

## THE ETHICS OF HEAT: FUNDAMENTALS AND CHALLENGES IN ALLOCATING THE GLOBAL COMMONS

ANTHONY RUSSOMANNO\*

*The global warming dilemma provides an opportunity for the global community to ask fundamental questions about the Earth's potential to serve human needs. This Note examines whether a community ethic that promotes prudence and longevity exists. The author begins by outlining the global warming process and its anticipated consequences. To provide the international context of global warming, the author explains how developed countries have used, and continue to use, the international commons. The author also identifies a well-developed first-come-first-served method of resource allocation, prior appropriation. An analysis of this current resource allocation reveals that today's multiple, developing sovereigns further compound the allocation's practice and ethical problems. In response, the author proposes that a different allocation ethos is needed. The author further recommends two models more in tune with international and natural demands: correlative rights allocation and the notion of accommodation.*

### I. INTRODUCTION

The science of global warming—or as some maintain, the phantasm—looms large. Warming may cast a very long shadow indeed, as the idea of warming is the idea of a global limit, and the idea of a limit implies caps, rules, and enforcement.<sup>1</sup> In this sense, the global limit on space for carbon dioxide discharge is like a scarce natural resource. In turn, the components of natural resource dilemmas are often ideas about

---

\* Law clerk to the Hon. Mary Russell of the Supreme Court of Missouri. J.D., 2008, University of Illinois, College of Law; B.A., 2001, English, Psychology, University of Missouri. This Note is dedicated to my parents, Jim and LaVerne Russomanno, for their love and support and for their quality of character. Also, I would like to mention the debt owed to Professor Eric T. Freyfogle's teachings. Finally, thank you to the editorial staff for their conscientious work.

1. Michael Wenig, *Making Sense of Growth and Sustainable Development: Several Responses to Herman Daly's Latest Book*, 28 ENVTL. L. 235, 238 (1998) (suggesting that much of the debate between proponents of economic growth and advocates of ecologically imposed limits stems not from "whether there are limits," but rather from "identifying them and ensuring that the relevant limits are not exceeded" (reviewing HERMAN DALY, *BEYOND GROWTH—THE ECONOMICS OF SUSTAINABLE DEVELOPMENT* (1996))).

development, property rights, and resource allocation.<sup>2</sup> If this is the case, then warming is less a new problem than a lingering one. A prominent conservationist once called these lingering resource dilemmas a “great unfinished task” that arises where ethics and ecology meet;<sup>3</sup> more recently, other thinkers have suggested a central role for legal theory in reconciling cultural institutions and nature’s limits.<sup>4</sup>

With these ideas in mind, the following presents an “unfinished task,” a task that may include answering some tough questions: How can society share a limited global commons? What should the limit be, and what are the priorities of use under that limit? Can an ethos of expediency work in a complex commons? These are questions about scope, priority, and risk,<sup>5</sup> questions of both legal and ethical significance. A potentially effective allocation scheme asks these questions directly; short-term, fragmented thinking often ignores them.

Put another way, starting from something fundamental—resource allocation—may add clarity to a cluttered playing field:<sup>6</sup> legal controversies, media debate,<sup>7</sup> and policy declarations.<sup>8</sup> To start, then, the funda-

---

2. Compare Lisa Heinzerling & Frank Ackerman, *Law and Economics for a Warming World*, 1 HARV. L. & POL’Y REV. 331, 356 (2007) (arguing that “the development of climate change solutions requires a more optimistic and expansive vision of the role of the public sector,” suggesting that such a view is out of vogue in modern legal and economic theorizing), with Bruce Yandle & Andrew P. Morris, *The Technologies of Property Rights: Choice Among Alternative Solutions to Tragedies of the Commons*, 28 ECOLOGY L.Q. 123, 167–68 (2001) (“Although we cannot predict the ultimate path of technological change, we can safely say that such a path is preferable to the dead end offered by some forms of regulatory property.”).

3. Eric T. Freyfogle, *The Ethical Strands of Environmental Law*, 1994 U. ILL. L. REV. 819, 845 [hereinafter Freyfogle, *Ethical Strands*] (quoting Bryan G. Norton’s comments on the famous conservationist Aldo Leopold and Leopold’s influential land ethic writings).

4. See, e.g., *id.*; Lynda L. Butler, *The Pathology of Property Norms: Living Within Nature’s Boundaries*, 73 S. CAL. L. REV. 927, 928–29 (2000); A. Dan Tarlock, *Western Water Law, Global Warming, and Growth Limitations*, 24 LOY. L.A. L. REV. 979, 1012–13 (1991).

5. See Douglas A. Kysar, *Sustainability, Distribution, and the Macroeconomic Analysis of Law*, 43 B.C. L. REV. 1, 6 (2001).

6. See ERIC T. FREYFOGLE, WHY CONSERVATION IS FAILING AND HOW IT CAN REGAIN GROUND 144 (2006) [hereinafter FREYFOGLE, WHY CONSERVATION IS FAILING] (suggesting that policymakers should first articulate general principles of good land use before attempting specific policymaking); Heather L. Keough & Dale J. Blahna, *Achieving Integrative, Collaborative Ecosystem Management*, 20 CONSERVATION BIOLOGY 1373, 1374 (2006) (“The belief that social, cultural, and economic systems are intertwined with biological problems and their solutions is widely accepted by the conservation community.”); Robert Paehlke, *Sustainability as a Bridging Concept*, 19 CONSERVATION BIOLOGY 36, 37 (2005) (describing the breadth of modern environmentalism as encompassing social, economic, and foreign policy implications, making it “the first new political ideology since the rise of socialism”).

7. Compare Juliet Eilperin, *Carbon Output Must Near Zero to Avert Danger, New Studies Say*, WASH. POST, Mar. 10, 2008, at A1, and Vaclav Havel, Editorial, *Our Moral Footprint*, N.Y. TIMES, Sept. 27, 2007, at A33, available at <http://www.nytimes.com/2007/09/27/opinion/27havel.html> (former President of the Czech Republic calling for large-scale rethinking and immediate measures to combat global warming given the potentially enormous consequences to life on Earth), with Editorial, *Hockey Stick Hokum*, WALL ST. J., July 14, 2006, at A12 (questioning the rigor of scientific review for some studies on global warming), and George F. Will, *An Inconvenient Price*, NEWSWEEK, Oct. 22, 2007, at 68 (suggesting that “foregone economic growth, inefficiencies, and constricted freedom” will result from overemphasizing climate change problems).

mental pieces warrant attention. The background section presents these topics, first outlining the global warming process and its proposed consequences in Part II.A. Second, Part II.B puts this process into an international perspective, presenting the idea that developed societies have and continue to use the international commons intensively. And, third, Part II.C introduces resource allocation as such, presenting an analogous and well developed first-come-first-served style of allocation, often termed prior appropriation.

