sell the environmental property rights that they hold to others. For example, federal agricultural subsidies such as subsidized crop insurance, price supports and disaster assistance may be discouraging water trading, by reducing the incentives of agricultural interests, who continue to hold most western water rights, to switch to less water-intensive crops or fallow land.¹⁰⁹ While ranchers do not receive price supports, they are also subsidized through low grazing fees that do not cover the cost of managing public lands used for grazing, federal predator control programs that facilitate grazing livestock on federal lands, and disaster assistance.¹¹⁰ These subsidies may also be reinforcing the attachment of ranchers to federal grazing land and dampening enthusiasm for transferring grazing permits to conservationists.

2.2 The Politics of Environmental Property Rights

Some of the hurdles described above to market transfers of environmental property rights are due to the character of these resources. The precise amounts of fish, forage, and water available cannot be ascertained long in advance, so rights must be sufficiently flexible to accommodate the variability of supply due to

107. CASADO PÉREZ, *supra* note 18, at 86 (government well-positioned to develop public registry of water rights and “past transactions and clearing prices”).

108. For an analysis of the roles that governments need to play to make water markets work, *see* CASADO PÉREZ, *supra* note 18.

109. Culp et al., *supra* note 12, at 27.

110. *See* Leshy & McUsic, *supra* note 7, at 370; Katie Herzog, *7 Kinds of Government Subsidies Those Angry Ranchers Get That You Don't*, GRIST (Jan. 6, 2016), <https://grist.org/article/7-kinds-of-government-subsidies-those-angry-ranchers-get-that-you-dont/>; CHRISTINE GLASER ET AL., COSTS AND CONSEQUENCES: THE REAL PRICE OF LIVESTOCK GRAZING ON AMERICA'S PUBLIC LANDS (2015); Todd Oppenheimer, *The Rancher Subsidy*, ATLANTIC (Jan. 1996), <https://www.theatlantic.com/magazine/archive/1996/01/the-rancher-subsidy/306414/>; U.S. DEP'T OF THE INTERIOR, BUREAU OF LAND MGMT., *BLM and Forest Service Announce 2018 Grazing Fees* (Jan. 30, 2018), <https://www.blm.gov/press-release/blm-and-forest-service-announce-2018-grazing-fees> (2018 grazing fee is \$1.41 per AUM, down from \$1.87 in 2017).

hydrological, meteorological, or other conditions.¹¹¹ Water uses are also highly interdependent. Because one person's diversion of water may affect the amount and quality of the water available to others, western water law includes rules like the no-injury rule to prevent one water right holder from making changes that harm other rights holders.¹¹² This rule gives rise to legal requirements to have trades approved, which in turn contributes to delays that may discourage trading.¹¹³ Indeed, because the amount of water that can be transferred without violating the no-injury rule or other applicable legal rule may not be known until the end of the approval process, the uncertainties associated with engaging in water trades may outright discourage potential buyers from thinking about water rights purchases as a means of satisfying their water needs. They may resort instead to "developing new sources of water," for example "from groundwater or water storage projects."¹¹⁴

It is important not to lose sight of the fact that there are alternative ways to design rights to take into account resource variability and interdependence that would lead rights to be more clearly defined, and therefore more amenable to trading. For example, Squillace has proposed, and others have endorsed, the idea that water rights should be delineated in terms of the volume consumed, as this would eliminate the need for the no-injury rule that may chill trading.¹¹⁵

So why have ideas to reform environmental property rights, reduce the costs of exchanging them, or lower government subsidies for resource extraction not been adopted? Inertia and path dependence are no doubt factors.¹¹⁶ But political considerations are likely a primary reason as well. Many of the political hurdles to reform are likely rooted in the political power of the incumbent right holders, the industries that supply them with inputs, and the organizations that represent the rights holders.¹¹⁷ For example, the limitations on who can purchase grazing permits

111. Garrick & Svensson, *supra* note 3, at 383 ("nature of resource" has made it difficult establish clear property rights in water).

