

CLEARING THE AIR: FOUR PROPOSITIONS ABOUT PROPERTY RIGHTS AND ENVIRONMENTAL PROTECTION*

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INTRODUCTION

Privatization is sweeping the globe.¹ Since the Reagan-Thatcher revolution of the 1980s, governments around the world have been selling off public assets to private owners in order to improve efficiency and increase production. Between 1985 and 1994, \$468 billion worth of state enterprises were sold off to private investors.² But privatization so far has been limited to state enterprises. Governments have not, with a few notable and highly controversial exceptions,³ be-

* This article combines and elaborates on ideas developed in two previous works: Daniel H. Cole, *Property Rights on Environmental Goods*, in 1 ENCYCLOPEDIA OF LAW AND ECONOMICS (Boudewijn Bouckaert & Gerrit de Geest eds., forthcoming Sept. 2000); and DANIEL H. COLE, INSTITUTING ENVIRONMENTAL PROTECTION: FROM RED TO GREEN IN POLAND (1998).

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1. The term “privatization,” as used throughout the law and economics literature, encompasses a wide variety of activities by which some public entity conveys property rights to some private entity or entities—everything from outright giveaways or sales of public lands to the granting of licenses or concessions under which private firms finance, construct, or manage hotels, airports, wastewater treatment plants, highways, prisons, and schools. See Robert W. Poole, Jr., *Privatization for Economic Development*, in THE PRIVATIZATION PROCESS: A WORLDWIDE PERSPECTIVE 1, 1 (Terry L. Anderson & Peter J. Hill eds., 1996). On this broad definition, “privatization” can, but need not be, total. But privatization’s most vociferous proponents implicitly adopt a narrower definition, which demands *total* relinquishment of public property rights and control.

2. See *id.*

3. In 1990 the New Zealand government offered for sale more than a million acres of plantation forests, in order to raise money to pay off the national debt. See Don Wije-wardana, ‘Sale Of The Century’: NZ Forestland For Sale, WORLD WOOD, Feb. 1990, at 24, 24, available in LEXIS, World Library, Allwld File. But this sale was exceptional. In 1994 the Conservative government of British Prime Minister John Major was forced to abandon plans to privatize national forests in the wake of massive public opposition. See *Forestry; Private Woods*, THE ECONOMIST, Feb. 5, 1994, at 57, available in LEXIS, World Library, Allwld File; Philip Greig

gun selling off their vast natural resource holdings, including forest lands, parks, and waterways.

This is a mistake, according to some economists who claim that the same economic arguments favoring private ownership of economic producers (polluters and resource users) also support private ownership of natural resources (*i.e.*, environmental goods). As Richard Stroup and Sandra Goodman put it, “government ownership and control works just as badly with environmental resources as with all other resources.”⁴ In their view, privately owned natural resources would be better managed not only economically but environmentally. But critics argue that the claims of these so-called “free market environmentalists” are unrealistic,⁵ based on faulty premises,⁶ overly reliant on anecdotal evidence,⁷ and oblivious to economies of scale and the transaction costs of resource privatization.⁸

Swindon Wiltshire, *Privatisation by Stealth of Our National Forests*, SCOTLAND ON SUNDAY, May 29, 1994, available in LEXIS, World Library, Allwld File; Owen Bowcott & Erlend Clouston, *Forestry Sale Dropped, Campaigners Claim*, THE GUARDIAN, May 19, 1994, at 2, available in LEXIS, World Library, Allwld File; *Reason Wins over Political Dogma*, THE SCOTSMAN, Apr. 11, 1994, available in LEXIS, World Library, Allwld File. Similarly, public opposition forced the Reagan Administration to hastily abandon plans to privatize public lands in the mid-1980s. See, e.g., Christopher K. Leman, *How the Privatization Revolution Failed, and Why Public Land Management Needs Reform Anyway*, in WESTERN PUBLIC LANDS: THE MANAGEMENT OF NATURAL RESOURCES IN A TIME OF DECLINING FEDERALISM 110, 113-14 (John G. Francis & Richard Ganzel eds., 1984).

4. Richard L. Stroup & Sandra L. Goodman, *Property Rights, Environmental Resources, and the Future*, 15 HARV. J.L. & PUB. POL'Y 427, 427 (1992).

5. See, e.g., Peter S. Menell, *Institutional Fantasylands: From Scientific Management to Free Market Environmentalism*, 15 HARV. J.L. & PUB. POL'Y 489, 492 (1992).

6. See, e.g., Alan Randall & Emery N. Castle, *Land Resources and Land Markets*, in 2 HANDBOOK OF NATURAL RESOURCE AND ENERGY ECONOMICS 571, 613-14 (Allen V. Kneese & James L. Sweeney eds., 1985) (providing reasons “to be suspicious of normative uses of land market theory in support of privatization proposals”); Menell, *supra* note 5, at 493-94 (criticizing free market environmentalists for simply presuming that market prices would incorporate all values worth considering); Michael C. Blumm, *The Fallacies of Free Market Environmentalism*, 15 HARV. J.L. & PUB. POL'Y 371, 379 (1992) (criticizing free market environmentalism for assuming that private resource owners would possess environmental information superior to that possessed by public resource managers).

7. See, e.g., DANIEL W. BROMLEY, ENVIRONMENT AND ECONOMY: PROPERTY RIGHTS AND PUBLIC POLICY 180 (1991).

8. See, e.g., Menell, *supra* note 5, at 502 (arguing that “[e]conomies of scale in research and difficulties in appropriating returns to innovation may enable even highly imperfect public institutions to outperform private entrepreneurs in some technological fields”); DANIEL H. COLE, INSTITUTING ENVIRONMENTAL PROTECTION: FROM RED TO GREEN IN POLAND 233 (1998) (claiming that the choice of institutions for environmental protection depends on comparative transaction cost analyses, which free market environmentalists typically do not provide).

This article contributes to the debate about the utility of property rights for environmental protection by arguing four propositions. First, environmental protection efforts are inevitably property-based in that all solutions to the “tragedy of the commons” involve the imposition of property rights (private/individual, common, or state/public) on formerly unowned (nonproperty or open-access) resources. Second, the “privatization” of natural resources—their conversion from nonproperty or public property to private (common or individual) property—can, in some circumstances, enhance environmental protection, economic efficiency, or both. Third, claims that “privatization” is a necessary and sufficient condition for optimal environmental protection are inherently implausible, under-supported by economic theory, and under-determined by the available empirical evidence. Fourth, and often overlooked, private ownership of resource users/polluters remains vitally important for environmental regulation to be effective.

PROPOSITION I.

ALL SOLUTIONS TO ENVIRONMENTAL PROBLEMS ARE “PROPERTY-BASED.”

Environmental problems stem, in the first instance, from the insufficient specification of property rights in environmental goods (*i.e.*, natural resources). Aristotle recognized this more than 2,000 years ago, when he wrote, “that which is common to the greatest number has the least care bestowed upon it.”⁹ This implies that some type of property regime needs to be imposed to conserve resources. But property rights never have been imposed on many natural resources, for a variety of economic, technological, ecological, and cultural reasons. And history has only too often confirmed Aristotle’s observation that unowned resources receive “the least care.”

Throughout this century economists have studied relations between property rights and patterns of resource use and degradation. In 1911 the Danish economist Jens Warming elaborated on Aristotle’s observation about unowned resources in the context of open-access fisheries.¹⁰ Warming’s findings led to further investigations of

9. See ARISTOTLE, POLITICS § 1261b 32-33 reprinted in THE BASIC WORKS OF ARISTOTLE 1148 (Richard McKeon ed. & Benjamin Jowett trans., 1941).

10. See Jens Warming, *Om ‘Grundrente’ af Fiskegrunde*, NATIONALOKONOMISK TIDSSKRIFT 495 (1911), reprinted and trans. in Peder Andersen, ‘On Rent of Fishing Grounds’: A Translation of Jens Warming’s 1911 Article, with an Introduction, 15 HIST. POL. ECON. 391 (1983) (including an introduction by Peder Andersen).

open-access fisheries by H. Scott Gordon and Anthony Scott in the 1950s.¹¹ In the late 1960s, the biologist Garrett Hardin and the economist Harold Demsetz provided the classic accounts of, respectively, the depletion of open-access/nonproperty resources and the evolution of property institutions (*i.e.*, the conversion of nonproperty to property) to avert their overexploitation by reducing externalities and transaction costs.¹²

Hardin's allegory of the "tragedy of the commons" provides a framework for analyzing relations between property rights and environmental protection.¹³ Its thesis is that resource depletion and pollution problems both stem from the incentives created by open access resources: when no one can exclude anyone else from access and use, scarce resources ultimately will become polluted and depleted.¹⁴ The only way of avoiding the tragedy is to restrict access and use.¹⁵ Hardin offers two means of doing so. The first is to *privatize* the resource—convert it from nonproperty to private (though not necessarily individual) property.¹⁶ Privatization would internalize the costs of access and use decisions to the resource owner(s), who presumably would have the incentive to conserve the resource over time.¹⁷ Hardin's second means for averting the tragedy of the commons is government regulation.¹⁸ Under this regime, conservation is achieved by restrictions on access and use that may be externally imposed by government or self-imposed by users.