Collectively, this background sets the stage for a critique: if global carrying capacity has historically used a first-come-first-served allocation method, then it can be evaluated as such. This evaluation suggests that present allocation raises longstanding practical and ethical problems that are now further compounded by a world of multiple, developing sovereigns. As such, the current system may address the wrong questions, failing to bring users together to attempt systemwide answers. Finally, as a recommendation, Part IV suggests that because prior appropriation is a poor default allocation model, a different allocation ethos is needed to make progress in this commons. The recommendation suggests two models more in tune with international and natural demands: correlative rights allocation and the notion of accommodation.

## II. BACKGROUND

To discuss the global commons, a rudimentary understanding of its characteristics is important. For example, the legal rules surrounding other resources often grow out of a resource's physical behavior (such as the animal-like mobility of natural gas).<sup>9</sup> To this end, Part A presents a basic look at global carrying capacity's physical properties. Further, a legal allocation regime both grows out of and serves a certain group of people. With this in mind, Part B looks to the users of this resource—a worldwide collection of societies pulling from a commons. As the final background element, Part C presents a well established standard for allocating a scarce resource, that of first-in-time or prior appropriation. Here, it is suggested that the historical use of global carrying capacity most closely resembles a prior appropriation system. As such, the prac-

---

8. For example, the recent Bali Action Plan does not create binding commitments yet concludes that “deep cuts” are needed in global emissions. Thomas Fuller & Andrew C. Revkin, *Climate Plan Looks Beyond Bush's Tenure*, N.Y. TIMES, Dec. 16, 2007, at 1, available at <http://www.nytimes.com/2007/12/16/world/16climate.html>.

9. For an example of a resource's physical behavior influencing the law, see *Continental Resources of Illinois v. Illinois Methane*, 847 N.E.2d 897 (Ill. App. 2006). *Continental* addresses the rule of capture, a rule for determining ownership of natural gas. *Id.* at 901. The rule states that when unrecovered gas migrates from under one property to another property, the second property owner may recover the gas and possess it legally. *Id.* Highlighting the importance of gas's migratory nature, the court then reasons that “[b]ecause coalbed gas is similar to and migrates in the same manner as other natural gas,” the rule of capture applies. *Id.*

tical and ethical implications of prior appropriation may be brought to bear on global carrying capacity.

### A. *Carrying Capacity and Global Warming*

To first approach the issue, it may be helpful to divide the global warming problem into categories. In the first category, we may put (nearly) unanimous scientific fact: the concept of atmospheric carrying capacity and theoretical radiation-trapping by greenhouse gases.<sup>10</sup> A second category may be called causes and consequences. This is a hybrid of strong scientific consensus<sup>11</sup> and more controversial interpretation, such as predicting attribution and future consequences.<sup>12</sup> Third, and finally, are the policy implications that reflect a continuum of social tolerance for risk and a ranking of priorities.<sup>13</sup> In all, then, the global warming issue might reduce to three spheres: facts, uncertain consequences, and the policymaking attitude toward both.

#### 1. *Terms and Process*

Though the scientific aspects of global warming are many, the concern here is with two fundamental elements: global carrying capacity (usable storage space)<sup>14</sup> and human-released gases (what gets put into that space). On a basic level, carrying capacity refers to a measure, or a quantity, of something natural—here, the quantity of nature available to safely absorb discharged gases.<sup>15</sup> Users fill a portion of the capacity with radiation-trapping gases, including large quantities of carbon dioxide, or CO<sub>2</sub>.<sup>16</sup>

---

10. See Jeffrey D. Sachs, Dir., Earth Inst. at Columbia Univ., Keynote Address at the Fordham Environmental Law Review Symposium, in 17 *FORDHAM ENVTL. L. REV.* 159, 165 (2006).

11. See, e.g., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, HISTORICAL OVERVIEW OF CLIMATE CHANGE 93 (2007), available at <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter1.pdf> [hereinafter INTERGOVERNMENTAL PANEL]; Ann Brewster Weeks, *Subseabed Carbon Dioxide Sequestration as a Climate Mitigation Option for the Eastern United States: A Preliminary Assessment of Technology and Law*, 12 *OCEAN & COASTAL L.J.* 245, 249 (2007). See generally Sachs, *supra* note 10.

12. See INTERGOVERNMENTAL PANEL, *supra* note 11, at 103 (“[U]nequivocal attribution would require controlled experimentation with our climate system.”); *supra* note 7.

13. See ERIC T. FREYFOGLE, *THE LAND WE SHARE* 218 (2003) [hereinafter FREYFOGLE, *THE LAND WE SHARE*] (discussing the role of precaution in decision making); Heinzerling & Ackerman, *supra* note 2, at 334.

14. The terms “appropriated carrying capacity” and “ecological footprint” are often used to talk about a similar measure. E.g., Mathis Wackernagel, *Can Trade Promote an Ecologically Secure World?*, 5 *BUFF. ENVTL. L.J.* 179, 181 (1998) (“As we consume the products and services of nature, every one of us has an impact on the Earth. This is not tragic as long as the human load stays within global carrying capacity.”).

15. *Id.*

16. See *id.*; Sachs, *supra* note 10, at 165. Carbon dioxide molecules in the atmosphere trap infrared radiation, “start vibrating, heat up, and transmit infrared back to the [E]arth.” *Id.* As of 2007, a strong scientific consensus had earth’s carbon output at 6.5 billion tons, or 22 gigatons of carbon dioxide. *Id.* Because of this, the Earth’s atmosphere is at 370 carbon dioxide molecules per million molecules, up from 280 parts per million around 1800 (prior to the Industrial Revolution). *Id.* At the cur-

Global warming results when these gases (CO<sub>2</sub> and others) trap radiation in the Earth's atmosphere, which is often called the greenhouse effect.<sup>17</sup> Roughly, the more gas in the atmosphere, the more radiation is blocked from escaping into space.<sup>18</sup> Greenhouse gases come from a number of sources, including human released CO<sub>2</sub> from fossil fuel consumption and through Earth-altering activities such as deforestation.<sup>19</sup> As such, the theory provides that if life on Earth can tolerate only a limited amount of radiation-produced heat, then, in turn, humans may emit only a limited amount of radiation-trapping gases.<sup>20</sup>

A few other facts are relevant to understanding global carrying capacity's nature. Notably, the who and where of discharge matters little to the who and where of effects: a greenhouse gas mixes into a global pool and "becomes the world's."<sup>21</sup> Also, the gases are thought to remain in the atmosphere for long periods, perhaps a century (though commentators debate precisely how long).<sup>22</sup>

The foregoing briefly summarizes nature but does not raise the lurking problem: scarcity (how much capacity is available). Researchers point to probable numerical limits to the capacity in calculating measures such as "ecological footprints."<sup>23</sup> Using this and similar methods, scientific consensus suggests that the world's carrying capacity is not just scarce, but it is actually being used in its entirety—and then some.<sup>24</sup>

## 2. *Consequences and Policy*

One complication is that the limit question is tied to the consequence question because a chosen limit reflects a chosen tolerance for risk.<sup>25</sup> To get at this, we might again look at the topic in three parts. First, as described above, scientific fact shows that CO<sub>2</sub> in the atmosphere contributes to a warming process by trapping radiation.<sup>26</sup> Second,

---

rent rate of emission, the Earth will reach 560 parts per million within the next century, a doubling of the pre-industrial rate. *Id.*

17. INTERGOVERNMENTAL PANEL, *supra* note 11, at 96–97, 115–16 (a detailed explanation of the greenhouse effect with illustrations).