112. See *supra* note 85 and accompanying text (explaining the potential for one user's use of water to affect the water available to others).

113. See *supra* note 101 and accompanying text (explaining the relationship between the no-injury rule and ex ante approval requirements for water trades).

114. Squillace, *supra* note 31, at 10806.

115. *Id.* at 10800-17; Culp et al., *supra* note 12, at 15; CASADO PÉREZ, *supra* note 18, at 45; Leonard et al., *supra* note 2, at 3-4. Trading consumed water would reduce the likelihood that a transfer would negatively affect other appropriators because the trade would not be transferring water that is returned to the stream through return flow. Squillace, *supra* note 31, at 10804-05, 10811. As an alternative, Bonnie Colby recommends that states define an amount of water that can be traded "per irrigated acre," and impose on the opponents of a trade the burden of showing that this amount is inappropriate. Colby, *supra* note 100, at 1191.

116. Libecap has argued that it would have been better if water rights had been defined like catch shares as a proportional share of an "annual total allowable withdrawal," rather than a fixed volume. Libecap, *Institutional Path Dependence*, *supra* note 36 at 71. However, he recognizes that the historical choice to delineate prior appropriation water rights in fixed volumes is difficult to undo due to path dependence. *Id.* at 77.

117. Squillace, *supra* note 31, at 10802 ("Arguably, much of the cost and uncertainty associated with water transfers is attributable to the resistance of the agricultural community to any transfers that propose moving water out of agricultural use."); Garrick & Svensson, *supra* note 3, at 395 (referring to "the primacy of politics in the emergence, evolution, and performance of water markets" in the U.S.,

that block conservationists from acquiring them seem due, in part, to the political power of the trade association representing ranchers, the Public Lands Council, and stakeholders in ranching communities, including neighboring ranchers and those who supply ranchers with feed and other inputs.¹¹⁸ Conservationist buyouts would reduce the number of ranchers and therefore diminish the constituency of the trade association. If ranchers sold out, neighboring ranchers might lose access to backup grazing land and feed and suppliers would lose customers.¹¹⁹

There also are less tangible concerns that transferring water rights, grazing permits, and catch shares away from their existing owners would erode longstanding ways of life and cultures.¹²⁰ There is a great deal of concern in rural areas that transferring water rights, especially outside the water basin, will undermine the way of life in agricultural communities.¹²¹ Some of this concern is rooted in experience, as long-distance water transfers have been followed by environmental degradation of the sending area, and transferring water out of an irrigation district could increase the costs that the remaining members of the district have to pay for irrigation infrastructure.¹²² Ranchers and fishermen similarly fear that allowing transfers of grazing permits and catch shares will harm their communities and alter their ways of life.¹²³ In some instances, legal rules that keep environmental rights within the community and impede their reallocation persist even though the rules appear contrary to the economic interests of existing rights holders. For example, many ranchers are aging, and they accordingly would benefit from opening the market for grazing permits to people with no intention of grazing,

Australia and China); Leonard et al., *supra* note 2, at 12 (“Large water transfers, transfers from agricultural to urban and in-stream uses, and transfers across political and hydrologic boundaries all threaten to reduce the demand for a variety of farm-related goods and services. Laborers, agricultural processors, and suppliers of farm-related inputs lack property rights to water but are residual claimants to the existing distribution of water use who experience pecuniary externalities associated with major shifts in the location and nature of water use. As third-parties to the actual transactions that threaten their livelihoods, these groups often resort to legal and political means to impair high-value water transfers.”); *id.* at 13 (“Reductions in total fishing, fleet consolidation, and changes in the demand for fresh vs. processed fish associated with the implementation of ITQs create pecuniary externalities for non-fishers by changing the structure of the industry and potentially reducing employment . . . Stakeholders affected by these pecuniary externalities have been a vocal source of opposition to fisheries reform.”).

118. Leshy & McUsic, *supra* note 7, at 371, 385-87.

119. *Id.* at 386-87.