While scholars have discussed and distinguished Hardin's two solutions to the tragedy of the commons, many have failed to notice that both constitute property-based solutions in that each involves the

11. See, e.g., H. Scott Gordon, *Economics and the Conservation Question*, 1 J.L. & ECON. 110 (1958); H. Scott Gordon, *The Economic Theory of a Common Property Resource: The Fishery*, 62 J. POL. ECON. 124 (1954); Anthony Scott, *The Fishery: The Objectives of Sole Ownership*, 63 J. POL. ECON. 116 (1955).

12. See Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243 (1968) [hereinafter Hardin, *Tragedy of the Commons*]; Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347 (1967) [hereinafter Demsetz, *Toward a Theory of Property Rights*].

13. See Hardin, *Tragedy of the Commons*, *supra* note 12, at 1244.

14. See *id.* at 1244-45.

15. See *id.* at 1245.

16. See *id.*

17. Unfortunately, this presumption—that private owners will always act to conserve natural resources under their control—does not always hold either in fact or as a matter of economic theory. See *infra* notes 91-93 and accompanying text. But Hardin's chief insight—that valuable open-access/nonproperty resources will be unsustainably exploited unless *some* property rights regime (private, common, or public/state) is imposed for their protection—nonetheless remains valid, even though private ownership is not always sufficient to ensure resource conservation.

18. See Hardin, *Tragedy of the Commons*, *supra* note 12, at 1245.

imposition of property rights on formerly open-access/nonproperty resources. This is obviously true of privatization, but it is also, though less obviously, true of government regulation.

When the government regulates access to and use of some resource, it imposes *public* property rights on it. Similarly, when the state regulates air pollution, it imposes a system of rights (often implicit) and duties (usually express) with respect to the atmosphere. Whether it chooses to regulate with command-and-control measures, such as technology-based standards, or with market-based incentives, the state imposes on air polluters a legally enforceable duty to comply with all restrictions on use of (what amounts to) the public's atmosphere.¹⁹ What distinguishes this regulatory approach from privatization is not the existence or nonexistence of property rights but only the *type* of property regime imposed. Privatization converts nonproperty into private (individual or common²⁰) property. Govern-

19. This carries important implications for the assertion of *de facto* "rights" to pollute, commonly found in the writings of property rights economists. A resource cannot be at once "open access" (nonproperty) and the subject of property "rights." "Open access" signifies the utter absence of rights or duties with respect to the resource. At most, prior to the initial allocation of property rights (and corresponding duties), polluters are "at liberty" to use the atmosphere as a storage facility for their waste products. They have no "right" to do so; but neither do they have any "duty" to refrain from doing so. See WESLEY NEWCOMB HOHFELD, *FUNDAMENTAL LEGAL CONCEPTIONS AS APPLIED IN JUDICIAL REASONING AND OTHER LEGAL ESSAYS* 36, 65 (Walter Wheeler Cook ed., 1920). One implication of this reasoning is that privatization and regulation *both* depend on top-down allocations of rights and duties by the state. Cf. Terry L. Anderson & J. Bishop Grewell, *Property Rights Solutions for the Global Commons: Bottom-Up or Top-Down?*, 10 *DUKE ENVTL. L. & POL'Y F.* 73, 82 (admitting that "bottom-up property rights begin to blur with top-down property rights because both depend on having the coercive power to exclude"). For an excellent recent work stressing the state's responsibility and incentives for defining and allocating property rights and duties, see ITAI SENED, *THE POLITICAL INSTITUTION OF PRIVATE PROPERTY* (1997).

20. Proponents of common property for environmental protection have criticized Hardin for preferring private (*e.g.*, individual) over common ownership (as those regimes are conventionally defined). See Susan Jane Buck Cox, *No Tragedy of the Commons*, 7 *ENVTL. ETHICS* 49, 61 (1985) ("Since it seems quite likely if 'economic man' had been managing the commons that tragedy really would have occurred, perhaps someone else was running the common."); F. Berkes et al., *The Benefits Of The Commons*, 340 *NATURE* 91, 91-93 (1989). But Hardin made no such claim in *The Tragedy of the Commons*, nor does his analysis in that article support such a claim. *But cf.* Carol M. Rose, *Expanding the Choices for the Global Commons: Comparing Newfangled Tradable Allowance Schemes to Old-Fashioned Common Property Regimes*, 10 *DUKE ENVTL. L. & POL'Y F.* 45, 46-47 (1999).

Hardin did, however, claim, in an article written a decade later, that private and state ownership (or "private enterprise" and "socialism") were the *only* viable solutions to the "tragedy of the commons," implying that common (private, nonindividual) ownership would not suffice. See Garrett Hardin, *Political Requirements for Preserving Our Common Heritage*, in *WILDLIFE IN AMERICA: CONTRIBUTIONS TO AN UNDERSTANDING OF AMERICAN WILDLIFE AND ITS CONSERVATION* 310, 314 (Howard P. Brokaw ed., 1978) [hereinafter Hardin, *Preserving Our Common Heritage*]:

ment regulation typically (but tacitly) converts nonproperty into public/state property.

Because both solutions to the tragedy of the commons involve the imposition of property rights on previously unowned environmental goods, the choice in environmental protection and resource conservation is not *whether* to adopt a property-based approach but *which* property-based approach or approaches to adopt. To what extent should the state assert public rights (*res publicae*) as opposed to vesting limited or unlimited private property rights in individual users (*res individuales*) or groups of users (*res communes*)? The answer to this question requires a comparative institutional analysis of alternative property rights regimes, including their relative costs of production, exclusion, and administration.²¹ In some cases, a private-

What is to be done? Only one thing will suffice: We must renounce the system of the commons. The group can agree either to divide up the commons into private property (Case I[: private enterprise]), or to appoint a manager for the common property (Case II). (A managed commons is socialism and so should no longer be called a commons.) Neither change can be made as an individual option; the group (or the most powerful elements of it) must agree on the change and then institute whatever force may be required to make the change stick. This is what the 17th century philosopher Thomas Hobbes wrote about in his book *Leviathan*, which was the name for the force by which a community of men must be governed precisely because individual consciences are not enough.

So, in this later piece, Hardin does take the position that the alternatives of coercion on the one hand and private property on the other are the only two choices that will prevent the “tragedy of the commons.” See Rose, *supra*, at 46-47. In fact, he specifically cites to William Ophuls when invoking the notion of “Leviathan” in this later article. See Hardin, *Preserving Our Common Heritage*, *supra*, at 314; see generally WILLIAM OPHULS & A. STEPHEN BOYER, JR., *ECOLOGY AND THE POLITICS OF SCARCITY REVISITED* 189 (1992) (emphasis added):

[S]carcity is the source of original political sin: Resources that are scantier than human wants *have to be allocated by governments*, for naked conflict would result otherwise. In the words of the philosopher Thomas Hobbes in *Leviathan*, human life in an anarchic “state of nature” is “solitary, poor, nasty, and short.” To prevent the perpetual struggle for power in a war of all against all, there *must* be a civil authority capable of keeping the peace by *regulating* property and other scarce goods.

But, again, nothing in Hardin’s analysis in *The Tragedy of the Commons* supports the claim that individual, private property and government coercion are the only two alternatives for solving the tragedy. In fact, numerous theoretical and empirical studies dispute such a claim. See, e.g., ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* (1990); *MAKING THE COMMONS WORK: THEORY, PRACTICE, AND POLICY* (Daniel W. Bromley ed., 1992); *PROPERTY RIGHTS AND THE ENVIRONMENT: SOCIAL AND ECOLOGICAL ISSUES* (Susan Hanna & Mohan Munasinghe eds., 1995).

21. For excellent works comparing institutional alternatives and their costs, see NEIL K. KOMESAR, *IMPERFECT ALTERNATIVES: CHOOSING INSTITUTIONS IN LAW, ECONOMICS, AND PUBLIC POLICY* (1994); Thráinn Eggertsson, *The Economics of Control and the Cost of Property Rights*, in *RIGHTS TO NATURE: ECOLOGICAL, ECONOMIC, CULTURAL, AND POLITICAL PRINCIPLES OF INSTITUTIONS FOR THE ENVIRONMENT* 157 (Susan S. Hanna et al. eds., 1996); Roger G. Noll, *Economic Perspectives on the Politics of Regulation*, in 2 *HANDBOOK OF INDUSTRIAL ORGANIZATION* 1253 (Richard Schmalensee & Robert D. Willig eds., 1989); Carol M. Rose, *Rethinking Environmental Controls: Management Strategies for Common Resources*,

property regime based on individual ownership may most efficiently and effectively conserve resources, particularly when private exclusion costs are relatively low but governmental administrative costs would be particularly high. A “common” or “state” property regime may be preferable, however, when the costs of exclusion for a private owner would be relatively high but administrative costs for government regulators are relatively low. Finally, when administrative and exclusion costs are both extraordinarily high (reflecting, perhaps, the technological unfeasibility of controlling access) or the resource itself is “superabundant,”²² open access may be inevitable, maximally efficient, or both. Stated as a rule, that property regime is best which, under the circumstances, would achieve exogenously set environmental protection goals at the lowest cost.²³

PROPOSITION II.

