

PROPERTY RIGHTS SOLUTIONS FOR THE GLOBAL COMMONS: BOTTOM-UP OR TOP-DOWN?

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I. INTRODUCTION

Environmental concerns often ignore geo-political borders. Problems that previously were dealt with by one nation and its government now involve scores of nations and their governments. At one time, policymakers focused predominantly on local matters, where pollutants might simply cross the boundary of two neighbors' backyards, or interstate problems, such as air and water pollution that could be handled within a nation or two. Now, however, policymakers are faced with international problems, such as the extinction of species, and global problems, such as ozone depletion and global warming.

Local environmental concerns are best understood and resolved in a framework initially developed by Nobel laureate Ronald H. Coase, wherein these concerns are viewed as a competition over conflicting uses for scarce resources.¹ In this context, air pollution by a factory is simply a use of air that conflicts with others' enjoyment of that resource. So, the question then becomes: which user has a right to the air?² Conflicting uses, such as in the air pollution example, can be resolved through bargaining if well-defined property rights specify who has the right to use the resources and therein derive value from them.³

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1. See R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 2, 15 (1960).

2. See *id.* at 15 (“[I]t has to be remembered that the immediate question . . . is *not* what shall be done by whom *but* who has the legal right to do what.”).

3. See *id.*

The main question this article addresses is whether the Coasean property rights solution to environmental problems can be used as effectively on the international level as it has been used on the local level. Specifically, the authors pose the following two questions: (1) can effective property rights be created under international law, and (2) can and should such property rights be created top-down instead of bottom-up? In this article, “top-down” means government-mandated property rights, and “bottom-up” means customary, common law property rights that are formed over time when conflicts over resource use arise.

In addressing these questions, this article first contrasts the Coasean view of conflicting resource use with the Pigouvian view of externalities. It then considers the importance of time- and place-specific information in the evolution of property rights to determine how they are established. Then, the article contrasts bottom-up property rights with the prospect of developing effective top-down property rights and provides examples of both. Acknowledging that transaction costs may thwart privatization of the global commons (*e.g.*, the global atmosphere), it then addresses the limits of top-down solutions and offers policy suggestions that build on property rights and the rule of law.

II. TWO VIEWS OF THE COMMONS: PIGOU VS. COASE

Following A. C. Pigou,⁴ the dominant policy approach for solving environmental problems has been to use government’s power to tax and regulate.⁵ Government intervention is seen as justified when externalities exist. The term “externality” refers to an economic concept asserting that inefficiencies result when costs incurred and benefits received by individuals involved in an economic transaction or activity do not incorporate *all* the costs and benefits to society.⁶ Therefore, a transaction that seems efficient to the individual parties to a transaction may really be inefficient from the viewpoint of society

4. A.C. PIGOU, *THE ECONOMICS OF WELFARE* 172-203 (AMS Press 1978) (4th ed. 1932):

5. See Bruce Yandle, *Coase, Pigou, and Environmental Rights*, in *WHO OWNS THE ENVIRONMENT?* 119, 127 (Peter J. Hill & Roger E. Meiners eds., 1998) [hereinafter Yandle, *Coase and Pigou*].

6. See Terry L. Anderson, *Bucking the Tide of Globalism: The Free Market Alternative*, in *THE GREENING OF U.S. FOREIGN POLICY* (Terry L. Anderson & Henry I. Miller eds., forthcoming 2000) [hereinafter *GREENING U.S. FOREIGN POLICY*]. A classic externality example is planting a flower garden. The property owner who plants flowers benefits from their aesthetic beauty, but so does his neighbors; yet, the neighbors bear none of the costs associated with planting or maintaining the flowers and still receive their benefits.

because of the existence of externalities.⁷ *Negative* externalities are present when a portion of the *costs* of an economic transaction are imposed on others outside of that transaction without their consent. According to this reasoning, negative externalities result in over-production or over-use of resources, because resource users do not bear the full costs associated with their activities.⁸ This problem can turn into a “tragedy of the commons” when every user of a commons receives the full marginal benefit from their use, but bears only a portion of the marginal cost.⁹

Coase, however, offered a different approach to the problem of social cost.¹⁰ Coase did not think in terms of externalities, but rather considered pollution and clean air (or water, forests, wildlife habitat) as conflicting or alternative resource uses for which there is competition.¹¹ According to Bruce Yandle,

This approach considers the paper mill and others who wish to consume or enjoy water quality as a part of a competitive market where people bargain for the use of the rights to scarce property.

7. An externality is negative when its costs are imposed on those other than the owner and positive when it results in benefits for those other than the owner. The flower garden example mentioned in the note above results in a positive externality. Noise from a factory that drifts onto neighboring properties, creating a nuisance, is an example of a negative externality. In this example, the factory receives the full benefit of its production process (and its attendant noise) in the form of whatever it is selling, but bears only part of the costs, as the community bears part of the noise costs associated with its production process.

8. Positive externalities result in under-production as others receive benefits without paying for them—the free rider problem. See *supra* text accompanying note 7 for further explanation.

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

10. See Coase, *supra* note 1, at 42-43.

11. See *id.* at 15. Coase entitled his paper *The Problem of Social Cost* because he disagreed with the Pigouvian formulation of the problem in terms of “externality,” or the divergence between private and social costs. See *id.* at 42-43. Pigou did not actually use the term “externality;” however, the concept of externality can be traced back to Pigou’s analysis of the divergences between social and private net product. See Steven N.S. Cheung, *The Structure of a Contract and the Theory of a Non-Exclusive Resource*, 13 *J.L. & ECON.* 49, 64 (1970); see also PIGOU, *supra* note 4, at 174:

The source of the general divergences between the values of marginal social and marginal private net product that occur under simple competition is the fact that, in some occupations, a part of the product of a unit of resources consists of something, which, instead of coming in the first instance to the person who invests the unit, comes instead, in the first instance . . . as a positive or negative item[] to other people.

For other works criticizing the concept of externality, see Cheung, *supra*, at 70 (“The concept of ‘externality’ is vague because every economic action has effects; it is confusing because classifications and theories are varied, arbitrary, and *ad hoc*. For these reasons, theories generated by the concept of ‘externality’ are not likely to be useful.”); Richard Stroup & John Baden, *Externality, Property Rights, and the Management of Our National Forests*, 16 *J.L. & ECON.* 313, 307 n.8 (1973) (finding Cheung’s suggestion—that the term “externality” is so broad as to be useless—to be “a cogent and productive perspective”).

This analysis has nothing to do with polluters' imposing costs on society, but everything to do with competing demands for use of an asset.¹²

The focus on competing uses rather than on social costs necessitates resolving an important question: who has the property rights to a scarce resource? While free trade and competition for resource use resolves which use is valued higher, the issue of who actually owns the property right to a scarce resource must be resolved. Thus, the Coasean perspective defines environmental problems not in terms of externalities, but rather as problems brought about by ill-defined property rights.¹³

In order for a system of bargaining to resolve conflicting resource uses, property rights to the resource in question must be defined, divisible, and defensible.¹⁴ Given such property rights, two parties with an interest in the same resource may voluntarily negotiate for its use, and the party who values the use highest will offer the greatest compensation to the owner, thereby winning the right to use the resource.¹⁵ This institutional framework of competitive resource use and property rights has fostered the resolution of environmental problems at the local and national level for centuries.¹⁶

As Coase recognized, however, establishing property rights, bargaining over them, and enforcing them have associated transaction costs.¹⁷ The definition and enforcement of property rights requires

12. Yandle, *Coase and Pigou*, *supra* note 5, at 120.

13. See Coase, *supra* note 1, at 19.

14. See TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM* 20 (1991) [hereinafter ANDERSON & LEAL, *FREE MARKET ENVIRONMENTALISM*]; Bruce Yandle, *Grasping for the Heavens: 3-D Property Rights and the Global Commons*, 10 *DUKE ENVTL. L. & POL'Y F.* 13, 14 & n.3 (1999) (referring to property rights that have these three conditions as "3-D property rights") [hereinafter Yandle, *Grasping for the Heavens*].

15. See Coase, *supra* note 1, at 2-8.

16. For examples of property rights working on these levels, such as water marketing, fee hunting, pollution control and others, see ANDERSON & LEAL, *FREE MARKET ENVIRONMENTALISM*, *supra* note 14; TERRY L. ANDERSON & DONALD R. LEAL, *ENVIRONMENTAL CAPITALISTS: DOING GOOD WHILE DOING WELL* (1997); BRUCE YANDLE, *COMMON SENSE AND COMMON LAW FOR THE ENVIRONMENT: CREATING WEALTH IN HUMMINGBIRD ECONOMIES* (1997) [hereinafter YANDLE, *COMMON SENSE AND COMMON LAW*].