18. *See supra* notes 16–17.

19. *See* Aurelie Lopez, *The Protection of Environmentally-Displaced Persons in International Law*, 37 ENVTL. L. 365, 371 (2007); *supra* notes 16–17.

20. *See, e.g.,* Weeks, *supra* note 11, at 245–50; Sachs, *supra* note 10, at 164.

21. Sachs, *supra* note 10, at 160.

22. *Id.* at 160–61; *see also* Heinzerling & Ackerman, *supra* note 2, at 333 (stating that carbon dioxide "has a half-life in the atmosphere of a little over a century").

23. *See* Wackernagel, *supra* note 14, at 180–83. To make this phenomenon more intelligible, researchers have estimated how much of the Earth's carrying capacity, on average, a particular person in a particular society requires to maintain his lifestyle, often called a "footprint." *Id.* at 183. One estimate states that a typical Canadian uses three times the amount of carrying capacity available to her; an American uses 30% more than a Canadian. *See supra* note 11. As such, the United States, though only comprising 4% of the global population, may release 20% of the world's emissions. J. TIMMONS ROBERTS & BRADLEY C. PARKS, *A CLIMATE OF INJUSTICE* 10 (2007).

24. *See supra* note 11.

25. *Cf. supra* note 13.

26. *See supra* notes 16–18 and accompanying text.

one encounters controversy over humankind's precise degree of responsibility and, most controversially, what the consequences are to Earth and human settlements.<sup>27</sup> To that end, scientific consensus asserts that industrialization-related, human-released gases are the key ingredient to dangerous warming: temperatures may rise between three and eight degrees Fahrenheit in the next sixty years, a change unique in the last 10,000 years, and many assert that the timing is no coincidence.<sup>28</sup> On the other hand, some media commentary and select scientists suggest that the warming process is not so easy to attribute; they adopt a wait-and-see attitude, if not outright skepticism.<sup>29</sup>

Greater controversy exists over consequences. Although the exact ecological effects of the warming process are unpredictable and complex, many agree that the stakes are very high.<sup>30</sup> The consequences may be both direct and indirect; they may combine and compound.<sup>31</sup> For example, direct effects could in themselves devastate cities (ice sheets melting and sea levels rising); less publicized consequences (such as decreased rainfall in certain regions) may lead to violent conflict among those competing for already-scarce natural resources.<sup>32</sup> In all, though, no one can know what would happen for certain; as such, the discussion must then turn to a tolerance for risk.

This brings us to the last analytical level, that of incorporating scientific facts and predictions into policy.<sup>33</sup> This involves choice and requires discussion, especially about tolerance for risks and consequences—will society gain more than it risks losing, who in society may gain or lose, and in which generations—that must bleed over into ethics.<sup>34</sup> Policy decisions concern how far to step over the “limit,” if at all.<sup>35</sup> Moreover, this concern with a limit may hold true even if the exact numerical limit and

---

27. See sources cited *supra* note 7.

28. Lopez, *supra* note 19, at 371; see *supra* notes 11, 16 and accompanying text.

29. See Editorial, *supra* note 7; Will, *supra* note 7.

30. See Heinzerling & Ackerman, *supra* note 2, at 333; Sachs, *supra* note 10, at 168–69.

31. For example, a rise in sea level is expected to result from an increase in global temperature. Lopez, *supra* note 19, at 372. This is alarming because roughly one-third of the world lives near a coastline. *Id.* Among other secondary effects, problems also include water supply depletion (especially when slow snow melt is relied upon), an expanded geographical range for certain diseases and pests, and more intense storms. Matthew D. Zinn, *Adapting to Climate Change: Environmental Law in a Warmer World*, 34 *ECOLOGY L.Q.* 61, 67–81 (2007). A recent United Nations panel on climate change concluded that “reductions in greenhouse gases had to start immediately,” listing the potential consequences of inaction as the submergence of island states, a 50% decrease in African crop yields, and a 5% decrease in gross domestic product globally. Elisabeth Rosenthal, *U.N. Report Describes Risks of Inaction on Climate Change*, N.Y. TIMES.COM, Nov. 17, 2007, <http://www.nytimes.com/2007/11/17/science/earth/17cnd-climate.html>.

32. Sachs, *supra* note 10, at 168–69.

33. See Heinzerling & Ackerman, *supra* note 2, at 332 (“[Climate change] is the ultimate challenge for public policy.”); cf. Kysar, *supra* note 5, at 68–69 (“By incorporating ecological economic insights into their policy analysis . . . scholars could take an important step toward harmonizing economic and scientific concerns.”).

34. See Freyfogle, *Ethical Strands*, *supra* note 3.

35. See Sachs, *supra* note 10, at 165 (stating that current output of CO<sub>2</sub> is already unsustainable); Wackernagel, *supra* note 14, at 183.

exact effects of surpassing it remain unclear, since uncertainty is not an atypical state of affairs when making policy; rather, it is one of many factors.<sup>36</sup>

Policy responses could take a number of forms. For example, some commentators suggest goals that peg “the material scale of the economy” to “the carrying capacity of the [E]arth,”<sup>37</sup> creating something like an ecological balanced budget. Alternatively, a policy might be consciously unbalanced, accepting the risks up to a certain point.<sup>38</sup>

### B. *Global Development and the Commons*

To allocate a resource, a scientific understanding is not enough; rather, the how and where of human access comes into play.<sup>39</sup> To this end, the question arises: where does the resource reside and, given this, how might humans use it? And so we arrive at the commons. The commons is the space from which a resource is taken, including much of what we generally think of as the environment, such as the air and the oceans.<sup>40</sup> A commons may vary in size: it might be a watershed, a river, or a given field.<sup>41</sup> In the case of global carrying capacity, the commons reaches its maximum breadth: it circumscribes the Earth, a space to which the whole world has access.<sup>42</sup> Also, in any given commons, a regime may implement rules and strategies to allocate the common resource, sometimes called commons management.<sup>43</sup> Commons management might be a collective decision to take less, to take more or less quickly, to put the resource to use in a certain way, to trade rights under a collective ceiling, or to act according to other common goals.<sup>44</sup> Arguably, an overall management strategy may help shape individual uses into larger, big-picture ends (like sustainable use or healthy land).<sup>45</sup>

For example, two notable international agreements attempt to address, in some sense, the global carrying capacity commons: the 1992

---

36. *E.g.*, Heinzerling & Ackerman, *supra* note 2, at 334.