PRIVATIZATION CAN, IN SOME CIRCUMSTANCES, ENHANCE ENVIRONMENTAL PROTECTION.

Societies have relied on both of Hardin’s solutions to the tragedy of the commons. Some environmental goods, such as land, typically (though not exclusively, and not at all in socialist economies) have been protected by private property rights. But many other environmental goods, including the atmosphere and wildlife, have for various reasons been protected primarily by government regulation, entailing the implicit or explicit assertion of public property rights. These are generalizations, of course. Most real-world property regimes governing environmental goods have been admixtures of individual private ownership, non-public common ownership, and state/public ownership.²⁴

1991 DUKE L.J. 1. The need for a comparative institutional analysis is also implied by Coase’s suggestion that efficiency is maximized sometimes by private market transactions, sometimes by transactions organized within a firm, and sometimes by government regulation. See R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 16-19 (1960) [hereinafter Coase, *Problem of Social Cost*].

22. See Harold Demsetz, *The Exchange and Enforcement of Property Rights*, 7 J.L. & ECON. 11, 20 (1964).

23. It should be noted that the environmental goals themselves must be taken as given in the comparative analysis. See J.H. DALES, POLLUTION, PROPERTY, AND PRICES 39-40 (1968) (noting that economic analysis can tell us how much it would cost, under alternative approaches, to achieve a desired environmental protection goal, but cannot determine what that goal should be).

24. For this reason, J.H. Dales (wisely, in the author’s opinion) has abandoned the conventional but confusing typology of property regimes—private, common, public—to focus instead on “[j]ust ‘property rights,’ by whomever exercised.” *Id.* at 61.

Pollution control today remains heavily dominated by command-and-control—a pure public property/regulatory approach. Command-and-control has been successful in reducing pollution levels, and in at least some cases, it has done so efficiently.²⁵ But since the 1970s, governments have experimented with various mixed public and private property/regulatory approaches to environmental protection primarily in order to improve regulatory efficiency.²⁶ This section discusses one such mixed property-based approach: marketable “rights” to pollute.²⁷

The Structure of a Marketable Pollution “Rights” Program

Economists have long criticized the command-and-control approach to environmental regulation as unnecessarily expensive.²⁸ Since the late 1960s, they have recommended instead the implementation of marketable pollution “rights” programs as a less costly means of achieving environmental protection goals. This idea is simple enough in theory.²⁹ The government first determines its pollution-control goal and decides how much of a reduction from current pollution levels is necessary to achieve it. It then subtracts the necessary reduction from current emissions to derive total allowable emissions. Next, the government unitizes and allocates those allowable emis-

25. See Daniel H. Cole & Peter Z. Grossman, *When is Command-and-Control Efficient? Institutions, Technology, and the Comparative Efficiency of Alternative Regulatory Regimes for Environmental Protection*, 1991 WISC. L. REV. 887, 888, 893.

26. In the mid-1980s, for example, U.S. Environmental Protection Agency (EPA) introduced a temporary but highly successful program for trading “rights” to lead-content in gasoline. See Robert W. Hahn & Gordon L. Hester, *Marketable Permits: Lessons for Theory and Practice*, 16 *ECOLOGY L.Q.* 361, 380-91 (1989) [hereinafter Hahn & Hester, *Marketable Permits*]. Another success story occurred in New Jersey, where the state government used tradable development rights to preserve the world’s largest pineland forest. See James T.B. Tripp & Daniel J. Dudek, *Institutional Guidelines for Designing Successful Transferable Rights Programs*, 6 *YALE J. ON REG.* 369, 378-82 (1989). There were also, of course, less successful experiments with tradable pollution rights. See Hahn & Hester, *Marketable Permits*, *supra*, at 391-96 (discussing the failure of water pollution rights trading programs on Wisconsin’s Fox River and Colorado’s Dillon Reservoir).

27. Other mixed property-based approaches include Transfer of Development Rights and Conservation Easements. Where pollution “rights” trading programs involve an allocation of public property to private owners, these other mixed property-based approaches to environmental protection often involve transfers of private property rights to public agencies.

28. See DALES, *supra* note 23, 84-86. These claims have become so common in recent years that many economists and legal scholars now simply presume that command-and-control regulations are inherently inefficient or invariably less efficient than alternative “market-based approaches,” such as effluent taxes and marketable pollution permits. This is inaccurate. See Cole & Grossman, *supra* note 25, at 893.

29. The theory was first elaborated in DALES, *supra* note 23, at 92-97.

sions, in the form of transferable pollution “rights,” among regulated firms. In other words, the state conveys (*i.e.*, privatizes) some public “rights” in the environmental good to private “owners.” The total number of “rights” in circulation should equal the total emissions level the government deemed appropriate to achieve its pollution-reduction goal. Thus, the government’s pollution-reduction goal should be achieved regardless of whether firms can or do trade “rights” to pollute.

The primary purpose of allowing trading, therefore, is not to reduce emissions but to minimize the total cost of reducing emissions.³⁰ By making pollution “rights” transferable, the government “automatically ensures that the required reduction in waste discharge will be achieved at the smallest possible total cost to society.”³¹ The market facilitates the efficient allocation of pollution-control costs among regulated firms. Participating firms with low pollution-control costs may find it worthwhile to reduce emissions below mandated levels, leaving them with excess “rights” to sell to firms with higher pollution-control costs. In theory, exchanges of pollution “rights” should occur at any price below the marginal pollution-reduction costs of some firms and above the marginal pollution-control costs of others (all else being equal).

What distinguishes transferable pollution “rights” schemes from command-and-control regulations is not that the former are property-based while the latter are not. Command-and-control involves the (often implicit) assertion of public/state-property rights on environmental goods. The difference lies in the type and extent of property rights imposed. Command-and-control regulations assert only public property rights, while transferable pollution “rights” schemes impose a combination of public and private property rights on the environmental goods. It is that combination of public and private rights that facilitates more efficient pollution reductions. The public property rights empower the state to set (and re-set) emissions reduction quotas, which primarily determine the extent of pollution-reduction. The private property “rights” conveyed to regulated firms enable them to

30. Trading may, however, facilitate greater net pollution reductions than those required by the government. If there are more sellers than buyers in the pollution “rights” market, *e.g.*, if most regulated firms reduce their emissions below mandated levels, total emissions reductions will exceed the minimum level set by the state (at least temporarily). Indeed, this is precisely what has happened (so far) under the Clean Air Act’s acid rain program (described *infra* this section).

31. DALES, *supra* note 23, at 107.

allocate the costs of achieving pollution reductions most efficiently via the market.

But just what “rights” does the state convey to private resource users/polluters pursuant to a transferable pollution “rights” program? This question has perplexed legislators and commentators alike, as the short history of the Clean Air Act’s acid rain program illustrates.

The “acid deposition control” program established in Title IV of the 1990 Clean Air Act Amendments³² sought to halve sulfur dioxide (SO₂) emissions by the year 2000. A new, two-phase transferable emissions “allowance” scheme was established to accomplish this goal.³³ In Phase I, Congress issued emissions “allowances” (each of which equaled one ton of SO₂ emissions³⁴) for the 110 “dirtiest” power plants in 21 states.³⁵ The total number of allowances allocated equaled approximately one-half the total annual emissions of all 110 plants,³⁶ in order to achieve a 3.5 million ton reduction in aggregate SO₂ emissions before the second phase of emissions reductions takes effect in the year 2000.³⁷ The allowances were allocated to individual generating units based on their average quantity of fossil fuel consumed during the three-year period 1985-87 (assuming 2.5 pounds of SO₂ for each million BTUs of fuel input³⁸).³⁹ In Phase II, the goal will be to reduce SO₂ emissions from all but the smallest generating units⁴⁰ by approximately an additional 5 million tons (based on a formula of 1.2 pounds per million BTUs of fossil fuel input during the 1985-87 period⁴¹).⁴²

Most pollution reductions under this program have been pre-determined by the administratively set emissions quotas. These quotas are traditional “commands,” but they have been issued without at-

32. Pub. L. No. 101-549, 104 Stat. 2399 (codified as amended at 42 U.S.C. §§ 7401-671 (1994)).

33. See 42 U.S.C. § 7651b (1994).

34. See 42 U.S.C. § 7651c(a)(2) (1994); U.S. GEN. ACCOUNTING OFFICE, REP. NO. GAO/RCED-95-30, AIR POLLUTION: ALLOWANCE TRADING OFFERS AN OPPORTUNITY TO REDUCE EMISSIONS AT LESS COST 18 (1994) [hereinafter U.S. GAO]; ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 826 (2d ed. 1996).

35. See U.S. GAO, *supra* note 34, at 2; PERCIVAL ET AL., *supra* note 34, at 828; Byron Swift, *The Acid Rain Test*, ENVTL. F., May-June 1997, at 16, 19.