17. See Coase, *supra* note 1, at 15:

In order to carry out a market transaction it is necessary to discover who it is that one wishes to deal with, to inform people that one wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on. These operations are often quite costly, sufficiently costly at any rate to prevent many transactions that would be carried out in a world in which the pricing system worked without cost.

investments on the part of would-be owners.¹⁸ Once rights are established, bargaining over resource use can also be costly, especially if the value of a particular use comes from an aggregation of individual users' rights. If definition and enforcement and/or bargaining are too costly, then it may be difficult or impossible for the Coasean system to resolve the conflicting uses.¹⁹ Hence, two questions must be answered: (1) how are the initial property rights established, and (2) once established, what are the transaction costs of bargaining over, enforcing, and transferring property rights?

III. CREATION OF PROPERTY RIGHTS: FROM THE BOTTOM-UP OR THE TOP-DOWN?

Property rights may evolve from the bottom-up as individuals competing for resource uses assert their claims to be free of other competing uses.²⁰ Harold Demsetz notes that whether *res nullius* (open access) or private property governs resource use depends on the level of benefits expected from the property and the costs of monitoring and enforcing the property right by excluding others.²¹ When resources become scarcer or the costs of definition and enforcement decline, the possibility that property rights will be asserted and defended increases. Consider the example offered by Richard Posner of a primitive society whose principal use of land is grazing and whose numbers are relatively small compared to the amount of land.²² If there is plenty of unimproved grazing land to go around, in other words, if there are not competing uses, the costs of enforcing property rights are substantial relative to the benefits, and there is no call for property rights.²³ However, as population growth creates competing uses, the land resource becomes valuable and competition for use increases. Pressure builds to define and enforce property rights and to find lower cost methods of doing so. In essence, the production of property rights responds to the economic calculus of

18. See Terry L. Anderson & P.J. Hill, *The Evolution of Property Rights: A Study of the American West*, 18 J.L. & ECON. 163, 165-67 (1975) [hereinafter Anderson & Hill, *Evolution of Property Rights*].

19. See Coase, *supra* note 1, at 16.

20. See Anderson & Hill, *Evolution of Property Rights*, *supra* note 18, at 164-68.

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

22. See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 39 (5th ed. 1998).

23. See *id.*

marginal benefits and marginal costs.²⁴ Once the benefits of property rights outweigh the costs of definition and enforcement, a property system develops.²⁵

Yet, property need not be claimed solely by individuals. Often, as Elinor Ostrom illustrates, community property rights arise to resolve conflicting uses.²⁶ In *Governing the Commons*, Ostrom defines a common pool resource as “a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from obtaining benefits from its use.”²⁷ Problems that arise from a common pool resource are similar to those that arise from the free rider problem.²⁸ Ostrom notes that “[w]hen appropriators act independently in relationship to a [common pool resource] generating scarce resource units, the total net benefits they obtain usually will be less than could have been achieved if they had coordinated their strategies in some way.”²⁹ In order to combat these problems, common property often arises.³⁰ As Margaret McKean and Ostrom put it, this “common property is shared private property” that gives all of the individual owners a claim in the whole resource and thus instills them with proper incentives to protect the resource.³¹

Whether property rights evolve as private or as shared common property, definition and enforcement costs are likely to be lower at the local level because those involved in the process have more incentive and greater ability to economize on expenditures.³² There are a

24. See Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 350 (1967).

25. Numerous texts cite the development of property through technologies both improving the value of property and lowering the cost of enforcing it. See, e.g., Anderson & Hill, *Evolution of Property Rights*, *supra* note 18. For instance, the invention of barbed wire and the development of branding techniques lowered costs of enforcing and demarcating property in the Old West. See *id.* at 172. The benefits of devoting resources to defining and enforcing property rights also grew as more people crowded into the Old West, making good land scarce relative to the number of people, which increased its value. See *id.*

26. See ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* 20-21 (1990).

27. *Id.* at 30. Fisheries are a classic example of a common pool resource. See, e.g., H. Scott Gordon, *The Economic Theory of a Common Property Resource: The Fishery*, 62 J. POL. ECON. 124 (1954).

28. See OSTROM, *supra* note 26, at 32-33. See *supra* text accompanying note 8.

29. See *id.* at 38.

30. See *id.* at 18-21.

31. M. McKean & E. Ostrom, *Common Property Regimes in the Forest: Just a Relic From the Past?*, UNASYLVA, 1995/1, at 3, 6.

32. See Terry L. Anderson & Peter J. Hill, *Privatizing the Commons: An Improvement?*, 50 S. ECON. J. 438, 441 (1983) [hereinafter Anderson & Hill, *Privatizing the Commons*]:

number of reasons to expect this. Individuals at the local level are likely to be more culturally homogeneous, and that homogeneity provides norms that can help resolve conflicts in closely knit groups.³³ Such social and cultural norms develop over time as efficiency-enhancing norms replace efficiency-reducing ones and as those who disagree with norms move where the norms better fit their preferences.³⁴ Cultural homogeneity also reduces transaction costs through common language that can lower the costs of specifying property rights and negotiating over their use.³⁵

Adjudication procedures are also likely to be less costly in a culturally homogeneous group. Cultural norms specify right and wrong behavior and provide low-cost ways of resolving disputes. As individuals within a group confront similar conflicts over property rights, tradition becomes a way of economizing on adjudication costs. Hence, the common law evolves by categorizing similarities between different conflicts and using those similarities to create property and liability rules.

Moreover, homogeneous interdependent technologies can lower the costs of defining and enforcing property rights. Economies of scale in a production process can provide members of a community with a reason (in addition to avoiding the tragedy of the commons) to cooperate and can provide a mechanism for excluding others.³⁶ For example, Indians in the Southwest built elaborate irrigation systems that benefited from economies of scale in construction.³⁷ They cooperated in building dams to check the water and ditches to deliver it to fields but cultivated their fields as private property.³⁸

[T]wo individuals faced with the problem of defining rights to an unclaimed acre of land . . . have an incentive to establish ownership in the cheapest manner, since they bear the cost of the resources consumed in the property rights production . . .

As long as those bargaining for the property rights are free to choose their own definition process, there is an incentive to reduce definition costs since they are residual claimants.

33. See ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* 177-82 (1991).

34. See TERRY L. ANDERSON, *SOVEREIGN NATIONS OR RESERVATIONS? AN ECONOMIC HISTORY OF AMERICAN INDIANS* 7 (1995) [hereinafter ANDERSON, *SOVEREIGN NATIONS OR RESERVATIONS?*].

35. See Terry L. Anderson & Fred S. McChesney, *Raid or Trade? An Economic Model of Indian-White Relations*, 37 *J.L. & ECON.* 39, 49 (1994) (discussing the impact of language differences on Indian-white relations in the nineteenth century).

36. Economies of scale occur when increases in the quantity of a good lead to increased savings per good produced. These tend to occur when there are large fixed costs to a project.

37. See ANDERSON, *SOVEREIGN NATIONS OR RESERVATIONS?*, *supra* note 34, at 33-34.

38. See *id.* at 34.

To illustrate how these characteristics of bottom-up or local evolution of property rights can conserve on definition and enforcement costs, consider cattlemen's associations in the American West. Cattlemen arriving on the Montana and Wyoming plains first found no conflicts over resource use.³⁹ If a range was occupied, a cattleman simply moved to a new location where grass was abundant and cows were few.⁴⁰ "There was room enough for all, and when a cattleman rode up some likely valley or across some well-grassed divide and found cattle thereon, he looked elsewhere for range."⁴¹ But as more and more cattle arrived, the potential for overgrazing the commons became a real possibility, especially without low-cost materials for fencing.