37. Kysar, *supra* note 5, at 25.

38. One might legitimately ask if a policymaker can ever ethically decide to risk the future habitability of the planet given the interests of future generations. *See* FREYFOGLE, WHY CONSERVATION IS FAILING, *supra* note 6, at 149; G.F. Maggio, *Inter/Intra-Generational Equity: Current Applications Under International Law for Promoting the Sustainable Development of Natural Resources*, 4 BUFF. ENVTL. L.J. 161, 162–70 (1997).

39. *See, e.g.*, Kristen H. Engel & Scott R. Saleska, *Subglobal Regulations of the Global Commons: The Case of Climate Change*, 32 ECOLOGY L.Q. 183, 190–94 (2005) (discussing the legal difficulties of an “open access” resource).

40. *Id.* at 190; Yandle & Morriss, *supra* note 2, at 129 (The commons is property “available to all mankind.”).

41. *See, e.g.*, Butler, *supra* note 4, at 956–60 (describing development of the Chesapeake Bay watershed and the diversion of the Roanoke River).

42. *See id.* at 982–83.

43. *See, e.g.*, Julianne Lutz Newton & William C. Sullivan, *Nature, Culture, and Civil Society*, 1 J. CIV. SOC’Y 195 (2005).

44. *See* FREYFOGLE, THE LAND WE SHARE, *supra* note 13, at 171–72.

45. *See, e.g., id.* at 144–47; Heinzerling & Ackerman, *supra* note 2, at 356.

United Nations Framework Convention for Climate Change (in which the United States participates) and the Kyoto Protocol (which the United States did not join).<sup>46</sup> In addition, some policymakers propose smaller-scale projects.<sup>47</sup> Examples of these are found in regional “cap-and-trade” strategies that set a cap and then allocate the quantity of the resource under that cap among users, who may buy and sell them.<sup>48</sup> Recently, the United States Senate considered such a scheme domestically.<sup>49</sup> Though the details of these agreements are beyond the scope of this discussion (they have been called ineffective, symbolic, and merely descriptive by critics),<sup>50</sup> they are notable for what they lack: a matching jurisdictional authority and meaningful international consensus.

### 1. *Sharing a Global Commons*

Some popular ideas about commons management are useful for understanding the potentials and pitfalls of the global commons. First, the “tragedy of the commons” introduces some famous assumptions about human behavior: users will deplete a commons if left unregulated and unowned.<sup>51</sup> The theory points to two solutions: either privatize or regulate the commons.<sup>52</sup> The world of law and economics has given the former option much attention;<sup>53</sup> students of ecology often prefer the latter.<sup>54</sup>

The tragedy starts with a resource, for example, a commonly held piece of grazing land, to which a set of users have open access, perhaps as a place to graze their cattle.<sup>55</sup> It is clear that the grazing land can bear only so much use—grass only grows so quickly—and past that point it

---

46. United Nations Framework Convention on Climate Change, May 9, 1992, 1771 U.N.T.S. 107, available at <http://unfccc.int>; Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 10, 1997, 37 I.L.M. 22 (1998), available at <http://unfccc.int/resource/docs/convkp/kpeng.pdf>; see Engel & Saleska, *supra* note 48, at 191 (“The actual Kyoto framework is a mixture of approaches, with binding limits on signatory countries that can be met through trades of emission allowances with other signatory countries or through the financing of emissions reductions in signatory countries or non-signatory developing countries.”) (footnotes omitted).

47. See *Lexington: Gore the Pure*, ECONOMIST, Oct. 20, 2007, at 48 (stating that all major Democratic candidates in the 2008 Presidential election favored a cap-and-trade program; Al Gore also favors a less popular but potentially more effective carbon tax).

48. See *id.*; Elizabeth Shogren, *Senate Committee Mulls Cap-and-Trade System*, NPR, Dec. 5, 2007, <http://www.npr.org/templates/story/story.php?storyId=16913038>.

49. Shogren, *supra* note 48.

50. See, e.g., Sachs, *supra* note 10, at 177–78 (stating that the United Nations has a normative role with the Agreed Framework, but little more; the Kyoto Protocol, which the United States did not sign, is “a start,” putting “a framework in place”).

51. See Engel & Saleska, *supra* note 39, at 183 (noting that the tragedy may occur where preservation of a commons is desirable collectively yet irrational individually); Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243, 1244 (1968).

52. See Engel & Saleska, *supra* note 39, at 191.

53. The United States’s legal culture, institutions, and laws reflect a “general inclination against government intervention.” Heinzerling & Ackerman, *supra* note 2, at 335.

54. See HERMAN E. DALY & JOSHUA FARLEY, *ECOLOGICAL ECONOMICS: PRINCIPLES AND APPLICATIONS* 6–7 (2004).

55. Hardin, *supra* note 51, at 1244; see Engel & Saleska, *supra* note 39, at 190.

will deteriorate, eventually becoming useless for everyone.<sup>56</sup> Even with this knowledge, the tragedy of the commons suggests that the users will not restrain themselves.<sup>57</sup> Each individual user will add more cattle, reaping the benefits of another cow. Yet that individual's loss for that cow (the depletion of the grazing land) will be dispersed widely.<sup>58</sup> Moreover, the theory suggests that no one individual can stop this process because the other users will continue adding cattle regardless of what the far-seeing individual chooses.<sup>59</sup> So, the theory goes, all will continue adding cattle until the land effectively collapses.<sup>60</sup>

To avoid collapse, commentators suggest either privatizing the land (having each user use only the land she actually owns, feeling all the benefits and losses individually) or using centralized regulation (having a sovereign enact and enforce rules top down).<sup>61</sup> Practically speaking, privatization typically requires that a scheme divvy up the resource for individual ownership. Moreover, to then address the commons depletion problem, privatization also requires that the individual owners actually feel the costs of their own use and plan accordingly (sometimes thought of as internalizing externalities).<sup>62</sup> Flaws arise when the costs still leak out to neighbors, or when the costs are too complex or mysterious for ownership to capture them.<sup>63</sup> In fact, ecologists argue that costs escape in many natural settings despite our best efforts to internalize them, because natural processes overlap, depending on relationships that are not amenable to fences.<sup>64</sup>

Notably, in the global commons, the problem of externally felt costs is potentially great given the shear complexity, scope, and inseparability of processes on an atmospheric level.<sup>65</sup> Put another way, an owner of carrying capacity would hardly bear the costs of overuse in the same way that a farmer would bear the costs of overusing a piece of grassland. As such, the other response to the tragedy, regulation, deserves a closer look.<sup>66</sup>

---

56. Hardin, *supra* note 51, at 1244.

57. *Id.* at 1246.

58. *Id.* at 1244.

59. *Id.*

60. *Id.* But see FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 157–78 (arguing that other collective action alternatives exist that blend the public and the private).