36. See Swift, *supra* note 35, at 19.

37. See U.S. GAO, *supra* note 34, at 16.

38. See 42 U.S.C. § 7651c(a)(2)(B) (1994).

39. See U.S. GAO, *supra* note 34, at 18 n.4.

40. See 42 U.S.C. § 7651d(b)(1) (1994).

41. See 42 U.S.C. § 7651d(a)(2) (1994).

42. See U.S. GAO, *supra* note 34, at 16.

tendant “controls.” The Act does not specify *how* sources are to meet their emissions reduction targets. In fact, the law does not even require sources to reduce emissions to the levels set by Congress but only to possess allowances equal to their actual emissions. Congress designed the program to utilize market forces by expressly authorizing the nationwide buying and selling of emissions allowances. Sources that can economically reduce their emissions below required levels can sell or bank their excess allowances. Those with higher costs of controlling emissions can purchase extra allowances, *i.e.*, increase their quota, rather than reduce emissions pursuant to the initial allocations.

But just what are these emissions “allowances?” Do they constitute conveyances of “property” from the government to regulated utilities? Well, yes and no. According to the terms of § 403(f) of the 1990 Clean Air Act Amendments:

An allowance allocated under this subchapter is a limited authorization to emit sulfur dioxide Such allowance does not constitute a property right. Nothing in this subchapter or in any other provision of law shall be construed to limit the authority of the United States to terminate or limit such authorization Allowances, once allocated to a person by the Administrator, may be received, held, and temporarily or permanently transferred in accordance with this subchapter and the regulations of the Administrator⁴³

This provision has two purposes. One is to placate environmentalists, many of whom are offended by the very notion of “rights” to pollute (let alone the idea that firms might actually profit from selling excess “rights” to pollute).⁴⁴ Even more importantly, Congress wanted to ensure that the program’s pollution-reduction goals would ultimately be achieved. By specifying that allowances are not property rights and by expressly authorizing the EPA to terminate or limit allowances, Congress empowered the agency to implement the program without fear of having to compensate utilities for “taking” their allowances.

But § 403(f) is premised on the confusion between property rights in something and the thing itself. It provides that an emissions allowance is not “a property right” but expressly recognizes property

43. 42 U.S.C. § 7651b(f) (1994).

44. See Robert W. Hahn & Gordon L. Hester, *Where Did All the Markets Go? An Analysis of EPA’s Emissions Trading Program*, 6 YALE J. ON REG. 109, 142-43 (1989) [hereinafter Hahn & Hester, *Where Did the Markets Go?*].

rights in emission allowances.⁴⁵ According to the section's express terms, utilities can receive, hold (*i.e.*, possess), and transfer (*i.e.*, alienate) allowances. And although the statute does not expressly say so, the utilities can exclude all others besides the government from interfering with their possession, use, and disposition of allowances. These are certainly valuable property rights in emission allowances.⁴⁶ Indeed, there already has been litigation over disputed "ownership" of emission allowances.⁴⁷

The Clean Air Act's acid rain program mixes public and private property rights in emission allowances. The allocation of allowances constitutes a conveyance by the government of some, but not all, of the public's property rights in the atmosphere to the regulated utilities. The specific property rights conveyed include limited rights to possess, use, and exclude. Meanwhile, pursuant to § 403(f) the government expressly reserves the right to terminate or limit the allowances.

From an economic point of view, the legal characterization of property rights in emission allowances is less important than their incentive effects for market participants. The less secure property rights are, the less likely potential buyers will be to invest in them.⁴⁸ Leaseholds, for example, have lower market value than freeholds precisely because of their more limited tenure and security. And there is every reason to suspect that defeasible pollution allowances would have lower market values than absolute pollution rights.⁴⁹ Completely insecure rights would have a market value approximating zero, at which price the market would simply disappear.⁵⁰

45. 42 U.S.C. § 7651b(f) (1994).

46. For a discussion of *de facto* rights that are property rights except in name, see RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 51-53 (5th ed. 1992) (using broadcast frequencies as an example of *de facto* property rights); Bruce Yandle, *Grasping for the Heavens: 3-D Property Rights and the Global Commons*, 10 *DUKE ENVTL. L. & POL'Y F.* 13, 20 & n.32 (1999) (referring to Posner's broadcast frequencies example and also offering the example of Japanese sunshine rights as *de facto* property rights). While *de facto* property rights clearly do exist, one must also be cognizant of their *extent*. See *supra* text accompanying note 19.

47. See, e.g., *Ormet Corp. v. Ohio Power Co.*, 98 F.3d 799 (4th Cir. 1996).

48. See, e.g., POSNER, *supra* note 46, at 36.

49. See Hahn & Hester, *Marketable Permits*, *supra* note 26, at 379 ("To the extent that future confiscation is probable, the value of rights is reduced and fewer advantageous trades can be made.").

50. The EPA has confronted this problem in previous experiments with emissions trading. Consequently, commentators expect the agency to treat sulfur dioxide emissions allowances *as if they were* property rights, except in unusual circumstances. See Jeanne M. Dennis, *Smoke for Sale: Paradoxes and Problems of the Emissions Trading Program of the Clean Air Act Amendments of 1990*, 40 *UCLA L. REV.* 1101, 1137 (1993). The risk of confiscation should, therefore,

The limitations on emission allowances under the Clean Air Act unquestionably *lower* the economic value of the allowances, as several commentators have noted.⁵¹ But they do not render the allowances worthless, any more than a leasehold, usufruct, or defeasible fee is worthless because it is not permanent or absolute. To claim that emission allowances are not property rights simply because they are neither absolute nor perpetual would be tantamount to claiming that fee simple is the only legitimate estate in land.

Pollution "Rights" Trading in Practice

So far, the Clean Air Act's sulfur dioxide emissions trading program for acid rain has been an unalloyed environmental and economic success. As of November 1995, 23 million allowances worth more than \$2 billion had been traded in more than 600 transactions under the acid rain program.⁵² The result has been a far greater than expected reduction in sulfur dioxide emissions, and a 10 to 25 percent decline in acid precipitation in the Northeast.⁵³ According to the EPA, by 1995 the 110 participating power plants had reduced aggregate emissions of sulfur dioxide well below the 8.9 million ton statutory limit;⁵⁴ total emissions in 1995 were 5.3 million tons, 39 percent below the target ceiling and more than 50 percent below 1980 emission levels.⁵⁵ The larger than expected reductions flooded the market with cheaper than expected allowances; prices fell from an average of

be remote. See Adam J. Rosenberg, *Emissions Credit Futures Contracts on the Chicago Board of Trade: Regional and Rational Challenges to the Right to Pollute*, 13 VA. ENVTL. L.J. 501, 508 n.54 (1994).

51. See, e.g., Hahn & Hester, *Where Did the Markets Go?*, *supra* note 44, at 116-17 (noting that uncertainty regarding property rights in emissions creates a disincentive for firms to engage in emissions trading).

52. See PERCIVAL ET AL., *supra* note 34, at 830; Cole & Grossman, *supra* note 25, at 932.

53. See Swift, *supra* note 35, at 17; Cole & Grossman, *supra* note 25, at 932.

54. See 42 U.S.C. § 7651b(a)(1) (1994) (setting out the statutory limit—the emissions cap—of 8.90 million tons of sulfur dioxide); ENERGY INFO. ADMIN., U.S. DEP'T OF ENERGY, REP. NO. DOE/EIA-0582(97), THE EFFECTS OF TITLE IV OF THE CLEAN AIR ACT AMENDMENTS OF 1990 ON ELECTRIC UTILITIES: AN UPDATE 4 (1997) [hereinafter U.S. DOE]; Swift, *supra* note 35, at 17 ("Results from 1995 and 1996 show that . . . utilities have over-complied by emitting 30 percent less sulfur dioxide than the program's emissions cap allows.").

55. See U.S. DOE, *supra* note 54, at 4; Alec Zaccaroli, *Leading the News: Air Pollution: Utilities Achieve 100 Percent Compliance with EPA Acid Rain Program, Report Says*, Env't Rep. (BNA) (Aug. 12, 1996), available in LEXIS, BNA Library, BNANED File; Cole & Grossman, *supra* note 25, at 932.

around \$325 per allowance in 1992 to an average of \$68 per allowance in 1996.⁵⁶

In economic terms, the program has been described as “a terrific bargain.”⁵⁷ The lowest estimates of its annual health benefits—\$12 billion—are four times higher than the highest estimates of annual program costs.⁵⁸ And those calculations exclude more difficult-to-quantify environmental benefits, such as reduced damage from acid rain to forests, waterways, and architecture.⁵⁹ The total cost-savings from trading (as opposed to alternative regulatory controls) are difficult to estimate, but they must be substantial.⁶⁰ Consider that just four utilities have estimated their aggregate savings from purchasing allowances rather than installing scrubbers at \$706 million.⁶¹ This figure almost matches the *total* annual costs of compliance with Phase I reduction requirements for *all* participants, estimated at \$836 million through 1995.⁶²

The success of the acid rain program has encouraged scholars and policymakers to innovate new applications for conserving ocean resources,⁶³ endangered species habitat,⁶⁴ and wetlands.⁶⁵ But questions have been raised about the utility of marketable pollution “rights” for every institutional and ecological context.⁶⁶ Indeed, not

56. See PERCIVAL ET AL., *supra* note 34, at 831-32; Alec Zaccaroli, *Air Pollution: Acid Rain Allowance Auction Generates \$32 Million in Sales; Prices Up Dramatically*, Chem. Reg. Rep. (BNA) (Mar. 28, 1997), available in LEXIS, BNA Library, CHEMRG File; Cole & Grossman, *supra* note 25, at 932.