To prevent the tragedy of the commons, cattlemen announced customary range rights and declared the range closed. An 1883 notice in a Helena, Montana paper was typical:

We the undersigned, stock growers of the above described range, hereby give notice that we consider said range already overstocked; therefore we positively decline allowing any outside parties or any parties locating herds upon this range the use of our corrals, nor will they be permitted to join us in any roundup on said range from and after this date.⁴²

The associations enforced their customary range rights with two mechanisms. First, line camps were established on the boundaries of the customary range.⁴³ From these camps, cowboys rode along the boundaries keeping the cattle on their respective sides of the boundary line and watching for trespassers and rustlers.⁴⁴ Second, the cattlemen formed cattlemen's associations that recorded the customary range descriptions and coordinated collective roundups twice each year.⁴⁵ Detailed local rules were established regarding the organization of the roundup and the areas that it would cover. For example,

39. See ERNEST STAPLES OSGOOD, *THE DAY OF THE CATTLEMAN* 182 (1929).

40. See *id.*

41. *Id.*

42. R. Taylor Dennen, *Cattlemen's Associations and Property Rights in Land in the American West*, 13 *EXPLORATIONS IN ECON. HIST.* 423, 427 (1976) (quoting a notice published in the Helena, Montana, *Daily Herald* of Sept. 3, 1883); see also GARY D. LIBECAP, *LOCKING UP THE RANGE: FEDERAL LAND CONTROLS AND GRAZING* 18 (1981) (quoting same passage); OSGOOD, *supra* note 39, at 185-86 (quoting a similar notice declaring the range closed, appearing in the *Rocky Mountain Husbandman*, July 19, 1883).

43. See ANDERSON & LEAL, *FREE MARKET ENVIRONMENTALISM*, *supra* note 14, at 31 (describing the use of such "human fences").

44. See *id.*

45. See Dennen, *supra* note 42, at 426-27; MICHAEL P. MALONE & RICHARD B. ROEDER, *MONTANA: A HISTORY OF TWO CENTURIES* 120 (1976).

an 1884 roundup in the North Dakota territory published its rules in a local paper.⁴⁶

The cattlemen are all supposed to know that the roundup for this section of the Bad Lands begins May 25, at the Beaver Creek crossing of the N.P.R.R. Every stock owner will send enough cowboys to look after his interests, who will be under orders of and subject to dismissal by the foreman, John Goodall. Each cattle owner will provide a mess-wagon or make arrangements with someone else. At least six good horses will be needed by every man. There will be day and night herding, in which each man must take a part. Branding will be done every day. Every man who wishes his cattle taken care of, must be represented on the roundup. The time taken by the roundup will be six weeks to two months and the extent of the territory is about one hundred by fifty miles. In this district there are about 40,000 cattle.⁴⁷

These roundups were a necessary part of the production process, with the spring roundup used to brand new calves and the fall roundup used to collect and drive cows to market.⁴⁸ With cattle scattered over very large areas, roundups required a large number of cowboys, more than any single cattle operation had.⁴⁹ By cooperating in roundups, cattlemen could capture scale economies.⁵⁰ Thus, there were substantial savings realized by the cattlemen in forming a common, coordinated roundup.⁵¹

As the notice in the Helena, Montana, newspaper exemplifies, however, the ability to exclude newcomers from a roundup was also a crucial mechanism for blocking entry to the range.⁵² By excluding outsiders from the roundup, association members could exclude them from the range itself; because, without the roundup, grazing on the open range was economically unfeasible. Michael Malone and Richard Roeder provide the following example:

In 1885, for instance, John H. Conrad, a Fort Benton[, Montana,] area rancher, moved six thousand cattle onto rangeland east of the Musselshell River which was claimed by the Niobrara Cattle Company. A fall meeting of Miles City stockmen condemned Conrad for this violation of range law and warned him that they would not handle his stock or cooperate with him in any way. He got the mes-

46. See MARK H. BROWN & W.R. FELTON, BEFORE BARBED WIRE 173 (1956).

47. *Id.* (quoting a notice appearing in Medora's paper, *The Cow Boy*, on May 15, 1884).

48. See MALONE & ROEDER, *supra* note 45, at 120.

49. *See id.*

50. See Dennen, *supra* note 42, at 427.

51. *See id.* at 427-28.

52. *See id.* at 427.

sage and withdrew his herd⁵³

The cattle company's effectiveness at limiting entry and therefore protecting their share of the range resources is evident in the fact that when a ranch was sold, the purchaser obtained the customary range rights that represented the exclusive privilege to graze on the open range.⁵⁴ R. Taylor Dennen lists several observations of range rights that were valuable in the market place.⁵⁵ He calculates the range rights in two purchases made by one cattle company in 1884 as "valued at something over \$200,000."⁵⁶ Another company carried on its book a valuation of \$85,000 for the range rights that it owned.⁵⁷

Such customs—line camps and cattlemen's associations—were effective for defining and enforcing property rights as long as the community was homogeneous and bound together by its collective production function—the roundup. This system broke down, however, when shearers began competing for use of the range.⁵⁸ With sheep controlled on the open range by herders, there was no need to rely on neighbors for a roundup.⁵⁹ Thus, roundups lost their effectiveness as an exclusion mechanism, and range wars sometimes resulted.⁶⁰

The breakdown of customary range rules enforced by cattlemen's associations illustrates one of the problems of developing property rights from the bottom-up—enforcement. For property rights to be effective in resolving competing uses, they must be enforced against outsiders. Local, customary enforcement mechanisms, however, may have difficulties excluding outsiders because exclusion ultimately requires a comparative advantage in the use of force. If

53. MALONE & ROEDER, *supra* note 45, at 124.

54. *See* Dennen, *supra* note 42, at 434.

55. *See id.*

56. *Id.*

57. *See id.*

58. *See* OSGOOD, *supra* note 39, at 189; DAN FULTON, FAILURE ON THE PLAINS: A RANCHER'S VIEW OF THE PUBLIC LANDS PROBLEM 42-43 (1982):

[A] considerable part of Western folklore revolves around sheep. The idea that cattle can't graze on the same ranch with sheep is known to almost everyone. It is also completely untrue. If they belong to the same owner or, as the saying used to be, "they wear the same brand," they get along very well.

The problem came when a "floating" sheepman brought his sheep into an area already the "accustomed range" of someone else, whether a cattleman or another sheepman. The classic case in Montana was in the Tongue River Country, December 28, 1900. An entire band of sheep was beaten to death with clubs.

59. *See* OSGOOD, *supra* note 39, at 189 ("Against the sheep herder, fences and force were the only successful protective measures.")

60. *See id.* at 189, 247-54; FULTON, *supra* note 58, at 43 (describing and providing examples of cattlemen-sheepmen wars).

would-be entrants question that comparative advantage, conflict will result.

The issue is, thus, one of sovereignty, where sovereignty determines the ultimate authority to exclude others. The cattlemen's associations were sovereign with respect to the customary grazing rights until homesteaders and sheepherders challenged that sovereignty. The latter won the challenge by turning to the national sovereign with its power to force cattlemen off their customary ranges.⁶¹

In this sense, bottom-up property rights begin to blur with top-down property rights because both depend on having the coercive power to exclude. The difference between the two is a matter of degree, which depends on the number of people encompassed in the sovereign group. Accordingly, property rights determined by cattlemen's associations evolved from the bottom-up relative to the top-down homestead acts legislated by the Congress of the United States.

If bottom-up evolution of property rights conserves on resources in definition and enforcement, then why are top-down property rights ever observed? At least two possible reasons may account for the existence of top-down property rights. First, because transaction costs may preclude agreement among individuals or between competing groups (*e.g.*, cattlemen and sheepherders), a larger sovereign (*e.g.*, state or national government) with coercive power over competing resource users may be necessary to resolve conflicts.⁶² In other words, where transaction costs are prohibitive for bottom-up agreement, top-down rules may be the only way of minimizing costs. Range wars, though few, did arise with their attendant dead weight losses. Calling on a sovereign with superior coercive power may provide a way of conserving on these dead weight losses. In other words, where transaction costs are prohibitive for bottom-up agreement, top-down rules may reduce losses from conflict.

Second, the existence of top-down property rights may be explained by the efforts of parties excluded by local sovereigns to use higher levels of government to redistribute locally defined and enforced rights. For example, by inducing the national government to

61. See LIBECAP, *supra* note 42, at 31-32.

62. See David D. Haddock, *Must Water Regulation be Centralized?*, in WATER MARKETING—THE NEXT GENERATION 43, 45 (Terry L. Anderson & Peter J. Hill eds., 1997) [hereinafter WATER MARKETING] (“[T]ransaction costs offer a motivation for regulatory centralization. Because far-flung boundaries for a governing body are more likely to contain externalities fully, centralized regulation confers benefits.”). Coercive power refers to the ability of a government to send in deadly force to enforce a law.

redistribute customary rights, competing users of a resource can obtain the rents therefrom without paying for them, as they would through negotiations.⁶³ This process, known to economists as “rent seeking,” was exemplified by homesteaders and sheepmen employing the national government to take away the customary range rights from cattlemen rather than directly bargaining with the cattlemen for them.⁶⁴ Examples of this type of rent seeking emanate from the Indian Wars of the last half of the nineteenth century when the U.S. military took away Indian land for settlement by whites.⁶⁵ In a modern global context, the Kyoto accord can be interpreted as rent seeking.⁶⁶ In the discussion of Kyoto below, rent-seeking costs that arise with top-down property rights must be balanced against the transaction costs of bottom-up evolution.