61. Engel & Saleska, *supra* note 39, at 191; Hardin, *supra* note 51, at 1245; see also Yandle & Morriss, *supra* note 2, at 130 (dividing the possible solutions into four options: common property, limited by land ownership; public property, such as a park; selling or granting land to individuals; or, government-controlled grazing permits).

62. Heinzerling & Ackerman, *supra* note 2, at 345.

63. DALY & FARLEY, *supra* note 54, at 186 (“Because [fossil fuel] externalities are so widespread, affecting not only virtually everyone in the world alive today but future generations as well, transactions costs for resolving these externalities through the market would be infinite.”).

64. *Id.*

65. *Id.*

66. Butler, *supra* note 4, at 1005 (“Legislatures, on the other hand, can address issues of scale comprehensively and systematically through a number of devices designed to alter the behavioral incentives of land users.”).

To be most effective, top-down regulation of a commons needs certain minimum elements, such as an authority that matches the commons's scope and some method of enforcement. If achieved, though, regulation may offer particular advantages. As a practical challenge, the matching principle calls for a regulatory scope whose authority is coextensive with the problem.<sup>67</sup> Also, like any other law or legally created property right, rules require enforcement.<sup>68</sup> These elements may be especially challenging in the global commons<sup>69</sup>—to match the global commons, an agreement would approach a worldwide scope, with overarching authority or enforcement mechanisms.<sup>70</sup>

Moreover, size does matter when it comes to human nature: for a group to cooperate successfully, it often needs strong bonds, ones that transcend “mere individual economic interest.”<sup>71</sup> This might be especially challenging across diverse cultures. And so, finding common causes becomes paramount; rules allocating something will work better when all users perceive the rules as fair and for a common good.<sup>72</sup>

Challenges aside, regulation does offer at least one attractive virtue: it allows a decision maker to address scope directly.<sup>73</sup> For instance, as described above, global warming raises policy questions—choices based on priorities, tolerance for risk, and ethical beliefs. These speak to whether and how far to go past a limit or how to allocate a limited quantity. These are choices that require knowledge of “possibility” (or how

---

67. The matching principle states that the proper “level of jurisdictional authority . . . is the entity whose geographic scope most closely ‘matches’ the geographic scope . . . of the environmental problem at hand.” Engel & Saleska, *supra* note 39, at 187.

68. See Gregory J. Hobbs, Jr., *Priority: The Most Misunderstood Stick in the Bundle*, 32 ENVTL. L. 37, 48 (2002).

69. Moreover, on a cultural level, difficulties occur as governmental regulation comes up against the cultural ideals of an unregulated free market and, to some, the idea of “freedom itself.” Heinzelring & Ackerman, *supra* note 2, at 347 (quoting MILTON FRIEDMAN, *CAPITALISM AND FREEDOM* 14–15 (1962)).

70. Although agreeing that a complete match between the commons and the regulatory authority is best, some commentators observe that localized (“subglobal”) efforts may still reap some benefits. See Engel & Saleska, *supra* note 39, at 187–88.

71. Newton & Sullivan, *supra* note 43.

72. Some might see this as especially challenging given the individual-based ethics of some developed societies, especially the United States. See FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 143 (relating the challenges of Aldo Leopold’s land health (“land as a community”) to American culture’s individualism).

73. Traditional economics argues that distribution problems can be “solved” by simply making allocation more efficient: the latter will necessarily improve the former. See Kysar, *supra* note 5, at 64. Critics of this approach point out that efficiency is not the only concern; in fact, in terms of global warming, efficiency for efficiency’s sake is increasingly irrational. *Id.* at 64, 67 (“[T]he current accepted wisdom regarding the distribution problem . . . directly conflicts with the goal of maintaining society’s ecological footprint within sustainable parameters.”). This relates to the economic assumption of an “open system,” a system without significant natural barriers—but ecologists and ecologically conversant economists point out that the Earth is inherently a “closed system,” a system with both a limited supply of inputs (resources) and limited space for outputs (the Earth). DALY & FARLEY, *supra* note 54, at 15. If the resource is limited, then distributive inequities are an issue: someone will lose out if demand is greater than supply. Kysar, *supra* note 5, at 69.

the world works) and “purpose” (or a “ranking of ends”).<sup>74</sup> As such, some commentators argue that because warming requires society to address choices about ethics and culture, as embodied in law, decisions would be most naturally made from the top down, not delegated to individual preferences (such as aggregating individual economic choices) that never contemplate the larger issues.<sup>75</sup> Put simply, regulation may allow a policymaker to address what is good, healthy, or fair, not simply what works for the time being.<sup>76</sup>

## 2. *Disparate Development and the Commons*

When choices are on the table, who thinks what is fair, and why, matters.<sup>77</sup> Ideas about fairness are formed against a historical backdrop in which the global North made intensive use of global carrying capacity first and now enjoys the short-term benefits.<sup>78</sup> Currently developing nations, in turn, are coming to the negotiating table with this historical disparity in mind.<sup>79</sup>

Development refers to a process of industrialization—a process that historically has led to the release of much CO<sub>2</sub> into the atmosphere.<sup>80</sup> Countries that developed early, such as the United States and much of Europe, are in the so-called global North.<sup>81</sup> For reasons too involved and various to describe here, other countries have undergone slower industrial growth, and many of these countries, such as Sub-Saharan Africa, are in the global South.<sup>82</sup>

To put it lightly, the modern impulse is toward development, and to many, it is not a question of whether to quicken it, but rather *how* to

74. DALY & FARLEY, *supra* note 54, at 37–38.

75. *Id.*; cf. Heinzerling & Ackerman, *supra* note 2, at 357 (“Public choices cannot be deduced from isolated, individual preferences.”).

76. Commentators with an eye on ecological complexity point out that the tragedy of the commons is only one side of the story. See William E. Odum, *Environmental Degradation and the Tyranny of Small Decisions*, 32 *BIOSCIENCE* 728, 728 (1982). This is especially true if the commons is divided and the decisions about its fragmented elements are handled as individual, short-term issues. *Id.* (“Much of the current confusion and distress surrounding environmental issues can be traced to decisions that . . . resulted from a series of small decisions.”).

77. See ROBERTS & PARKS, *supra* note 23, at 214.

78. “The United States produces about 25% of world anthropogenic carbon dioxide emissions.” Weeks, *supra* note 11, at 249. Electricity production is a big part (about 42%) of this output, which reflects the nature of industrialized infrastructure’s contribution to greenhouse gases generally (from cars, power plants, industrial facilities, etc.). *Id.* Only recently has wide public awareness of this contribution arisen in the United States, spurred by various media sources (for example, through the global warming documentary film *An Inconvenient Truth*). *Id.* at 250.

79. See ROBERTS & PARKS, *supra* note 23, at 213–14.

80. See Heinzerling & Ackerman, *supra* note 2, at 333–34.

81. Some commentators also refer to these developed countries as “the rest.” See ALICE H. AMSDEN, *THE RISE OF “THE REST”: CHALLENGES TO THE WEST FROM LATE-INDUSTRIALIZING ECONOMIES 1–2* (2001).