57. PERCIVAL ET AL., *supra* note 34, at 832; Cole & Grossman, *supra* note 25, at 933.

58. PERCIVAL ET AL., *supra* note 34, at 832; Cole & Grossman, *supra* note 25, at 933. See also DALLAS BURTRAW ET AL., THE COSTS AND BENEFITS OF REDUCING ACID RAIN 26 (Resources for the Future Discussion Paper 97-31-REV, 1997) (concluding that the benefits of the acid rain program exceed its costs “by a substantial margin”).

59. See PERCIVAL ET AL., *supra* note 44, at 832; Cole & Grossman, *supra* note 25, at 933 n.145.

60. See Cole & Grossman, *supra* note 25, at 933.

61. See U.S. GAO, *supra* note 34, at 33-34. The four utilities were Central Illinois Public Service, Illinois Power Company, Duke Power, and Wisconsin Electric Power Company. See *id.*

62. See U.S. DOE, *supra* note 54, at 12.

63. See Carrie A. Tipton, Note, *Protecting Tomorrow's Harvest: Developing a National System of Individual Transferable Quotas to Conserve Ocean Resources*, 14 VA. ENVTL. L.J. 381, 397-400 (1995).

64. See David Sohn & Madeline Cohen, Note, *From Smokestacks to Species: Extending the Tradeable Permit Approach from Air Pollution to Habitat Conservation*, 15 STAN. ENVTL. L.J. 405, 411-15 (1996).

65. See William W. Sapp, *The Supply-Side and Demand-Side of Wetlands Mitigation Banking*, 74 OR. L. REV. 951, 967-70 (1995).

66. For example, see Kathleen A. Miller, *Water Banking to Manage Supply Variability*, 1 ADVANCES IN THE ECONOMICS OF ENVIRONMENTAL RESOURCES: MARGINAL COST RATE

every marketable pollution “rights” program has been as successful as the Clean Air Act’s acid rain program.⁶⁷ However, that program does illustrate the potential economic and environmental benefits of *limited* privatization of environmental goods.⁶⁸

PROPOSITION III.

CLAIMS THAT A SINGLE INSTITUTION—PRIVATE PROPERTY—IS THE FIRST-BEST SOLUTION TO ALL ENVIRONMENTAL PROBLEMS IN THIS SECOND-BEST WORLD ARE INHERENTLY IMPLAUSIBLE, UNSUPPORTED BY ECONOMIC THEORY, AND UNDER-DETERMINED BY EMPIRICAL EVIDENCE.

If the limited privatization of marketable pollution “rights” programs enhances both the efficiency and effectiveness of environmental protection, then should not the *complete* privatization of environmental goods maximize both efficiency and effectiveness? On the theory that if *X* is good then more of *X* must be better, free market environmentalists contend that the complete privatization of all environmental goods would result in optimal environmental protection.

DESIGN AND WHOLESALE WATER MARKETS 185 (Darwin C. Hall ed., 1996), and Barton H. Thompson, Jr., *Institutional Perspectives on Water Policies and Markets*, 81 CAL. L. REV. 673 (1993), which both identify institutional impediments to successful trading programs in water pollution rights.

67. See *supra* note 26 (discussing various successful and unsuccessful experiments with trading schemes).

68. Based on the success of the acid rain trading program, many environmental policymakers now advocate the use of tradable permit systems across a wide spectrum of environmental problems, including at the international level. See, e.g., Sohn & Cohen, *supra* note 64, at 409 (advocating a tradable permit system for habitat conservation); Jonathan Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677, 798 (1999) (stating that global environmental protection should presumptively favor quantity-based tradable allowances). Their advocacy is paying off. The recently concluded Kyoto Protocol climate-change agreement, for example, calls for the institution of a global CO₂ trading system. See Kyoto Protocol, Dec. 10, 1997, art. 6, 37 I.L.M. 22, 35 (not yet in force) (84 signatories and 22 Parties as of Jan. 20, 2000), available at <<http://www.unfccc.de/resource/docs/cop3/107a01.htm>>. However, it is unclear that a trading system would necessarily be more efficient than a technology-based command-and-control system for reducing global greenhouse gas emissions, given the significant institutional and technological constraints of many signatory countries. Those constraints are especially problematic with respect to emissions monitoring, which is a necessary governmental function to ensure the integrity of the trading market. As several authors have noted, monitoring costs tend to be higher for “market-based” systems than for technology-based command-and-control. See, e.g., Cole & Grossman, *supra* note 25, at 904-05, 920-22; Michael T. Maloney & Bruce Yandle, *Estimation of the Cost of Air Pollution Control Regulation*, 11 J. ENVTL. ECON. & MGMT. 244, 247 (1984); cf. CLIFFORD S. RUSSELL ET AL., ENFORCING POLLUTION CONTROL LAWS 3 (1986). If that cost-differential is high enough, then the efficiency advantages of emissions trading may be more than offset. At the very least, policymakers ought to be suspicious of studies that claim great efficiency advantages for tradable permit systems without considering differential monitoring costs.

Indeed, they have criticized marketable pollution “rights” programs as a form of “market socialism.”⁶⁹ No doubt such programs constitute an improvement over the “feudalism” of command-and-control,⁷⁰ but free market environmentalists reject the need for *any* form of government environmental regulation. Instead, they promote a complete private property rights solution to environmental problems.

The theory of free market environmentalism challenges the conventional welfare economics story concerning the causes of environmental problems. It does not deny that environmental problems stem from market failures but notes that those market failures are themselves the result of incompletely specified property rights in environmental goods. Government remedies that ignore that root cause are at best palliative. The only way to cure the underlying cause of the market failure—and, thus, the only truly appropriate and effective remedy for environmental problems—is to completely specify private property rights in environmental goods, *i.e.*, privatize them. Free market environmentalists claim that a system of completely specified and protected property rights should prevent inefficient externalities and, therefore, market failures. And in the absence of market failures, government regulation for environmental protection is neither necessary nor justified.

It is important to recognize that the theory of free market environmentalism cannot be explained solely by reference to the “tragedy of the commons” model, which merely recognizes the need to establish *some* property regime (public, common, or private) to limit access to, and use of, increasingly scarce resources.⁷¹ The free-marketeers argue further that *public* property regimes are inevitably insufficient for effective and efficient conservation. The *complete* privatization of environmental goods, on the other hand, constitutes both a sufficient *and* necessary condition for optimal environmental protection.

69. See, *e.g.*, TERRY L. ANDERSON & DONALD R. LEAL, FREE MARKET ENVIRONMENTALISM 158-59 (1991) (stating that “tradeable permits do not represent a truly free-market approach”); Robert W. McGee & Water E. Block, *Pollution Trading Permits as a Form of Market Socialism and the Search for a Real Market Solution to Environmental Pollution*, 6 FORDHAM ENVTL. L.J. 51, 52 (1994) (stating that, as presently advocated and applied, tradable emission rights systems are “really just a form of market socialism”).

70. See, *e.g.*, Bruce Yandle, *Escaping Environmental Feudalism*, 15 HARV. J.L. & PUB. POL’Y 517, 517, 536-37 (1992) (“United States environmental policy is a modern-day form of feudalism The nationalization of environmental assets that occurred in the late 1960s and early 1970s effectively reduced the centuries-old scope of action for common-law remedies [Through this national system of command-and-control environmental regulation, t]he United States has returned to the law of the manor.”).

71. See *supra* notes 12-21 and accompanying text.

This is a logical but unwarranted extension from Harold Demsetz's historical and theoretical explanations of the emergence of private property rights (in virtually all societies, at some point in their socioeconomic development) to conserve scarce resources by reducing externalities and transaction costs.⁷² Demsetz has never claimed that privatization is the *exclusive* efficient response to increasing scarcity. In stark contrast to free market environmentalists, he expressly maintains that efficiency is at least sometimes maximized through government action rather than market transactions.⁷³

In arguing that a single institution—private property—constitutes the first-best solution for all environmental problems, regardless of institutional and technological contexts, free market environmentalists have taken upon themselves a tremendous burden of proof. It is inherently implausible, in a second-best world in which transaction costs are always positive and usually quite significant, that *any* single institution would constitute a universal first-best solution.⁷⁴ Nevertheless, the advocates of complete privatization attempt to satisfy their heavy burden with arguments about the differential incentives of private property owners and government regulators, anecdotal evidence of government mismanagement of publicly owned resources, and anecdotal evidence of useful conservation efforts by private resource owners.