IV. PROPERTY RIGHTS SOLUTIONS TO RESOLVE GLOBAL CONFLICTS

The problems with bottom-up evolution of property rights and the contrasting explanations for top-down property rights are especially evident in the global environmental commons. When conflicting resource uses involve individuals or groups on opposite sides of political borders or across non-adjointing borders, there is less possibility for cultural homogeneity, increased communication difficulties, and less-developed adjudication procedures. There is, therefore, less possibility for norms to lower the transaction costs of defining and enforcing property rights at the local level. To make matters worse, competing sovereigns may be willing to exert their power over a resource and challenge other sovereigns to counter that power. Sover-

63. See, e.g., *THE POLITICAL ECONOMY OF RENT-SEEKING* (Charles K. Rowley et al. eds., 1988) (providing several perspectives on the workings of the political marketplace and the creation and destruction of rents via voting, regulation, aid, etc.).

64. See *LIBECAP*, *supra* note 42, at 31-36.

65. See Anderson & McChesney, *supra* note 35, at 57-58, 61-64.

66. See BRUCE YANDLE, *BOOTLEGGERS, BAPTISTS AND GLOBAL WARMING* 7-13 (Pol. Econ. Res. Ctr., PERC Pol’y Series PS-14, 1998) [hereinafter *YANDLE, BOOTLEGGERS*]. The Kyoto Protocol is the result of a conference on climate change held in Kyoto, Japan in December of 1997. See *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, Dec. 10, 1997, Conference of the Parties, 3d Sess., Agenda Item 5, U.N. Doc. FCCC/CP/1997/L.7/Add. 1, reprinted in 37 *I.L.M.* 22 (1998) (not yet in force) (84 signatories and 22 Parties as of Jan. 20, 2000) [hereinafter *Kyoto Protocol*], available at <<http://www.unfccc.de/resource/docs/cop3/107a01.htm>>. It calls for a reduction in so-called “greenhouse gases” by the countries of the world.

Rent seeking refers to activities to earn a profit in excess of those that would be earned in an unhindered competitive market. Thus, it refers to attempting to gain profits through government interference with the market.

eign nations also may be unwilling to let their subjects bargain across borders to resolve conflicting resource uses. For example, Canada resisted including water trading in the North American Free Trade Agreement, even where individuals had clearly specified property rights and could find willing buyer-willing seller exchanges.⁶⁷

This is not to say that bottom-up property rights cannot work in the context of global resources, but that transaction costs are more likely to preclude bargaining solutions. However, international agreements can help reduce transaction costs by recognizing local property rights and establishing tribunals for adjudicating conflicts across boundaries.⁶⁸ Julian Morris cites one such case where an international tribunal adjudicated conflict over transboundary pollution.⁶⁹ In the *Trail Smelter* case,⁷⁰ a smelter operated by Cominco in British Columbia, Canada, had been operating since the 1920s, emitting fumes which were harming cattle ranchers in the United States.⁷¹ Rather than sue Cominco directly, the ranchers petitioned the U.S. government, which, in conjunction with the Canadian government, appointed the International Joint Commission (IJC) as a special tribunal.⁷² The IJC awarded the ranchers damages, but the harm continued so the U.S. rejected the award on behalf of the ranchers.⁷³ Canada and the U.S. then set up a special arbitration including a judge from each country and one from Belgium.⁷⁴ The arbiters' decision awarded more substantial damages and granted an injunction against further emissions.⁷⁵ As Morris writes, the arbiters in *Trail Smelter* reasoned that

under the principles of international law, as well as the law of the United States, no State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the

67. See Jon R. Johnson, *Canadian Water and Free Trade*, in CONTINENTAL WATER MARKETING 55, 67 (Terry L. Anderson ed., 1994).

68. See Julian Morris, *International Environmental Agreements: Developing Another Path*, in GREENING U.S. FOREIGN POLICY, *supra* note 6 (manuscript at 205, 210-11, on file with authors).

69. See *id.* (manuscript at 211).

70. *Trail Smelter Case* (U.S. v. Can.), 3 R.I.A.A. 1905 (1949).

71. See Morris, *supra* note 68 (manuscript at 211).

72. See *id.*

73. See *id.*

74. See *id.*

75. See *id.*

case is of serious consequence and the injury is established by clear and convincing evidence.⁷⁶

In this case, the adjudicating international body recognized the local property rights of the U.S. ranchers.⁷⁷

For property rights solutions to figure into international law, the two questions asked at the beginning of this article must be answered regarding the applicability of property rights: (1) can effective property rights be created under international law, and (2) can and should such property rights be created top-down instead of bottom-up?

A. *Bottom-Up Prospects*

The first question was answered with the *Trail Smelter* case mentioned above. This case illustrates how cultural homogeneity and international law can help create and recognize effective property rights. The *Trail Smelter* case relied on adjudication by an international body agreed upon by two countries that share the British tradition of property rights and common law. This common tradition certainly lowered the costs of agreeing on an adjudication mechanism and facilitated recognition of the ranchers' right to use air free from pollutants. Nonetheless, the case took several years to adjudicate and was costly enough that such actions for resolving conflicting resource uses may be discouraged. It stands to reason, however, that if more *Trail Smelter*-type cases were brought forward, the adjudication process would become more common, costs would go down, and trials would be quicker as precedent is set. Treaties, which facilitate the ability of individuals such as the ranchers in *Trail Smelter* to bring suit against international counterparts such as the Cominco Smelter, could lower the costs of enforcing and recognizing international property rights. In summary, *Trail Smelter* shows that local property rights that evolve bottom-up can be recognized and enforced from the top-down.

The number of such examples in international law is small, suggesting that transaction costs make bottom-up evolution more diffi-

76. *Id.* (quoting *Trail Smelter*, 3 R.I.A.A. at 1965).

77. *See id.* *Trail Smelter* analysis recognizes that the transaction costs of protecting property rights in the way of the *Trail Smelter* case may be prohibitive. *See id.* (manuscript at 211 n.12). In a footnote, Morris cites four reasons transaction costs associated with *Trail Smelter*-type solutions may be prohibitive: (1) it is costly to organize a petition; (2) the petition may not motivate the government to take action; (3) the government action may not be successful in the end; and (4) it may take considerable time to achieve any success. *See id.* The fourth reason was particularly evident in the *Trail Smelter* case itself, because the arbitration was not resolved until sixteen years after the ranchers' initial petition. *See id.*

cult for the global commons. An abundance of interstate examples, however, illustrates what it takes to make bottom-up evolution more efficacious.⁷⁸ Common law in the United States, especially prior to the recent growth of national regulations, is filled with cases where plaintiffs in one state have brought actions against polluters in another and have prevailed.⁷⁹ For example, in *Carmichael v. City of Texarkana* the city of Texarkana, Arkansas, built a sewage system in the 1890s, depositing the collected sewage opposite a homestead owned by the Carmichael family, living in Texas.⁸⁰ The sewage outlet was eight feet inside the Arkansas state-line, while the Carmichael residence was on the other side in Texas.⁸¹ Because the sewage made the private water supply unsafe, the family was forced to connect their property to a public water system to obtain water at a cost of \$700.⁸² In addition, they claimed their property value was reduced by \$5,000, their enjoyment of their property had been reduced by \$2,000 over a two-year period, and fear of disease harmed them another \$2,000.⁸³ They sued the city of Texarkana in federal court for the sum of these costs, as well as for a permanent injunction against the cesspool.⁸⁴ The federal court rewarded the Carmichael family victory on all claims against the City of Texarkana.⁸⁵

In order for such common law actions to be effective in creating a legal environment in which bottom-up property rights can evolve, the same ingredients that made *Trail Smelter* work are necessary—namely, that sovereign states agree that they will recognize and abide by binding decisions from a higher tribunal. In this setting, harmed parties can take action against polluters in other jurisdictions, and courts can decide who has what rights. In the *Trail Smelter* case, the specially created international tribunal performed this function establishing a model for how international agreements might help facilitate bottom-up evolution of property rights. Of course, it must again be stressed that the possibility of this type of evolution is made easier by

78. See, e.g., YANDLE, COMMON SENSE AND COMMON LAW, *supra* note 16, at 87-117, 143-66.

79. See *id.*; ROGER E. MEINERS & BRUCE YANDLE, THE COMMON LAW: HOW IT PROTECTS THE ENVIRONMENT 3-23 (Pol. Econ. Res. Ctr., PERC Pol'y Series PS-13, 1998).