82. For theories about the historical causes, current issues, and future prospects regarding late-industrializing countries, see *id.* The author points to divides such as manufacturing experience, skilled labor, and infrastructure. *Id.* at 1–28.

quicken it.<sup>83</sup> Commentators suggest several rationales for undeveloped or developing nations' continued development.<sup>84</sup> First, problems of poverty, environment, and development are interconnected.<sup>85</sup> It makes sense that resource scarcity due to poor or degraded land creates conditions that lead to both poverty and conflict: absent ample supply of a basic resource, people resort to violence to get what little there is, and society as a whole fixates on mere subsistence.<sup>86</sup> The resulting violent conflict more often than not further depletes resources through both collateral and intentional destruction.<sup>87</sup> Moreover, given that effects of conflict reverberate internationally—for example, through influxes of refugees, or through effects across the shared commons of air and water—some hold that developed nations have a practical interest in helping others promote stability.<sup>88</sup>

Regardless of their merits, these arguments certainly find their way into international discussions.<sup>89</sup> Moreover, underlying them is a fundamental questioning of legitimacy and fairness: why should anything important turn on first-come-first-served allocation? In these terms, the North developed first and, as such, made use of carrying capacity for its CO<sub>2</sub> output first.<sup>90</sup> Arguably, the North has used all of it up. But, clearly, many undeveloped and developing nations intend to use more of that space, regardless of its scarcity.<sup>91</sup> The result is greater demand than

---

83. See, e.g., Sachs, *supra* note 10, at 166.

84. Commentators point out that global warming effects may already—and will increasingly—deplete resources in some of the world's most sensitive regions. See, e.g., WORLD COMM'N ON ENV'T & DEV., UNITED NATIONS, OUR COMMON FUTURE Part I, ch. 1, ¶¶ 37–41 (1987), <http://www.un-documents.net/wced-ocf.htm>.

85. See Lars Bergman, *Sectoral Differentiation as a Substitute for International Coordination of Carbon Taxes: A Case Study of Sweden*, in ENVIRONMENTAL POLICY WITH POLITICAL AND ECONOMIC INTEGRATION 329 (John B. Braden et al. eds., 1996).

86. Sachs, *supra* note 10, at 169. Sachs sees the spiraling “social effects” as examples of a “nonlinear response.” *Id.*

87. See, e.g., David Keane, Note, *The Environmental Causes and Consequences of Migration: A Search for the Meaning of “Environmental Refugees,”* 16 GEO. INT'L ENVTL. L. REV. 209, 214 (2004) (citing water shortages as one source of conflict in Gaza).

88. See, e.g., WORLD COMM'N ON ENV'T & DEV., *supra* note 84, para. 37.

89. See ROBERTS & PARKS, *supra* note 23, at 1–5.

90. *Id.* at 165.

91. See, e.g., Thomas L. Friedman, Op-Ed., *Doha and Dalian*, N.Y. TIMES.COM, Sept. 19, 2007, <http://www.nytimes.com/2007/09/19/opinion/19friedman.html> (“Demand for oil has grown 22 percent in the U.S. since 1990. China's oil demand has grown nearly 200 percent in this same period.”). Moreover, some commentators assert that even with the possibility of more modern and efficient technology, economic development will usually come with a correlative increase in energy consumption. See Sachs, *supra* note 10, at 164. Moreover, fossil fuels—including CO<sub>2</sub>—are fueling this growth. *Id.* Sachs asserts that current uses of renewable resources, such as solar power and wind, are nowhere near economically viable enough to provide a comparable boost in quality of life. See *id.* In economics terms, this process could implicate a phenomenon called the Kuznet's Curve. See Joseph E. Stiglitz, *The Ethical Economist*, 84 FOREIGN AFF. 128, 129 (2005) (discussing Kuznet's curve, which (roughly) states that the early stages of economic development cause much higher environmental degradation than later stages). But see BENJAMIN M. FRIEDMAN, THE MORAL CONSEQUENCES OF ECONOMIC GROWTH 382 (2005) (describing an environmental Kuznet's curve). Friedman suggests that no Kuznet's Curve exists for CO<sub>2</sub>. *Id.* at 385.

supply for a resource that the North appropriated first-come-first-served, and on which the North's infrastructure now relies.<sup>92</sup>

Because of this trend, commentators predict that rising producers of CO<sub>2</sub> will far surpass developed countries' output in the future.<sup>93</sup> Moreover, to some minds, a country such as China (growing rapidly at 9% per year) is simply "making up for 500 years of lost time," time that the developed world has used to dramatically increase its quality of life largely through energy consumption and gas release.<sup>94</sup> Even if these claims are flawed, the perception of inequities is important. To be legitimate, an allocation regime likely needs the support of its users (a disparately developed world of nations) who, in turn, will chose whether to ratify or enforce a set of rules.<sup>95</sup>

### C. *An Example of Allocating a Scarce Resource: Western Water and Prior Appropriation*

The basic elements of global carrying capacity present a challenge, a socially unique one, but also one familiar in a number of ways. This Part addresses the overlap with another type of commons: water. Both types of commons deal with something scarce, and both have an important timing element.<sup>96</sup> Moreover, global development leaves policymakers with the prospect of more demand than supply. As such, the universal problem of allocation comes to the fore.<sup>97</sup>

A system may allocate a resource in a great variety of ways, and embedded in each variety are choices, preferences, and values. For example, correlative allocation apportions a resource among users based on some chosen factor.<sup>98</sup> A correlative scheme might allocate a resource in

---

92. The level of reliance is debated, as is how long and how costly it would be to switch over to less carrying-capacity consumptive technology. Some commentators assert that more vigorous introduction of carbon-reducing technology, if given proper support from governmental infrastructure and subsidies, would be a net gain to the economy. See Heinzerling & Ackerman, *supra* note 2, at 359–60; Sachs, *supra* note 10, at 173 ("It is likely that the shift to hybrid [cars] is a pure gain, not a cost, because the savings would be enough to pay for the extra costs of making hybrids relative to conventional automobiles."). Of course, some commentators assert that reliance on global carrying capacity is not a technology problem at all but rather a lifestyle problem, or a problem of cultural values gone awry. See, e.g., FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 203; Wenig, *supra* note 1, at 262.

93. See Sachs, *supra* note 10, at 165–66. For example, at present, Asia's energy use is increasing at 5 to 10% each year. *Id.* at 166.

94. *Id.*

95. See, e.g., Sandra Zellmer, *The Anti-Speculation Doctrine and Its Implications for Collaborative Water Management*, 8 NEV. L.J. 994, 1026–27 (2008) (describing the issues created when separate groups do not support the current allocation of water resources).