Like private owners, the politicians and bureaucrats who manage public property seek to maximize their self-interest.⁷⁵ But their incentives are quite different from private owners because bureaucrats and

72. See Demsetz, *Toward a Theory of Property Rights*, *supra* note 12, at 350.

73. See Harold Demsetz, *The Cost of Transacting*, 82 Q.J. ECON. 33, 34 (1968) ("For there are cases in which the cost of government action is less than the cost of transacting in markets. In such cases, we will employ government action that realigns resources more completely than can be achieved economically in the market place."). See also Coase, *Problem of Social Cost*, *supra* note 21, at 18 (explaining that government regulation may, if only on rare occasions, provide a more efficient solution to social problems than markets or firms).

74. See Coase, *Problem of Social Cost*, *supra* note 21, 15-19; KOMESAR, *supra* note 21, at 5-6.

75. See ANDERSON & LEAL, *supra* note 69, at 4, 10-11; RICHARD L. STROUP & JOHN A. BADEN, NATURAL RESOURCES: BUREAUCRATIC MYTHS AND ENVIRONMENTAL MANAGEMENT 43-45 (1983) [hereinafter STROUP & BADEN, NATURAL RESOURCES]; John Baden & Richard Stroup, *Natural Resource Scarcity, Entrepreneurship, and the Political Economy of Hope*, in ECONOMICS AND THE ENVIRONMENT: A RECONCILIATION 117, 132-33 (Walter E. Block ed., 1990) ("[Bureaucrats] are not selfless repositories of virtue and wisdom whose only mission is to advance the public interest. Bureaucrats appear to be approximately as self-interested as others, but they operate in an environment in which they are buffered and insulated from the negative consequences of their actions.") [hereinafter Baden & Stroup, *Political Economy of Hope*].

politicians do not bear the costs of poor management decisions.⁷⁶ They also tend to have shorter time-horizons and higher discount rates than private resource owners.⁷⁷ This is because “there is no ‘voice of the future’ in government equivalent to the rising market price of an increasingly valuable resource.”⁷⁸ For politicians facing re-election in two-, four-, or six-year cycles, the choice between preserving natural resources for unborn generations and developing them for living generations of voters is obvious: future generations always receive the short end of the stick.⁷⁹

Bureaucrats never face re-election, but their incentive structure is closer to that of politicians than private owners. They do not seek to maximize the value of the assets in their control but to maximize budget allocations and administrative turf, while minimizing congressional oversight and interference. As a consequence, they respond not to market signals but to political circumstances, even if doing so “reduces the total value of production.”⁸⁰ The usual result of public

76. As ANDERSON & LEAL, *supra* note 69, at 14, put it, the “*political sector operates by externalizing costs.*” It is also true that private resource owners externalize costs, but only because property rights in environmental goods are not completely specified. *See id.* at 20 (admitting that market transactions fail but usually because the costs of monitoring and measuring resource use are high, *i.e.*, property rights are not well-specified).

77. Many environmental management issues involve significant time-preference aspects. For example, an old-growth forest harvested today will not be available for future generations of users or viewers. All resources owners, whether public or private, implicitly or explicitly weigh present use values against anticipated future benefits, if current use is foregone. They do so by discounting the expected future benefits, reducing them to present day dollars, which can then be directly compared with current use values. If the discounted expected future value is greater than the present use value, the resource will be conserved (*i.e.*, invested for future use); otherwise, it will be presently used or consumed. The comparison of present and future values depends predominantly on two variables: the estimation of future value and the owner’s subjective discount rate, *i.e.*, the interest rate at which they reduce future values to present dollars. A low discount rate favors longer-term investments or conservation; a higher discount rate tends to favor current usage or consumption.

78. STROUP & BADEN, NATURAL RESOURCES, *supra* note 75, at 24. Note that this claim turns on its head a standard welfare economics justification for public ownership of environmental goods: that the discount rates of private owners tend to exceed the social rate of discount, resulting in too rapid resource use and depletion. *See, e.g.*, Harold Hotelling, *The Economics of Exhaustible Resources*, 39 J. POL. ECON. 137, 144 (1931).

79. Studies of congressional voting behavior on environmental legislation indicate that legislators do not vote for or against policies based on abstract conceptions of inter-generational public welfare but on the estimated costs and benefits to living and voting constituents. *See* B. Peter Pashigian, *Environmental Regulation: Whose Self-Interests Are Being Protected?*, 23 ECON. INQUIRY 551, 580-81 (1985). Of course, if living voters themselves are interested in conserving resources for future generations, then congressional voting behavior presumably would reflect the interests of both.

80. GARY D. LIBECAP, LOCKING UP THE RANGE: FEDERAL LAND CONTROLS AND GRAZING 9 (1981) [hereinafter LIBECAP, LOCKING UP THE RANGE].

resource management, according to free market environmentalists, is government failure to allocate environmental goods efficiently or effectively. Indeed, the government itself becomes “the cause of environmental problems.”⁸¹

The advocates of complete privatization illustrate this with numerous anecdotes of bureaucratic mismanagement of publicly owned resources. Gary Libecap, for example, has explained how government range land management practices (especially those limiting the establishment of secure property rights by ranchers) have led to overgrazing on, and desertification of, range land resources.⁸² Richard Stroup and John Baden, among others,⁸³ have pointed to the inefficiencies and environmental harm resulting from federal timber management policies, most notably below-cost timber sales in the National Forests.⁸⁴ Terry Anderson has criticized the Federal Bureau of Reclamation for undertaking uneconomic and environmentally harmful water development projects.⁸⁵ And Richard Epstein, among others,⁸⁶ has decried the perverse incentives created by well-meaning but misguided federal wildlife preservation policies.⁸⁷ The entire history of public resource management, Thomas Borcharding laments, is an immense tragedy of the “political commons,”⁸⁸ the only solution to which is complete privatization.

81. Baden & Stroup, *Political Economy of Hope*, *supra* note 75, at 132.

82. See LIBECAP, LOCKING UP THE RANGE, *supra* note 80, at 14, 28, 31-36. See also CHARLES F. WILKINSON, CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE AMERICAN WEST 80, 111-12 (1992) (“Overgrazing has put nearly 10 percent of all land in the American West in a state of severe desertification . . . [A]n impressive body of evidence indicates that the root concern is neither subsidies nor numbers of cattle. Rather, the real [problem] is poor cattle management.”).

83. See, e.g., William F. Hyde, *Compounding Clear-Cuts: The Social Failures of Public Timber Management in the Rockies*, in BUREAUCRACY VS. ENVIRONMENT: THE ENVIRONMENTAL COSTS OF BUREAUCRATIC GOVERNANCE 186 (John Baden & Richard L. Stroup eds., 1981). See also, e.g., Robert Repetto, *Subsidized Timber Sales from National Forest Lands in the United States*, in PUBLIC POLICIES AND THE MISUSE OF FOREST RESOURCES 353, 357-58, 379 (Robert Repetto & Malcolm Gillis eds., 1988) (“Despite difficulties in evaluation, the weight of evidence indicates substantial economic inefficiencies in national forest management . . .”).

84. See Richard Stroup & John Baden, *Externality, Property Rights and the Management of Our National Forests*, 16 J.L. & ECON. 303, 309-11 (1973).

85. See Terry L. Anderson, *Enviro-Capitalism vs. Enviro-Socialism*, KAN. J.L. & PUB. POL’Y, Winter 1995, at 35, 36.

86. See, e.g., ANDERSON & LEAL, *supra* note 69, at 58-59.

87. See RICHARD A. EPSTEIN, SIMPLE RULES FOR A COMPLEX WORLD 291-96 (1995).

88. See Thomas E. Borcharding, *Natural Resources and Transgenerational Equity*, in ECONOMICS AND THE ENVIRONMENT: A RECONCILIATION 95, 99 (Walter E. Block ed., 1990).

Privatization would replace the decision-making of bureaucrats and politicians with that of private owners, whose incentive structures, according to free market environmentalists, are conducive to economically and environmentally sound resource management. Most importantly, the information provided by market prices provides incentives for private resource owners (but not public resource managers) to take a longer-term perspective. As Stroup and Goodman explain,

The current market price reflects the present, discounted value of all future revenue flows that are expected to stem from [an] asset.

The ability to capitalize future value into an asset's present value induces property owners to consider the long-term implications of their asset-use decisions. It creates a strong incentive for owners to consider fully the effects of deferring consumption of their asset returns. Furthermore, it implies that property owners will be responsible to future users. Any activity that reduces the future benefits or increases the future costs stemming from an asset results in a reduction of that asset's current value. As soon as an appraiser or potential buyer anticipates future problems, his assessment of a property's value falls, and the owner's wealth declines immediately

Potential buyers interact with owners to maximize asset value over time.⁸⁹

Free market environmentalists surely are right about the environmental inadequacies and economic inefficiencies of bureaucratic resource management. Private resource ownership is without a doubt economically and environmentally preferable to public ownership and regulation in some (perhaps many) cases. But that hardly proves that the complete privatization of *all* environmental goods is both necessary and sufficient for effective and efficient environmental protection. To prove that, advocates must show that privately owned resources are inevitably better conserved and protected from pollution than publicly owned and managed resources. At the very least, they need to show that the benefits of privatization would *always* outweigh the costs, including the transaction costs.⁹⁰ This would require a sys-

89. Stroup & Goodman, *supra* note 4, at 431-32. Stroup and Goodman fail to mention that only *economic* values are maximized through this interaction. They simply presume that market prices capture all environmental values worth considering. This neglects the fact that there are no markets—hence no market prices—for certain ecological values; and there might not be even if all environmental goods were privatized. See Menell, *supra* note 5, at 493-94.