80. See *Carmichael v. City of Texarkana*, 94 F. 561 (C.C.W.D. Ark. 1899). See also MEINERS & YANDLE, *supra* note 79, at 4-6 (discussing the *Carmichael* case).

81. See *Carmichael*, 94 F. at 562.

82. See *id.* at 562-63.

83. See *id.* at 563.

84. See *id.*

85. See *id.* at 575.

the homogeneity of the state legal systems within the United States and between the United States and Canada. Similar examples can be expected to evolve within the European Union. The lesson for solving global disputes in this way is to create an institutional environment in which sovereign nations agree to bind their citizens to the decisions of higher tribunals.

B. *Top-Down Prospects*

Because extending this model across less homogeneous borders involving many more countries is more problematic, the following question must be answered: can international property rights be created top-down when the transaction costs of establishing bottom-up property rights are prohibitive? For resources that have traditionally been open-access, developing bottom-up property rights that exclude or restrict traditional users may be cost-prohibitive. Examples of nationally created property rights can help illustrate how international property rights might be created. The authors consider four examples: (1) ITQs in New Zealand fisheries, (2) water pollution rights in the Tar-Pamlico Basin of North Carolina, (3) air pollution rights in the Los Angeles Basin of California, and (4) rights to wildlife under Zimbabwe's CAMPFIRE program.

1. ITQs

Community-run fisheries illustrate that transaction costs are not always prohibitive for ocean resources where local groups can monitor access.⁸⁶ Donald Leal cites the success of numerous fisheries where agreements and social customs between the fishermen have prevented overharvesting.⁸⁷ Leal's work also notes cases where government intervention ruined these bottom-up solutions.⁸⁸

For fisheries where transaction costs have thwarted property rights solutions, however, top-down property rights have limited access and improved harvest mainly through individual tradable quotas (ITQs).⁸⁹ These quotas guarantee each fisherman a certain share of

86. See DONALD R. LEAL, COMMUNITY-RUN FISHERIES: AVOIDING THE 'TRAGEDY OF THE COMMONS' 2-3 (Pol. Econ. Res. Ctr., PERC Pol'y Series PS-7, 1996).

87. See *id.* at 3-10.

88. See *id.* at 6-10. In Valensa, Brazil, the government attempted to modernize an estuary fishery. See *id.* at 7. This intervention led to the fishery's eventual over-harvest and abandonment. See *id.* Government intervention into Nova Scotia's Port Lameron Harbor also destabilized the working order of a community-run fishery. See *id.* at 8.

89. See ANDERSON & LEAL, FREE MARKET ENVIRONMENTALISM, *supra* note 14, at 130-32.

the total allowable catch set by the government.⁹⁰ Hence, a fisherman does not need to rush out and fish, fearing that others will take anything he leaves. ITQs are nationally created, top-down property rights that have vastly improved fishery productivity, reduced fishing costs, and induced fishermen to invest in improving fish habitat.⁹¹ Especially in Iceland, New Zealand, and Australia, it appears that ITQs are working.⁹² Moreover, because the rights are secure and valuable, fishermen have an incentive to improve on enforcement mechanisms. In New Zealand, for example, satellites are being used to monitor boats fishing in the territory of the ITQs.⁹³

Setting the quota, however, illustrates the potential for rent-seeking behavior.⁹⁴ Regulators establishing quota levels are susceptible to political pressures from the special interest groups they regulate, which may result in inefficiently large quota levels being granted.⁹⁵ Furthermore, if fishermen believe that ITQs will be distributed on the basis of historical catch, which is the usual allocation mechanism, they have an incentive to increase their historic basis. Using a long-term average that includes years prior to the announcement of ITQs helps eliminate this type of race.⁹⁶ Even after ITQs are allocated, however, rent seeking may continue as it has in New Zealand.⁹⁷ Seeing how valuable the quotas have become, the Maori—the indigenous people of New Zealand—have petitioned the courts to increase their share of ITQs, which can only happen if the total allowable catch is increased, thus reducing the benefit of the ITQ system, or if other fishermen lose some of their quota.⁹⁸

90. *See id.* at 130-31.

91. *See id.* at 131.

92. *See, e.g.,* Michael de Alessi, FISHING FOR SOLUTIONS (Inst. Econ. Aff., IEA Studies on the Environment Series No. 11, 1998).

93. *See id.* at 51.

94. *See* ANDERSON & LEAL, FREE MARKET ENVIRONMENTALISM, *supra* note 14, at 130-32 (describing how ITQs motivate fishermen to employ more efficient fishing methods to increase profitability and afford additional quotas).

95. *See id.* at 132.

96. *Cf.* TERRY L. ANDERSON & PAMELA SNYDER, WATER MARKETS: PRIMING THE INVISIBLE PUMP 172-73 (1997) (offering a similar solution—basing individual rights on use over a longer period of time—to eliminate the “race to the pumphouse” associated with the initial allocation of groundwater rights).

97. *See* ANDERSON & LEAL, FREE MARKET ENVIRONMENTALISM, *supra* note 14, at 132.

98. *See id.*

2. Tar-Pamlico

In 1989, the first transacting water pollution control trading community in North America formed in the Tar-Pamlico River Basin of North Carolina.⁹⁹ Problems with phosphorus and nitrogen discharges had led to a series of fish kills, demonstrating that the Environmental Protection Agency's (EPA) strict regulations for the point source polluters in the basin were not working.¹⁰⁰

Thanks to cooperation from the EPA, the state of North Carolina was able to create an association of the point-source polluters, which would face an EPA-established overall cap on pollution rather than a firm-specific one.¹⁰¹ The important difference between the new system and the old system is that polluters in the association have pollution rights that are transferable among members. Though entry into the program is voluntary, the polluters only other option is to return to the expensive EPA firm-specific standards.¹⁰² Within the association, members are required to meet pollution levels in one of three ways: they can lower their own emissions; they can purchase the right to pollute more from other association members in return for those members lowering their emissions; or they can pay a \$56 fee per kilogram of pollutant that funds abatement of non-point source pollution such as agricultural runoff.¹⁰³ In the case of the Tar-Pamlico River Basin, the state of North Carolina and the EPA have created a top-down property right to pollute that has greatly reduced the cost of pollution abatement and improved water quality.

3. RECLAIM

The South Coast Air Basin in California, which includes Los Angeles, suffers some of the worst air pollution in the United States.¹⁰⁴ In the 1990s, after the EPA had struggled and failed to bring the area into attainment with state and federal air quality standards, a new plan was tried.¹⁰⁵ This plan, known as the Regional Clean Air Incen-

99. See David W. Riggs & Bruce Yandle, *Environmental Quality, Biological Envelopes and River Basin Markets for Water Quality*, in WATER MARKETING, *supra* note 62, at 147, 154.

100. See *id.*

101. Members' nutrient discharge was to be no more than 425,000 kilograms per year by the end of 1994. See *id.*

102. See *id.* at 154-55.

103. See *id.* at 155.

104. See LATA GANGADHARAN, *TRADABLE PERMITS IN ENVIRONMENTAL MARKETS: AN INVESTIGATION OF THE REGIONAL CLEAN AIR INCENTIVES MARKET IN LOS ANGELES 2* (Pol. Econ. Res. Ctr., PERC Working Paper 96-3, 1996).

105. See *id.*

tives Market (RECLAIM), set a cap on emissions of oxides of nitrogen (NO_x) and sulfur (SO_x) by the major stationary polluters and gave tradable pollution permits to those firms.¹⁰⁶ Like Tar-Pamlico, RECLAIM created top-down property rights that allowed flexibility in achieving standards and efficiency gains from transferability.