120. *Id.* at 385-87.

121. See, e.g., Culp et al., *supra* note 12, at 13; Colby, *supra* note 100, at 1185, 1189.

122. Squillace, *supra* note 31, at 10807-09, 10816.

123. Leonard et al. draw the parallel between the opposition to water transfers and catch shares: “The desire to maintain farming as a way of life is directly analogous to ITQ’s opponents opposition to the consolidation of fishing fleets.” Leonard et al., *supra* note 2, at 12.

Consider two policy proposals that would address some of the concerns with water transfers. In 1973, the National Water Commission recommended allowing the buyer of water rights to assume responsibility for the seller’s share of the costs of maintaining irrigation infrastructure, so that the remaining irrigators would not face higher costs as a result of the transfer of water rights. NAT’L WATER COMM’N, WATER POLICIES FOR THE FUTURE: FINAL REPORT TO THE PRESIDENT AND TO THE CONGRESS OF THE UNITED STATES BY THE NATIONAL WATER COMMISSION 267 (1973). Writing in 1990, Colby contemplated, but dismissed as infeasible, a tax on water transfers to account for the social costs of transfers; such a tax might be more viable now in the era of big data. Colby, *supra* note 100, at 1190.

such as conservationists.¹²⁴ With more potential buyers, the price of grazing permits might increase, and ranchers could use the proceeds from sales to fund retirement.¹²⁵

Notwithstanding the potential benefits of increasing the tradability of environmental rights, reformers have struggled to overcome the political clout of ranchers, fishers, and agricultural water rights holders.¹²⁶ This is not to say that the champions of environmental markets have not made any headway. The spread of catch shares in U.S. fisheries since 1990, when the first major federal catch share program was introduced, is an impressive achievement.¹²⁷ Depending on whether one measures by weight or species, 25% to perhaps 65% of fish are caught in U.S. federal waters under catch shares.¹²⁸ In introducing catch shares in the U.S., regulators followed the tried and true strategy of attempting to win over enough support within the fishing industry,¹²⁹ perhaps not surprisingly given the important role of industry-dominated fishery management councils in U.S. fishery policy-making.¹³⁰ As an example, catch shares were initially allocated for free to incumbents in the fishing industry, based on their catch levels in baseline periods.¹³¹ In some fisheries, “processors and other community members” also received shares as part of the initial allocation.¹³² As mentioned above, position limits also have been incorporated in many programs that set maximum limits on the ability of fishing interests – and outsiders – to consolidate the industry onto fewer vessels, although there has been a great deal of rationalization that has increased the economic efficiency of fisheries.¹³³ While it may have been politically necessary to establish catch shares, there is a downside to adopting the strategy of allocating catch shares to incumbents for free based in some measure on their historical usage – which also, incidentally, is how prior appropriation water rights were initially allocated.¹³⁴ It reinforces the power of the incumbents in the fishing industry and gives them a clear economic stake in protecting their interests in the political environment going forward.

Perhaps, given political realities, reformers have no choice but to continue to try to pursue reforms by adapting them to accommodate the interests of incumbents with property rights and the array of stakeholders allied with them, or

124. Ribe, *supra* note 50 (“65 percent of ranchers are over age 55 and only 12 percent are under 45 years old”).

125. *Id.*; Leshy & McUsic, *supra* note 7, at 371.

126. *See, e.g.*, Leonard et al., *supra* note 2, at 4-5, 10-14.

127. Nat’l Oceanic and Atmospheric Admin., *supra* note 37.

128. Wyman, *supra* note 38, at 173-74.

129. Grainger & Parker, *supra* note 4, at 377-82 (analyzing strategies used in implementing catch shares to address distributional concerns).

130. Wyman, *supra* note 38, at 163-64.

131. Grainger & Parker, *supra* note 4, at 370 (“Free allocation has been the default method of allocating quota shares in new ITQ programs in the United States.”); SCHWARTZ, *supra* note 2, at 11, 39 (U.S. catch share programs do not use auctions).