90. Transaction costs arguably are the key to understanding institutional choice. See R.H. Coase, *The Nature of the Firm*, 4 *ECONOMICA* 386, 390-92 (1937) (arguing that transaction costs explain why certain economic activities are organized in firms, rather than markets).

tematic study of the costs and benefits of privatization, for which anecdotes are no substitute.

Meanwhile, several empirical and theoretical economic studies suggest that private ownership is *not* the best solution to every environmental problem. Colin Clark's studies of the economics of whaling, for example, demonstrate that the "extermination of the entire [whale] population may appear as the most attractive policy, even to an individual resource owner," when "(a) the discount (or time preference) rate sufficiently exceeds the maximum reproductive potential of the population, and (b) an immediate profit can be made from harvesting the last remaining animals."⁹¹ Daniel Bromley reminds us of the Dust Bowls that resulted when supposedly "omniscient" private entrepreneurs" plowed up the prairies against the advice of government agricultural experts.⁹² More recently, in the late 1980s private timber owners accelerated harvests beyond sustainable levels in order to avert or pay for junk bond-financed hostile takeovers.⁹³ In these cases, private ownership did not guarantee the low discount rates and long time horizons that are necessary for resource conservation.

Free market environmentalists have, on occasion, acknowledged the need for transaction cost analyses. In their 1991 book, *Free Market Environmentalism*, Terry Anderson and Donald Leal concede that "[p]roperty rights are costly to define and enforce."⁹⁴ In an earlier work, Anderson and co-author Peter Hill explicitly recognized that "the definition and enforcement process may preclude whatever gains might have been realized by the establishment of [property] rights."⁹⁵ Yet, one is hard pressed to locate in the free market envi-

91. Colin W. Clark, *Profit Maximization and the Extinction of Animal Species*, 81 J. POL. ECON. 950, 951 (1973). See also Colin W. Clark, *The Economics of Overexploitation*, 181 SCI. 630, 630 (1974); Bruce A. Larson & Daniel W. Bromley, *Property Rights, Externalities, and Resource Degradation: Locating the Tragedy*, 33 J. DEV. ECON. 235, 242 (1990); Edella Schlager & Elinor Ostrom, *Property-Rights Regimes and Natural Resources: A Conceptual Analysis*, 68 LAND ECON. 249, 256 (1992).

92. BROMLEY, *supra* note 7, at 171.

93. See THOMAS MICHAEL POWER, *LOST LANDSCAPES AND FAILED ECONOMIES* 138 (1996).

94. ANDERSON & LEAL, *supra* note 69, at 167.

95. Terry L. Anderson & Peter J. Hill, *Privatizing the Commons: An Improvement?*, 50 S. ECON. J. 438, 438 (1983):

[U]nder certain institutional arrangements, the establishment of private rights to resources can leave a society no better off than when rights were held in common. In other words, the "tragedy of the commons" may be no worse than the rent dissipation that can result in the process of private property establishment.

Others, including several critics of free market environmentalism, have made the same point. See, e.g., Susan Hanna et al., *Property Rights and Environmental Resources*, in PROPERTY

ronmentalist literature efforts to systematically assess the transaction costs of privatization.⁹⁶ Absent such efforts, there is reason for skepticism about their blanket privatization prescriptions for domestic and international environmental policy.

There is a weaker version of free market environmentalism, however, that is more realistic than the stronger version just presented. The weaker version maintains that (1) privatization is a legitimate (sometimes preferable) option, which should be considered in comparative institutional analyses for policymaking; and (2) the choice of institution (public ownership/regulation versus unregulated private ownership) is not a once-and-for-all decision but is contingent on changing institutional and technological circumstances.⁹⁷

This weaker version of free market environmentalism appears uncontroversial, although it correctly implies an important consideration that conventional welfare economists often neglect: there is no such thing as a pure "public good." "Public goods" are determined economically by reference to the rates of supply and demand and the costs of privatization, given the technological capabilities of the time. Because technological capabilities and rates of supply and demand are subject to change, something that is deemed a "public good" today, such as the atmosphere, may become efficiently privatize-able at some time in the future.⁹⁸ Anderson and Hill have pointed out, for example, that the innovation of barbed wire in the 1870s greatly reduced the cost of enclosing land, thereby facilitating the settlement and privatization of public lands in the western United States.⁹⁹ Be-

RIGHTS AND THE ENVIRONMENT: SOCIAL AND ECOLOGICAL ISSUES 15, 18 (Susan Hanna & Mohan Munasinghe eds., 1995).

96. Gary Libecap's book, *Contracting for Property Rights*, is exceptional in providing historical and empirical transaction cost analyses. But his findings hardly support the complete privatization of all environmental goods. Rather, Libecap's analyses explain why some "open access" resources have been privatized, while others have been subjected to public ownership/regulatory control or remain "open access." See GARY D. LIBECAP, *CONTRACTING FOR PROPERTY RIGHTS* (1989).

97. This weaker version of free market environmentalism is usually presented implicitly, rather than explicitly. See, e.g., ROBERT H. NELSON, *PUBLIC LANDS AND PRIVATE RIGHTS: THE FAILURE OF SCIENTIFIC MANAGEMENT* 218-24 (1989) (advocating the privatization of some public lands).

98. It should be noted, however, that historical change is not uni-directionally towards private property. Property rights sometimes evolve in the opposite direction, from more sharply defined private rights to more ambiguous correlative rights. This has been the case, for example, with water law. See generally Carol M. Rose, *Energy and Efficiency in the Realignment of Common-Law Water Rights*, 19 J. LEGAL STUD. 261 (1990).

99. See Terry L. Anderson & P.J. Hill, *The Evolution of Property Rights: A Study of the American West*, 18 J.L. & ECON. 163, 172 (1975). See also Cole & Grossman, *supra* note 25,

cause what counts as a “public good” can change, it is vital that institutional choices not become reified; they must remain subject to revision as ever-changing circumstances alter comparative institutional analyses.

The weaker version of free market environmentalism is not consistent with the stronger one. The weaker version recognizes that the best mixture of property rights and regulatory regimes depends on institutional and technological factors, while the stronger version posits that *all* environmental goods should be completely privatized for optimal efficiency and environmental protection. The stronger version implicitly rejects the concept of “public good” in its entirety, so that there is no longer any point in engaging in comparative institutional analyses for public policymaking. It simply dispenses with the contest and declares victory on behalf of total and final privatization.

PROPOSITION IV.

PRIVATIZATION OF RESOURCE USERS AND POLLUTERS IS MORE IMPORTANT THAN PRIVATIZATION OF ENVIRONMENTAL GOODS IN THE REAL (SECOND-BEST) WORLD, FOR REASONS OF REGULATORY EFFICIENCY AND EFFECTIVENESS.

One issue concerning the relation between property rights and environmental protection that almost no one addresses (perhaps because it is so obvious) is the critical importance of private ownership of resource users and polluters for effective and efficient environmental protection. Indeed, as the author has argued elsewhere,¹⁰⁰ public ownership of polluters and resource users is likely, for reasons of regulatory efficiency, to be far more detrimental to environmental protection efforts than public ownership of the environmental goods themselves.

Private ownership of resource users and polluters averts the *regulatory conflict of interest* that inevitably arises whenever the government owns the very enterprises it is responsible for regulating, *e.g.*, for environmental protection. The Hungarian economist János Kornai has famously explained how governments invariably soften budget constraints for state-owned enterprises, relieving them from the competitive pressures of the marketplace, *i.e.*, the need to profit

921-22, 933-34 (arguing that the development of cost-effective continuous emissions monitoring systems between the mid-1970s and 1990 made marketable permit programs a feasible, and in some cases preferable, alternative to technology-based command-and-control regulation).

100. See COLE, *supra* note 8, at 227-28.

to survive.¹⁰¹ The French jurist Laurent Cohen-Tanugi has noted a similar softening of law constraints—the state relaxes regulatory standards and enforcement against enterprises in which it has a direct financial stake.¹⁰²

Softened budget and law constraints pose a great threat to effective and efficient environmental protection and resource conservation. More than any other institutional factors, they explain the environmental and economic failings of communism.¹⁰³ Polluters and resource users throughout the former Soviet Bloc were systematically insulated from the enforcement and fiscal consequences of environmental laws and regulations. Consequently, the communist countries of Europe suffered from environmental crises unparalleled in human history. But since communist institutions were replaced by democratic and market institutions beginning in 1989, former Soviet Bloc countries have experienced remarkable improvements in environmental protection.