In establishing these top-down property rights to SO_x and NO_x emissions, however, there are three problems. First, it is difficult to determine the proper level of emissions to set as the annual cap. The level changes as science and consensus about what level of pollution is acceptable changes. Second, the system does not work well if the pollution rights are easily reduced without compensation, and as the science gets better, there is likely to be pressure for the government to lower the cap. Third, as the government sets emission levels, science may be subjugated to politics in setting the cap.¹⁰⁷ Thus, rent-seeking concerns arise again as they do with all top-down property rights.

4. CAMPFIRE

Wildlife management in southern Africa provides another example of top-down property rights creation.¹⁰⁸ In the former country of Rhodesia, wildlife became the property of the Crown under colonial rule.¹⁰⁹ Rural communities that had been historically dependent on the wild species lost their traditional rights to hunt and manage the wildlife as they saw fit but retained the wildlife-associated costs.¹¹⁰ Wild animals destroyed crops, competed with the indigenous people's livestock for food and water, and, on occasion, were dangerous to humans.¹¹¹ Under such a system, it is no surprise that poachers ended up as heroes to the local people and animal populations dwindled.¹¹²

106. These particular pollutants were chosen because the basin was not meeting the federal standards regarding NO_x and SO_x, and the number of facilities emitting the pollutants were relatively small, making it easier to monitor and regulate them. *See id.*

107. *See generally* William Aron et al., *Flouting the Convention*, ATLANTIC MONTHLY, May 1999, at 22 (discussing how science succumbed to politics in the managing of the International Convention for the Regulation of Whaling).

108. *See* Urs P. Kreuter & Randy T. Simmons, *Who Owns the Elephants? The Political Economy of Saving the African Elephant*, in WILDLIFE IN THE MARKETPLACE 147, 160 (Terry L. Anderson & Peter J. Hill eds., 1995).

109. *See, e.g.*, BRIAN CHILD ET AL., ZIMBABWE'S CAMPFIRE PROGRAMME: NATURAL RESOURCE MANAGEMENT BY THE PEOPLE 3 (IUCN-ROSA Environmental Issues Series No. 2, 1997).

110. *See id.*

111. *See* Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), *Sharing the Land: People and Elephants in Rural Zimbabwe* (last modified Aug. 19, 1999) <http://www.campfire-zimbabwe.org/facts_07.html> [hereinafter CAMPFIRE, *Sharing*

To reverse this trend, the new nation of Zimbabwe implemented the Parks and Wildlife Act in 1975.¹¹³ The program gave private landowners the ability to manage wildlife on their land, including commercial exploitation of the animals.¹¹⁴ As a result, benefits once more accrued to the landowners and wildlife populations began to grow as game ranchers restocked animals and conserved the ones already there.¹¹⁵

Building on the success of this act, Zimbabwe established the Communal Areas Management Plan for Indigenous Resources, or CAMPFIRE.¹¹⁶ The CAMPFIRE program gave the same rights that private landowners held on their property to District Councils with respect to the communal property that makes up 42 percent of the land in Zimbabwe.¹¹⁷ And today, the District Councils are trying to devolve management even further to local wards and villages.¹¹⁸ The success of this program, measured in terms of burgeoning wildlife populations, is due to the fact that wildlife is now a profit-earning asset for the locals. Income from sport hunting, tourism, exchange of animals, and other CAMPFIRE programs has increased from Z\$743,699 in 1989 to Z\$14,082,032 in 1995.¹¹⁹ Over that same period, Zimbabwe's elephant populations have increased by 14 percent, while throughout most of Africa elephant populations have fallen by 24 percent.¹²⁰ When a rural family of eight can expect to live on US\$150 annually in Zimbabwe, the US\$12,000 trophy fees paid by sport hunt-

the Land]:

[A]n elephant or two can quickly munch their way through a family's crops, trampling those that they do not consume, and destroying the family's only source of subsistence in the process. Elephants also threaten people's lives—a local newspaper has reported that over 100 people have been killed by elephants or buffaloes in Kariba since 1980.

Traditionally, therefore, rural Africans have had much to fear from elephants, and have not had much incentive to manage them sustainably.

112. See CHILD ET AL., *supra* note 109, at 4.

113. See *id.*

114. See *id.*

115. See *id.* at 6.

116. See *id.* at 3, 9.

117. See Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), *What is CAMPFIRE?* (last modified Aug. 19, 1999) <http://www.campfire-zimbabwe.org/more_01.html> (“Since 1975, Zimbabwe has allowed private property holders to claim ownership of wildlife on their land and to benefit from its use. Under CAMPFIRE, people living on Zimbabwe's impoverished communal lands, which represent 42% of the country, claim the same right of proprietorship.”).

118. See CHILD ET AL., *supra* note 109, at 9.

119. See *id.* at 14.

120. See Wayne M. Getz et al., *Sustaining Natural and Human Capital: Villagers and Scientists*, 283 SCI. 1855, 1855 (1999).

ers for an elephant get locals thinking about whether they would rather raise cattle or elephants.¹²¹ Not surprisingly, anti-poaching units were one of the first things funded by local communities with the funding received through CAMPFIRE.¹²²

Under CAMPFIRE and the 1975 Parks and Wildlife Act, Zimbabwe removed its governmental control and bestowed property rights on landowners, both individual and communal. While the top-down designation came from the central government, the actual enforcement has largely been bottom-up with local communities monitoring access and poaching. The CAMPFIRE program simply removed the governmental barrier imposed by colonial rule that restricted private property rights to wild animals. Hence, in the case of CAMPFIRE, top-down action *removed* governmental restrictions on property rights thereby allowing bottom-up rights to work.

V. PROBLEMS WITH TOP-DOWN PROPERTY RIGHTS APPROACHES TO THE GLOBAL COMMONS

There can be no doubt that some environmental resources cross international boundaries. Wild animals, like the elephants in the CAMPFIRE program or fish in New Zealand ITQs, do not recognize political boundaries, nor does air or water. When migration across borders creates competing uses between international parties for the resources, bottom-up solutions become more problematic.

Whether *Trail Smelter*-type solutions are available depends on the ability of parties to identify harms, establish specific cause and effect relationships, and resolve conflicts through adjudication. As was shown in *Trail Smelter*,¹²³ international agreement can allow adjudication procedures to recognize property rights and resolve conflicting resource uses. Agreements may be required to establish the necessary adjudicatory institutions that would allow property rights to evolve bottom-up through common law.

121. See CAMPFIRE, *Sharing the Land*, *supra* note 111:

With a trophy fee of up to US\$12,000 or more, together with a daily hunting fee of \$1,000, one elephant can realise [sic] \$33,000 over the course of an average 21-day hunt As a rural family of eight would expect to subsist on about \$150 per year in Zimbabwe, this is no small amount.

122. See Kreuter & Simmons, *supra* note 108, at 150; Communal Areas Management Programme for Indigenous Resources (CAMPFIRE), *HUNTING: Funding Rural Development & Wildlife Conservation in CAMPFIRE* (last modified Aug. 19, 1999) <http://www.campfire-zimbabwe.org/facts_12.html>.

123. See discussion *supra* Part IV.

With cases such as global warming and ozone depletion, however, *Trail Smelter*-type adjudication may be difficult. For example, proving harm from global warming may be difficult, because, at present, science is inadequate¹²⁴ to provide conclusive evidence regarding whether global warming is even occurring¹²⁵ and, if it is, to provide the cause¹²⁶ of and possible harm¹²⁷ caused by global warming.

Yet, even if these issues are resolved, the transaction costs to identify each and every party harmed and causing harm would be prohibitive. Nearly every production process on the planet uses some form of carbon-based energy, and according to global warming proponents nearly everyone would suffer some harm from global warming. Who then is to bring suit and who is to be blamed? Can everyone sue everyone? Specifically, how do we know that a particular coal plant is causing your beachfront property to be gobbled up by the sea?

If property rights solutions are to prevail for the global atmospheric and oceanic commons, some top-down establishment seems inevitable. For example, fish quotas or tradable CO₂ permits could be established by treaty. But making such top-down international prop-

124. See ANDERSON & LEAL, *FREE MARKET ENVIRONMENTALISM*, *supra* note 14, at 159-61.

125. See Roy W. Spencer & John R. Christy, *Precise Monitoring of Global Temperature Trends from Satellites*, 247 *SCI.* 1558, 1562 (1990) (finding no indication of atmospheric warming in satellite data from 1979 to 1988). *But cf.* Frank J. Wentz & Matthias Schabel, *Effects of Orbital Decay on Satellite-Derived Lower-Tropospheric Temperature Trends*, 394 *NATURE* 661, 661-64 (1998) (countering that Spencer and Christy did not account for orbital drift in their data). On the NASA website, Spencer acknowledges Wentz and Schabel are correct in their criticism, but, factoring the new information on orbital drift in with other corrections for east-west drift, he and Dr. Christy still find no warming in the satellite data. See Roy Spencer, *Measuring the Temperature of Earth From Space: Even with Needed Corrections, Data Still Don't Show the Expected Signature of Global Warming* (last modified Aug. 13, 1999) <http://www.ghcc.msfc.nasa.gov/MSU/hl_measuretemp.htm>.