96. See, e.g., Jonathan B. Wiener, *Climate Change Policy and Policy Change in China*, 55 UCLA L. REV. 1805, 1809–20 (2008) (describing the need for China to address CO<sub>2</sub> and water scarcity issues to avert "tragedy of the global commons").

97. See Hobbs, *supra* note 68, at 51 (scarcity of the resource drives the law); David B. Schorr, *Appropriation as Agrarianism: Distributive Justice in the Creation of Property Rights*, 32 ECOLOGY L.Q. 3, 6–7 (2005) (reviewing uses and justifications for natural resource allocation and property rights).

98. See *Spear T Ranch, Inc. v. Knaub*, 691 N.W.2d 116, 128–29 (Neb. 2005).

proportion to land ownership or land mass, using a population-based ratio, or it might grandfather some uses in, skewing a per capita division based on historical use.<sup>99</sup> Another type of allocation might employ some sort of accommodation doctrine, evaluating competing users based on how each could change her individual practices or on who could more easily change, in order to avoid the most harm.<sup>100</sup> The accommodation approach is both vague and flexible, which may be by turns desirable and frustrating.<sup>101</sup> It assumes a social space where people can (or should) work together effectively.<sup>102</sup> Other options are preserving natural conditions no matter what (in other words, only allowing for the bare minimum of use by anyone); asking if a particular use is reasonable; favoring the more intensive or profitable use; lotteries; or something like anarchy, using violence.<sup>103</sup>

Historical global carrying capacity allocation fits none of these schemes. Rather, allocation has occurred first-come-first-served. When this method (first-come-first-served) is fully functional, it is sometimes termed prior appropriation or first-in-time.<sup>104</sup> In a pure prior appropriation scheme, those that appropriate first (i.e., put the resource to some use) have the exclusive right to the resource over all that come later.<sup>105</sup> This is a form of property.<sup>106</sup>

One can see something like a de facto prior appropriation scheme at work with global carrying capacity. The North used the resource first, relying on this use like a secure property right; now, scientists assert that this use has completely appropriated the resource, making it scarce.<sup>107</sup> In turn, the North faces a policy dilemma. It may treat the South as a late-comer, but if it does so, how does it enforce its first-come-first-served rights? In a traditional prior appropriation regime, the later users (developing nations) would simply be out of luck. The situation with the global carrying capacity commons is much more complicated.

---

99. See ERIC T. FREYFOGLE, *NATURAL RESOURCES LAW* 23 (2007) [hereinafter FREYFOGLE, *NATURAL RESOURCES LAW*].

100. See RESTATEMENT (SECOND) OF TORTS § 850A (1979) (also considering “the justice of requiring the user causing harm to bear the loss”); see also *Spear T Ranch*, 691 N.W.2d at 129.

101. FREYFOGLE, *NATURAL RESOURCES LAW*, *supra* note 99, at 450.

102. Some commentators have criticized dominant natural resource allocation theory as pulling too single-mindedly from the normative concepts of economics. See William H. Rodgers, Jr., *Building Theories of Judicial Review in Natural Resources Law*, 53 U. COLO. L. REV. 213, 214 (1982). Other ideas about how to act together socially may prove useful on a normative level as well. For example, anthropology suggests ways in which traditional societies resolved disputes informally, “using devices that both draw upon and uphold the continuities of social life.” *Id.* at 215–16. This anthropological view might be seen as a foundation for an accommodation doctrine. See *id.*

103. FREYFOGLE, *NATURAL RESOURCES LAW*, *supra* note 99, at 23 (listing the conceivable allocation methods of a resource, both in theory and in practice); Sachs, *supra* note 10, at 169 (suggesting the possibility of war when a resource is scarce).

104. Freyfogle, *Ethical Strands*, *supra* note 3, at 845; see Schorr, *supra* note 97, at 71.

105. Hobbs, *supra* note 68, at 48.

106. See Tarlock, *supra* note 4, at 982–83.

107. See Wenig, *supra* note 1, at 236.

### 1. *Prior Appropriation of Scarce Water*

Before considering global carrying capacity's special problems, a more typical setting for prior appropriation will help set the stage. We start with one of nature's commons: a spring, which produces a finite quantity of a resource, water. Then we add users, and the spring accommodates their demands, up to a point. When we continue to add user demand (either through increased population<sup>108</sup> or more intensive use), the resource comes up against complete appropriation or possible depletion.<sup>109</sup> When this happens, something has to give; an allocation regime might come in to decide what exactly that is.

A prior appropriation allocation scheme makes first-come-first-served a matter of rights: users who come to the water earlier get the water over those who come later.<sup>110</sup> Prior appropriation in its various permutations is the most common method of allocating arid water resources in the American West.<sup>111</sup> It is potentially the most stable of all the allocation methods, and that is its primary virtue.<sup>112</sup> Its faults stem largely (and perhaps egregiously) from fairness complaints, given that being first in time may not count for much in any moral sense, at least as morality is typically understood.<sup>113</sup>

A prior appropriation water right is a type of property right, specifically, the right to a certain quantity of water.<sup>114</sup> The user draws water from a common source, such as a river; roughly speaking, this act creates the right, which will consist of a certain quantity at a specific location.<sup>115</sup> As with other property rights, exclusion is key: the appropriator has a right to the water "to the exclusion of all others not then in priority."<sup>116</sup>

108. See ROBERT M. HARDAWAY, *POPULATION, LAW, AND THE ENVIRONMENT* 144 (1994) (describing the increasing concern of some environmentalists over population-induced resource depletion); Hobbs, *supra* note 68, at 44–45 (citing population's role in water demand in the West).

109. See *supra* notes 55–60 and accompanying text.

110. See *Baker v. Ore-Ida Foods, Inc.*, 513 P.2d 627, 631–32 (Idaho 1973) (relating brief histories of prior appropriation and correlative rights); Tarlock, *supra* note 4, at 983–84.

111. See *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443, 446–47 (1882), which many commentators point to as the foundational prior appropriation case in Colorado.

112. See Hobbs, *supra* note 68, at 45.

113. FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 108–10; Robert Thompson, *Property Theory and Owning the Sandy Shore: No Firm Ground to Stand on*, 11 *OCEAN & COASTAL L.J.* 47, 50 (2006). For a somewhat contrary view, see Rodgers, *supra* note 102, at 215. Rodgers suggests that biology may provide some moral basis to justify prior appropriation. He cites the tendency for an animal to exhibit more vigor as a possessor in defense than as a would-be usurper, which leads to the first-in-time critter more often than not winning out. *Id.*

114. Hobbs, *supra* note 68, at 48; see, e.g., *Cal. Or. Power Co. v. Beaver Portland Cement Co.*, 295 U.S. 142, 163–64 (1935); *State v. Sw. Colo. Water Conservation Dist.*, 671 P.2d 1294, 1304–08 (Colo. 1983).

115. Notably, in practice, this is subject to certain limitations in use and transfer. See Hobbs, *supra* note 68, at 48.