In Poland, for example, the private sector's share of economic growth has overtaken the residual public sector.¹⁰⁴ Budget and law constraints have hardened for almost all sectors of the economy (mining being a notable exception), leading to improved economic and environmental performance.¹⁰⁵ Poland's economy has been among the fastest growing in Europe for several years running.¹⁰⁶ Meanwhile, pollution emissions have declined dramatically and continuously since 1990.¹⁰⁷ Indeed, environmental protection is among the great (and under-appreciated) success stories of the transition to market democracy throughout Eastern Europe.

101. See, e.g., János Kornai, *The Soft Budget Constraint*, 39 KYKLOS 3, 13-21 (1986) (describing the softening of budget constraints in Hungary, Yugoslavia, and China, and concluding that “[s]ocialist economies exhibit a rather extreme degree of budget constraint softness”); COLE, *supra* note 8, at 152-53..

102. See LAURENT COHEN-TANUGI, *LE DROIT SANS L'ÉTAT: SUR LA DÉMOCRATIE EN FRANCE ET EN AMÉRIQUE* (1985).

103. See COLE, *supra* note 8, at 146-53. The environmental failure of communism may provide the clearest illustration of the regulatory conflict of interest that arises when the state owns the enterprises it is charged with regulating. But it is far from the only example. The problem arises virtually whenever the state owns polluters and resource users. Consider the differential treatment in the United States (and other countries) of privately owned versus publicly owned nuclear power. See *id.* at 149-50. Privately owned nuclear power plants (overseen by the Nuclear Regulatory Commission) have been policed far more effectively and transparently than federally owned nuclear facilities (overseen by the Departments of Defense or Energy). See *id.*

104. See *id.* at 190, 197.

105. See *id.* at 197-99.

106. See *id.* at 193.

107. See *id.* at 192.

A free market environmentalist might wonder, however, whether environmental protection might have improved even more in post-communist Poland had the State privatized not only state-owned enterprises (polluters and resource users) but the environmental goods themselves (*e.g.*, public lands, forests, and waterways). Perhaps, but there is reason for doubt. In Poland's case at least, public ownership of environmental goods did not automatically give rise to the regulatory conflicts of interest that resulted from public ownership of polluters and resource users.

In the 1960s to 1980s, as Poland became one of the world's most polluted countries, it managed to retain approximately 27 percent of its territory in "natural" condition.¹⁰⁸ As the economist Tomasz Żylicz has explained,

[B]ecause the communist industrialization concentrated in areas of traditionally high intensity of production, vast regions remained largely underdeveloped. These regions and their almost intact natural capital represent an asset which is becoming increasingly scarce in Europe[;] . . . about 8.5 percent of the area of [Poland] remains relatively unscathed by development. Commercial forests and farms operating within sustainable and ecologically acceptable principles include about 19 percent of Polish territory. Hence, over a fourth of Poland represents an asset that many areas of Europe no longer have.¹⁰⁹

Where the state did not provide an opportunity to exploit, develop, or pollute publicly owned resources, those resources, including many publicly managed national parks and forest reserves, remained "in their natural state."¹¹⁰ As a consequence, post-communist Poland retains ecological assets no longer found in the rest of Europe, including the last stands of primeval European forest and the last free-roaming herds of European bison.

Poland's experience challenges the free market environmentalists' fundamental premise that public ownership of environmental goods works just as badly for economic efficiency and environmental

108. See ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, ENVIRONMENTAL PERFORMANCE REVIEWS: POLAND 88 (1995) ("In 1991, while 11 per cent [sic] of Poland was considered to be 'severely environmentally threatened', 27 per cent [sic] was in natural or close to natural state.") [hereinafter OECD, POLAND].

109. Tomasz Żylicz, *Will New Property Right Regimes in Central and Eastern Europe Serve the Purposes of Nature Conservation*, in PROPERTY RIGHTS IN A SOCIAL AND ECOLOGICAL CONTEXT: CASE STUDIES AND DESIGN APPLICATIONS 63, 64 (Susan Hanna & Mohan Munasinghe eds., 1995); see also COLE, *supra* note 8, at 229 (quoting the same passage).

110. OECD, POLAND, *supra* note 108, at 88. Use of this quote is not meant to endorse the concept of a uniquely "natural state."

protection as public ownership of other resources.¹¹¹ This is not to say that public resource management is optimal or even preferable to private resource ownership. The point is that the state of ownership may not always be the key factor. Other factors, such as management policies, budget constraints, discount rates, economies of scale, technological capabilities, and even culture and ideology, may play more important roles in specific cases.

This raises interesting questions for free market environmentalists. Do their anecdotes of “government failure” in environmental resource management carry necessary implications for ownership? Or might they simply reflect curable defects in regulatory policy? Interestingly, virtually all of the free market environmentalists’ horror stories of government mismanagement concern environmental goods subject to multiple-use management, which by its very nature (balancing economic development and environmental preservation values) generates regulatory conflicts of interests.¹¹² A state agency that has contradictory missions to exploit and preserve a single resource is unlikely to do a very good (*i.e.*, efficient or ecologically sound) job of either.¹¹³ It seems clear, at any rate, that public ownership of environmental goods does not always result in a tragedy of the political commons, even in countries with generally woeful records of environmental protection.¹¹⁴ But the more obvious point—that resource users and polluters must be privately owned for environmental protection to be successful—may be even more important for policymakers to remember.

111. See Stroup & Goodman, *supra* note 4, at 427.

112. One rarely finds “horror stories” of government mismanagement of dominant or single use resources, such as Wilderness Areas, in the free market environmentalist literature. Of the dozens of tales of government mismanagement of environmental goods that Terry Anderson and Donald Leal recount in *Free Market Environmentalism*, not one concerns resources subject to single or dominant use management. It is interesting to note in this context that privatization of public lands would itself amount to a conversion from multiple-use to dominant-use management, with the dominant (but not necessarily exclusive) use determined by the interest of the private owner. But if the conversion from multiple-use to dominant-use by privatization is feasible, then one wonders whether insuperable obstacles prevent the government from achieving the same end by altering the management regime without changing the ownership structure.

113. See Michael C. Blumm, *Public Choice Theory and the Public Lands: Why “Multiple Use” Failed*, 18 HARV. ENVTL. L. REV. 405, 407 (1994).

114. By the same token, it is clear that private ownership does not always guarantee the conservation of environmental goods. See *supra* notes 91-95 and accompanying text.

CONCLUSION:
PROPERTY RIGHTS HAVE LIMITED UTILITY FOR INTERNATIONAL
ENVIRONMENTAL PROTECTION

In the mid-1970s, when federal environmental regulation was just getting off the ground in the United States, Nobel laureate Robert Solow wisely cautioned that society should be as skeptical of uncritical centralization as of uncritical free-marketizing.¹¹⁵ Today, as some economists advocate the complete privatization and deregulation of environmental goods, it is worth bearing in mind that Solow's admonition cuts both ways. There is no question that privatization—the allocation of private property rights in environmental goods—is *a* useful tool for environmental protection. But there are good reasons for skepticism about the blanket claims of free market environmentalists, especially in the international arena.

In the first place, it is difficult to imagine that any single social institution—including private property—could constitute a first-best solution for all environmental problems in this second-best world, with its wide variety of institutional and technological contexts and complexities. Moreover, it is especially difficult to imagine this in the absence of transaction cost analyses, which would provide some basis for institutional comparison and choice. No doubt, transaction cost analyses would often point to private property as a preferable institutional alternative, at least in societies with well-developed institutions to protect private property rights. But the real world and global environmental issues are far too complex and variable for the simplistic (but not so simple¹¹⁶) solution proffered by free market environmentalism.

115. See Robert M. Solow, *Richard T. Ely Lecture: The Economics of Resources or the Resources of Economics*, 64 AM. ECON. REV. 1, 12 (1974).

116. It is one thing to advocate privatization and quite another to implement it in a politically feasible way, which is precisely why transaction cost analyses are so important. There are several methods by which a state could transfer public property to private owners, each of which would benefit certain contenders over others. Even auctions, which may appear to be the most fair method (as well as the most remunerative for the government), have distributional ramifications. Because willingness-to-pay reflects ability-to-pay, auctions clearly would advantage those contenders with the largest pre-existing endowments. Furthermore, contenders can be expected to lobby, before the fact of privatization, for the privatization method that favors them over competitors. This political competition over the method of privatization inevitably increases the transaction costs of privatization.

Historically, the U.S. government has only rarely utilized the auction method to privatize natural resources. Indeed, many of the cases of governmental mismanagement of resources pointed to by free market environmentalists, such as below-cost timber sales in the National Forests and below-market grazing fees on BLM lands, constitute inefficient, non-market allocations of (limited) public property rights to private owners. See COLE, *supra* note 8, at 231-32.

The best instrument for environmental protection ultimately depends on technological and institutional circumstances that too many economists and legal scholars neglect. Because those circumstances are highly variable, especially at the international level, no single approach is appropriate for every circumstance. Indeed, for many countries—especially those with endemically soft budget and law constraints—institutional change itself is a prerequisite for any system of effective and efficient environmental protection, no matter which policy instrument is preferred in theory.