126. See Robert C. Balling, Jr., *Global Warming: Messy Models, Decent Data, and Pointless Policy*, in *THE TRUE STATE OF THE PLANET* 83, 95 (Ronald Bailey ed., 1995) (arguing that over 75 percent of the observed global warming in this century can be explained by variations in the length of the solar sunspot cycle) (citing E. Friis-Christensen & K. Lassen, *Length of the Solar Cycle: An Indicator of Solar Activity Closely Associated with Climate*, 254 *SCI.* 698 (1991)). See also E.N. Parker, *Sunny Side of Global Warming*, 399 *NATURE* 416, 416-17 (1999).

127. One person's loss of beachfront property is most likely another's gain. See Daniel K. Benjamin, *Tangents*, PERC REPORTS (Pol. Econ. Res. Ctr., Bozeman, Mont.), Mar. 1999, at 14, 14-15 (citing Brent Sohngen and Robert Mendelsohn, *Valuing the Impact of Large-Scale Ecological Change in a Market: The Effect of Climate Change on U.S. Lumber*, 88 *AM. ECON. REV.* 686, 704 (1998) (showing a net benefit from global warming for the U.S. timber industry)). For further discussion of warming benefits, see THOMAS GALE MOORE, *CLIMATE OF FEAR: WHY WE SHOULDN'T WORRY ABOUT GLOBAL WARMING* (1998). For further discussion of global warming, see Balling, Jr., *supra* note 126.

erty rights work, as they do in the national cases cited above, has considerable problems.

A. *Rent Seeking at the International Level*

Rent seeking is likely to occur at the international level. The process of *assigning* property rights has definite distributional consequences because property rights represent claims on rents.¹²⁸ Therefore, political creation of property rights attracts rent-seeking efforts to influence their distribution that can be costly in themselves.¹²⁹ As top-down rights move from the national to the international level, the number of individuals and groups with something to gain or lose from the property rights allocation process increases, thus increasing the opportunity for rent seeking.

Jonathan Baert Wiener counters that rent seeking is *less* likely to occur at the international level, because international treaties are enacted through a voluntary assent-voting rule, unlike the coercive majority rule of national law.¹³⁰ Presumably, no nation will sign an agreement unless it is made better off, and under voluntary assent, no nation is bound by an agreement unless it signs.¹³¹ Thus, rent seeking by countries would seem impossible or, at least, less likely.¹³² Wiener admits, however, that rent seeking will occur in the process of hammering out the details of international agreements and through reputational pressure.¹³³ Moreover, dividing up the gains and losses at the national level still opens the door for rent seeking in the treaty ratification process.

Wiener's arguments notwithstanding, Yandle studied rent-seeking efforts in the Kyoto global warming negotiations.¹³⁴ In his

128. See Anderson & Hill, *Privatizing the Commons*, *supra* note 32, at 439.

129. See *id.* at 440-41.

130. See Jonathan Baert Wiener, *On the Political Economy of Global Environmental Regulation*, 87 GEO. L.J. 749, 769-71 (1999):

In principle, the voluntary assent rule at the global level means that . . . coercive redistribution cannot occur. No country will adopt a treaty that does not yield net gains for the country. International agreements, unlike majoritarian legislation, are analogous to voluntary multiparty contracts in which every contracting party must benefit to secure its participation.

131. See *id.* at 769.

132. See *id.* at 771.

133. See *id.* at 773 (“[A]t the international level, the intended victims of a purely rent-seeking stratagem could always exercise their right to withhold their voluntary assent to the regulatory treaty. The real impact of rent-seeking is in the design of the detailed *content* of global regulatory treaties . . .”).

134. See YANDLE, BOOTLEGGERS, *supra* note 66, at 7-21.

“Bootleggers and Baptists” analysis, Yandle notes that natural gas producers, such as Enron, as well as oil companies and ethanol producers, trumpeted the need for global carbon emissions standards.¹³⁵ They supported the Kyoto Accord because it severely restricts the use of coal, their biggest competitor.¹³⁶

These companies were not the only ones rent seeking in Kyoto; nations were involved as well.¹³⁷ Specifically, Yandle cites two policies from Kyoto that resulted from the United States and the European Union (EU) fighting for better economic position relative to one another.¹³⁸ The EU wanted to raise its rivals’ costs by opposing emissions trading, fearing the United States could avoid significant costs by simply buying sufficient tradable greenhouse emission permits.¹³⁹ Yandle quotes British Deputy Prime Minister John Prescott who wanted to close this door on the United States: “Europe has always been clear that while we accept the trading possibilities in this matter, they should not be used as a reason for avoiding taking action in [one’s] own country.”¹⁴⁰

The United States saw its opportunity to raise its rival’s costs by not allowing European emissions to be treated as a bubble and not allowing trading within the EU.¹⁴¹ Clearly such trading would lower the costs of compliance with Kyoto, but the United States opposed the bubble concept for Europe and argued that each European nation should have to reach reductions on its own.¹⁴²

Therefore, while there may be theoretical reasons that rent seeking will be less likely to occur at the international level, the lessons from Kyoto indicate that rent seeking does and will occur in the formation of international environmental agreements. As the number of parties affected by an agreement increase when there is a move from the national to international level, the opportunity for rent seeking increases as well.

135. *See id.* at 8-9.

136. *See id.* at 3, 8-13, 18; Yandle, *Grasping for the Heavens*, *supra* note 14, at 39 (“[Under Kyoto, c]oal is predicted to suffer the largest loss of market share, while natural gas becomes the fuel of choice.”).

137. *See* YANDLE, *BOOTLEGGERS*, *supra* note 66, at 12-13, 18-21.

138. *See id.* at 19-21.

139. *See id.* at 18-19.

140. *Id.* at 19.

141. *See id.* at 20.

142. *See id.*

B. *Sovereignty and Top-Down Property Rights*

Even if rent seeking can be avoided in establishing such top-down property rights, Jeremy Rabkin puts forth three possible concerns of increased international environmental regulation.¹⁴³ First, greater international environmental regulation implies a new understanding of international affairs where national sovereignty is weakened and international institutions find increased authority.¹⁴⁴ Coercion is ultimately necessary for compliance; for this reason, issues of sovereignty get messy. International coercion means that one sovereign nation or group of nations must limit the sovereignty of another. If doing so means inflicting punishments through military action, it is possible that the repercussions of enforcing international environmental regulation are worse than doing nothing.

Perhaps it is possible to enforce international environmental agreements without the use of military force. Voluntary compliance is certainly a possibility if nations see compliance in their interest.¹⁴⁵ Furthermore, the possibility of trade sanctions may be sufficient to keep countries from renegeing on international treaties.¹⁴⁶ Shared traditions and repeat dealings between countries may also be able to ensure compliance with international environmental agreements. Surely the peaceful, long-term relations between the United States and Canada played a role in their willingness to enforce the results of arbitration in the *Trail Smelter* case.¹⁴⁷ But is the international picture likely to be so rosy?

What if signatories to international agreements simply defect, ignoring fishing quotas or emission permits? If top-down property rights are to be effective, this cannot be allowed. The Tar-Pamlico solution¹⁴⁸ would be ineffective if the parties to the agreement were not monitored and forced to comply by EPA. Therefore, similar enforcement would be necessary of countries engaged in an international agreement. Enforcement measures and the use of international coercion are thus required for top-down property rights solutions.

143. See Jeremy Rabkin, *The Value of Sovereignty and the Costs of Global Environmentalism*, in GREENING U.S. FOREIGN POLICY, *supra* note 6 (manuscript at 1, 1-2, on file with authors).