132. Leonard et al., *supra* note 2, at 12; *see also id.* at 14.

133. Grainger & Parker, *supra* note 4, at 375-77, 380; Ayeisha A. Brinson & Eric M. Thunberg, *Performance of Federally Managed Catch Share Fisheries in the United States*, 179 FISHERIES RES. 213, 220-22 (2016).

134. Squillace, *supra* note 31, at 10803.

insisting that the reforms are fundamentally in the interests of right holders and other stakeholders.¹³⁵ Still, in theory, there is a second way that reforms might come about. New entrants interested in the same goals as the reformers might arise that are sufficiently well-capitalized to displace the political power of the incumbents.

Consider, as an analogy, the rise of Uber and its triumph over the traditional taxi industry.¹³⁶ For decades starting in the early twentieth century, local governments regulated the number of taxis on city streets by requiring that each taxi have one of a limited number of licenses to operate.¹³⁷ These licenses could often be sold or leased with government approval, similar to water rights, grazing permits, and catch shares. The licenses were valuable where the number was capped by local governments below the number required to meet the demand for taxi services.¹³⁸ With high stakes in the value of their licenses, the license owners, and the financial institutions that serviced them by lending against licenses, largely dominated taxi politics, much like ranchers and fishers and the interests that service them have dominated grazing and fishing policy.¹³⁹ For decades, economists argued, largely to no avail, that limited licensing regimes capping the number of taxis should be abolished on efficiency and equity grounds because the cap excluded new entrants from an industry with few natural barriers to entry.¹⁴⁰ In the early 2010s, the most famous of these licenses, New York City taxi licenses, were worth over one million dollars, and few license owners actually drove taxis; many of the taxis on city streets were driven by drivers who leased licenses from absentee owners like the “sea lords” who lease out their catch shares.¹⁴¹ Then along came Uber which, backed by Silicon Valley investors, had much more capital than the taxi license holders and effectively outmaneuvered them in the political process to acquire the legal right to operate under a much less stringent regulatory framework than the incumbent taxi industry.¹⁴² That framework does not require Uber vehicles to have one of the limited number of taxi licenses, and so these licenses have declined dramatically in value, as Uber and other app-based companies compete

135. This is the strategy that Leonard et al. seem to advocate, as they identify options for addressing the political opposition to water transfers, from experiences introducing catch shares and air and water quality trading. Leonard et al., *supra* note 2, at 16-17. Grainger & Parker also assume that “[f]ishery reforms will probably need to be designed so that they are Pareto improving for all with stakes in the fishery to enable ‘reform without losers.’” Grainger & Parker, *supra* note 4, at 383. There certainly are good arguments that clarifying water rights by defining them in terms of consumptive use, eliminating the limitations on who can own grazing permits, and establishing public registries of rights and transactions would enhance the value of existing property rights, to the benefit of right holders. See *supra* notes 90, 93-98, 115 and accompanying text.

136. See generally Katrina Miriam Wyman, *Problematic Private Property: The Case of New York City Taxi Medallions*, 30 YALE J. REG. 125 (2013) [hereinafter Wyman, *Problematic Private Property*]; Katrina M. Wyman, *Taxi Regulation in the Age of Uber*, 20 N.Y.U. J. LEGIS. & PUB. POL’Y 1 (2017); Katrina M. Wyman, *The Novelty of TNC Regulation*, in CAMBRIDGE HANDBOOK ON LAW AND REGULATION OF THE SHARING ECONOMY (2018) [hereinafter Wyman, *Novelty*].

137. Wyman, *Problematic Private Property*, *supra* note 136, at 127, 168.

138. *Id.* at 127.

139. See *id.* at 156, 158.

140. *Id.* at n.121.

141. *Id.* at 131-32.