144. See *id.* (manuscript at 1).

145. See Jonathan Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677, 743-44 (1999).

146. For a succinct discussion of trade sanctions and their drawbacks, see *id.* at 757-60.

147. See discussion *supra* Part IV.

148. See discussion *supra* Part IV.B.2.

Second, Rabkin claims that international environmental regulation implies a change in our constitutional system by moving away from the checks and balances of a federalist system.¹⁴⁹ This raises concerns about reduced accountability of rule-makers to the citizens of sovereign nations on whom limits are imposed. John Cohnsen argues that “loss of sovereignty means a lack of accountability to American citizens for actions taken by . . . international organization[s] and the US government.”¹⁵⁰ He contends that there are cases where U.S. officials and representatives of non-governmental organizations (NGOs) encourage international organizations to get involved in an issue and to call for international regulations.¹⁵¹ The U.S. officials and other beneficiaries in the United States can then rely on the international organization’s position as a reason for U.S. government actions that redistribute rents, as in the case of climate change policy.¹⁵²

Third, Rabkin worries that international environmental regulation will increase the risk of international tension, reduce free trade, and undermine the confidence and trust of United States citizens in their government.¹⁵³ Enforcing international environmental agreements causes a loss of focus in foreign policy.¹⁵⁴ Tactics of retribution for violating foreign policy are weakened as more policies needing enforcement are added to the list of government foreign policy functions. Foreign policy is a bag of goods that includes issues from free trade to arms trading to human rights. Each new issue in the bag weighs it down, lessening the focus on other issues and even creating conflicts between issues.¹⁵⁵ As Brett Schaefer writes,

Because diplomatic currency is finite . . . it is critically important that the U.S. focus its diplomatic efforts on issues of paramount

149. See Rabkin, *supra* note 143 (manuscript at 2).

150. John Cohnsen, Esq., *The World Through Emerald Colored Glasses*, in GREENING U.S. FOREIGN POLICY, *supra* note 6 (manuscript at 63, 64, on file with authors).

151. See *id.*

152. See *id.*

153. See Rabkin, *supra* note 143 (manuscript at 2).

154. See *id.* (manuscript at 26).

155. For example, an appeals panel of the World Trade Organization (WTO) on October 12, 1998, ruled against a United States law protecting sea turtles because it posed a barrier to trade. The law required that shrimp imported to the United States be caught using nets equipped with special devices which allow trapped sea turtles to escape. The WTO ruled the law did not give the complaining countries sufficient time to implement the devices and did not negotiate with them to find other ways to meet the law’s objectives. See Anne Swardson, *Turtle-Protection Law Overturned by WTO; Environmentalists Angered by Decision*, WASH. POST, Oct. 13, 1998, at C-2.

importance to the nation. Traditionally, these priorities have been opposing hostile domination of key geographic regions, supporting our allies, securing vital resources, ensuring access to foreign economies, and the like.¹⁵⁶

If we choose to punish China for not complying with a global warming agreement, what form of punishment do we then use if China threatens Taiwan or sells ballistic missiles to renegade countries?¹⁵⁷ A choice must be made and more focus on one will lessen the focus on the other.¹⁵⁸

To Rabkin's list, add the problem of monitoring international agreements. In order for an agreement to be enforced, there must be monitoring to deter cheaters and noncompliance. Gary Becker notes that monitoring incurs costs.¹⁵⁹ Catching noncompliant entities will be costly if not impossible as witnessed by the problems with other international agreements, such as enforcement of the ban on ivory trading contained in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).¹⁶⁰ Detecting whether a country is cheating on its emission rights will surely be difficult unless an international police force can monitor compliance *within* countries, something most countries are not likely to condone.¹⁶¹ Finally, even with an international police force, the data required to detect noncompliance may not be accurate simply because monitoring technology is poor or those keeping records have an incentive to cheat. Kal Raustiala and David G. Victor conclude from

156. Brett D. Schaefer, *Green Creep: The Increasing Influence of Environmentalism in U.S. Foreign Policy*, in GREENING U.S. FOREIGN POLICY, *supra* note 6 (manuscript at 161, 164, on file with authors).

157. See Rabkin, *supra* note 143 (manuscript at 26).

158. See *id.*

159. See Gary S. Becker, *Crime and Punishment: An Economic Approach*, 76 J. POL. ECON. 169, 206 (1968):

If violations could be eliminated without cost, the optimal solution would obviously be to eliminate all of them and to engage in pure monopoly pricing. In general, however, as with other kinds of offenses, there are two costs of eliminating violations. There is first of all the cost of discovering violations and of "apprehending" violators. This cost is greater the greater the desired probability of detection and the greater the number of violations.

160. See Kreuter & Simmons, *supra* note 108, at 156-60.

161. See ABRAM CHAYES & ANTONIA HANDLER CHAYES, THE NEW SOVEREIGNTY: COMPLIANCE WITH INTERNATIONAL REGULATORY AGREEMENTS 190-91 (1995) (discussing the intrusiveness associated with the monitoring of environmental regulation).

their sampling of international agreements that “national data often are not comparable, and their accuracy is often low or unknown.”¹⁶²

VI. CONCLUSIONS AND POLICY SUGGESTIONS

Property rights *do* provide a viable way of solving some of the problems of the global commons. They can evolve bottom-up under international law; however, where transaction costs preclude this process, property rights can be created top-down.

To encourage property rights solutions to environmental problems, U.S. foreign policy and international agreements should lower transaction costs related to the definition, enforcement, and transfer of property rights in two ways. First, foreign policy should support sovereign states that respect and enforce property rights and the rule of law. In this way, the probability of fostering bottom-up solutions will be increased.

Second, where top-down property rights are created, those rights should be clearly assigned to specific individuals or groups and should be enforced through a judicial system that arbitrates disputes across borders. Treaties between nations that could lessen the costs and time constraints of adjudication, such as those encountered in the *Trail Smelter* decision, could encourage international bottom-up property rights.

Because international environmental treaties have significant implications for the sovereignty and accountability of governments, they should be confined to those issues that cannot be solved through local property rights and domestic policies. Chief Justice of the United States Charles Hughes recognized in 1929 that “the treaty-making power is intended for the purpose of having treaties made relating to foreign affairs and not to make laws for the people of the United States in their internal concerns.”¹⁶³ If an environmental problem can be handled internally, there is no need for international regulations that encourage rent seeking, encroach on sovereign powers, and discourage democratic accountability.

Where competition for resources can create a tragedy of the global commons, the top-down creation of property rights may be

162. Kal Raustiala & David G. Victor, *Conclusions*, in *THE IMPLEMENTATION AND EFFECTIVENESS OF INTERNATIONAL ENVIRONMENTAL COMMITMENTS: THEORY AND PRACTICE* 659, 680 (1998).

163. Rabkin, *supra* note 143 (manuscript at 15) (citing Charles Evans Hughes, *Remarks to the American Society of International Law, Seventh Session*, 23 *PROC. AM. SOC'Y INT'L L.* 176, 194 (1929)).

necessary. Tradable pollution permits and fishery ITQs provide examples of top-down property rights that have worked within national borders and could work in the international context. But before entering into treaties developing such property rights, citizens and treaty negotiators should be aware that these property rights will have to be enforced and that such enforcement will interfere with the sovereign powers of the countries involved. Because enforcement is costly, such treaties may undermine the rule of law that, ultimately, is the only hope for resolving competition over resource use.

Where competition for resource use crosses political boundaries and thus creates a global commons, foreign policy still can encourage property rights solutions by adhering to the following four guidelines:¹⁶⁴

1. Foreign policy should flow logically from a body of evolved, private law and should protect property rights.
2. If an agreement concerns a resource that has become the subject of national or local regulation and that has transjurisdictional effects, it might be desirable to create inter- or multi-jurisdictional rules governing ownership.
3. Signatory status should be restricted to those nations that have direct interests in the resources under threat.
4. Decisions relating to the validity of scientific claims should be subject to the balancing procedure of civil law, and decision-makers should bring to those decisions a healthy skepticism of claims that purport to represent a scientific consensus.

The tragedy of the commons, whether within one nation or between many, results from competition among resource users in a world where resources are scarce and access is uncontrolled. In order to prevent the tragedy, access must be limited either through the establishment of property rights or regulation by government. In many cases, the tragedy of the commons is avoided because people directly involved in competition for the resource benefit from developing property rights themselves. This evolutionary process is not without costs, but it can be encouraged by a rule of law, including adjudicatory institutions to facilitate the definition and enforcement of such rights. Fostering an international rule of law offers the best hope for preventing the tragedy of the global commons. Where transaction costs are prohibitive, top-down property rights provide a second-best solution if rent seeking can be kept to a minimum.

164. See Morris, *supra* note 68 (manuscript at 32).