142. See Wyman, *Novelty*, *supra* note 136.

with taxis for customers. The economists' longtime goal of eliminating restrictions on entry to the taxi business has effectively been achieved. The taxi industry has yet to recover.¹⁴³

While there are many differences between the taxi context and environmental property markets, Uber's triumph over the taxi license owners holds a relevant lesson for thinking about the politics of regulatory change in the environmental context. Just when the status quo seems immutable, a new entrant can arise, successfully overwhelm the entrenched property rights holders, and eviscerate the longstanding regulatory thicket that protected the incumbents. And this can happen very quickly, even if the entrenched interests have dominated policy-making for decades; Uber was able to obtain legislation legalizing and regulating its operations in 49 states plus the District of Columbia within roughly four years.¹⁴⁴

From New York University in Greenwich Village, it is hard to identify a new entrant that might disrupt the politics of water trading, grazing permits, or catch shares, and perhaps these contexts are less susceptible to disruptive innovation than the taxi industry was in the 2010s. But not many close observers of the taxi scene were predicting that an app-based company would triumph over taxi license holders in the years leading up to the emergence of Uber. The point is that working to appease the incumbent environmental property rights holders may not be the only strategy to facilitate resource transfers. There also might be an "outsider" strategy involving new entrants that substitutes for the "insider" strategy of trying to persuade incumbent rights holders to support reforms.

CONCLUSION

For decades, economists and others have been advocating greater use of property rights and markets to address environmental problems. This advocacy has had a major impact on environmental and natural resources law and policy and a number of free-market environmentalist ideas are now mainstream. This essay has argued that it is now time to focus on the reasons why environmental property rights and markets have not been a panacea, by comprehensively examining the property rights and markets that exist. In analyzing the problems that environmental markets as a category have experienced (and not focusing solely on water markets or catch share markets, for example), it becomes apparent that there are clear categories of recurring problems and broad similarities in the nature of the political opposition to reforms. This suggests that there also might be some broad categories of reforms and strategies for achieving them. For example, as mentioned above, systematically creating registries of catch shares, water rights, grazing permits, and other environmental rights might facilitate more transfers by reducing search costs.

143. John Aidan Byrne, *139 Taxi Medallions Will Be Offered at Bankruptcy Auction*, N.Y. POST (June 9, 2018, 10:55 PM), <https://nypost.com/2018/06/09/139-taxi-medallions-will-be-offered-at-bankruptcy-auction/>.

144. PROPERTY AND CASUALTY INSURERS ASS'N OF AMERICA, *Transportation Network Companies, States with Enacted Legislation*, <http://viewer.zmags.com/publication/60841263#/60841263/1> (last updated June 21, 2018).

A second point that emerges from analyzing the problems befalling the implementation of environmental property rights and markets is that the problems undermining the operation of markets are not completely distinct from the “first generation” issues encountered in implementing markets. Some of the “second generation” problems impeding the operation of markets are the legacy of decisions made in initially establishing the property rights and markets.¹⁴⁵ Decisions made decades ago to denominate water rights in terms of the amount diverted rather than the amount consumed, to allocate catch shares for free, or to limit grazing permits to livestock owners, all affect the operations of markets in these assets today. This is worth bearing in mind while considering the design of new environmental property rights and markets going forward. It might be desirable to avoid replicating some of the political compromises made in the past to facilitate the establishment of the markets. As an example, instead of initially allocating catch shares for free to garner the support of incumbents in the fishing industry, perhaps it would be preferable to initially auction catch shares while providing incumbents with financing assistance to enable them to compete in the auctions.¹⁴⁶ Using auctions to initially allocate catch shares might improve the efficiency and equity of the subsequent catch share markets by foreclosing the emergence of “sea lords” who acquired their catch shares for free. Thus, analyzing existing markets may lead to improvements in the next generation of new ones, as well as changes to the current markets.

145. Libecap, *Institutional Path Dependence*, *supra* note 36 (arguing that path dependence helps to explain why western water markets are not very active).

146. *See also* SCHWARTZ, *supra* note 2, at iv (urging auctions for marketable permits).