116. *Id.*; see, e.g., *Palmer v. Mulligan*, 3 Cai. 307, 312–13 (N.Y. Sup. Ct. 1805). In the famous case *Palmer v. Mulligan*, Palmer constructed a sawmill on a river, using a dam to make the system operational; the court denied a later user the same set-up because it interfered with Palmer's operation. *Id.* at 314.

The right expresses a preference for individual and proactive users: she who comes first gets the resource, and coming first means controlling or taming the resource to human ends.<sup>117</sup> The key to prior appropriation is its reaction to scarcity: the first people to have secured a valid water right take water before those whose rights vested later.<sup>118</sup> The former are called senior users, the latter, junior users.<sup>119</sup>

## 2. *Merits and Necessary Conditions of Prior Appropriation*

As suggested above, allocation schemes promote certain ends; in doing so, a regime prioritizes certain social needs over others. Prior appropriation of water tends to appear in rough conditions, usually arid, and may be seen as a response to these stressors.<sup>120</sup> As such, one aspect of the system (or justification) is simple expediency: immediate needs reign.<sup>121</sup> Other advantages are said to be security and reliability since, theoretically, a prior appropriation right is clear and quantifiable, a refuge from uncertain reasonableness standards.<sup>122</sup> Also, some favor its tendency toward private ownership as an end in itself;<sup>123</sup> conversely, others point to its distributive justice since prior appropriation may prevent a lucky, perhaps inefficient, few (those with land abutting the waterway) from hoarding all the water.<sup>124</sup>

Two other characteristics are worth a moment: efficiency and flexibility,<sup>125</sup> both of which relate to a legal rule called “beneficial use.” Beneficial use creates a limit to a water right in a prior appropriation system, and some see it as an opportunity to shape and improve water uses.<sup>126</sup> The beneficial use rule has two functions: to limit use to a definition of “beneficial” and to require actual “use” for a right to vest.<sup>127</sup>

---

117. See Butler, *supra* note 4, at 934 (“Preference basically is given to those who have controlled, cultivated, developed, or otherwise conquered nature.”).

118. See Tarlock, *supra* note 4, at 982–83 (noting that prior appropriation allocates “the risks of shortages”).

119. Hobbs, *supra* note 68, at 41.

120. *Cf. id.* at 44–45.

121. *Cf. id.* at 44.

122. *Id.* at 46–47. Proving a prior appropriation (which may come up in the event of a transfer) may be quite expensive and unwieldy. See *Green v. Chaffee Ditch Co.*, 371 P.2d 775 (Colo. 1962).

123. Schorr, *supra* note 97, at 5 (acknowledging and then pointing out the shortcomings of the view that prior appropriation was solely a child of nineteenth century growth and individualism).

124. *Id.*; see generally *Baker v. Ore-Ida Foods, Inc.*, 513 P.2d 627, 631 (Colo. 1973). A water rights tied to land ownership is sometimes called a “riparian” water right, an allocation method more common in places with less scarcity issues, such as the eastern United States. *Id.*

125. Compare FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 122 (suggesting a more flexible community role in adjusting use, Professor Freyfogle suggests that “[w]hat owners need most is security in the improvements already made to their land, not in the improvement they might make in the future”), with Hobbs, *supra* note 68, at 46–47 (stating that no one has made a “serious proposal” for an alternate allocation system with great flexibility that retains the other virtues or prior appropriation).

126. See Butler, *supra* note 4, at 940–41.

127. See *id.*; Hobbs, *supra* note 68, at 40 (providing a concise overview of western water law, prior appropriation, and its elements).

Theoretically, this rule can help shape uses to social ends, can make a right flexible (or evolving), and can encourage efficient use (if beneficial is defined to encompass efficient uses).<sup>128</sup> Arguably, though, this flexibility may conflict with prior appropriation's claim to fame: security and reliability.<sup>129</sup> But, in reality, the historical uses carry great weight: local custom tends to ossify what is beneficial and so little ever changes.<sup>130</sup>

Finally, enforcement is an ever-present concern, since it makes the other virtues possible. Logically, enforcement concerns loom larger as a resource becomes scarcer, when the commons is large, or where social resistance to change is likely.<sup>131</sup> Often prior appropriation regimes arise in just these circumstances. For example, prior appropriation often makes most sense in arid regions; as such, scarcity and "self-help" may be endemic to the system.<sup>132</sup> Self-help may also arise when the regulated commons is very large (as in a major river).<sup>133</sup> Finally, public resistance becomes more likely when enforcement changes significantly, or when it arrives belatedly.<sup>134</sup> This may happen when scarcity is not recognized upfront, such as with modern population increases.<sup>135</sup>

### 3. *Prior Appropriation's Failings*

In certain contexts, proponents of prior appropriation suggest that the system is as good as it gets.<sup>136</sup> Others are more wary, pointing out that the merits have—almost without fail—significant demerits.<sup>137</sup> Finally, some go even further, suggesting that the system is inherently illegitimate as a social institution.<sup>138</sup>

Generally, critics observe that first-in-time water rights tend toward ossification, and that localized, individualistic interests often overwhelm the mechanisms in place to shift uses to the general public good.<sup>139</sup> In other words, security and tradition come at the expense of good social policy. Also, some commentators see the method as promoting envi-

---

128. See Hobbs, *supra* note 68, at 40.

129. *Id.* at 46–47.

130. What is beneficial is defined by local custom, giving it little chance to evolve based on general social welfare. See Schorr, *supra* note 97, at 45–46 (“[S]ome have focused on the requirement’s potential as a doctrinal vehicle for invalidating uses seen to be wasteful,” though the doctrine traditionally has little to do with this approach since “practically all uses qualified as beneficial . . .”); Tarlock, *supra* note 4, at 986 (“[B]eneficial use has been defined as non-wasteful use.”).

131. Hobbs, *supra* note 68, at 53.

132. Scarcity defines the situation that many western states face whose water needs steadily increase with population increases. *Id.* at 44–45 (citing the example of an “urbanizing” Colorado, which experienced an 11% population increase in the early 1990s).

133. *Id.*

134. *Id.*

135. *Cf. id.*

136. See *id.* at 41.

137. See, e.g., Schorr, *supra* note 97, at 9.

138. *Id.*

139. *Id.*

ronmental degradation and unsustainable use.<sup>140</sup> In part, this is because beneficial use may encourage (in fact, require) immediate use and, at times, overconsumption.<sup>141</sup> As originally conceived, the system places little emphasis on landscape-sized or long-term goals; and, as mentioned above, significant post-hoc changes to any property system are difficult.<sup>142</sup>

Finally, some critics go further and question whether prior appropriation has any place at all in modern society. This relates to a lack of moral foundation.<sup>143</sup> Why should those that come first get a resource right at the expense of those, who by mere chance, happen to arrive second?<sup>144</sup> Apart from adopting animal instinct or expediency as a moral system, few answers to this question are apparent.<sup>145</sup>

To address this deficiency, some commentators suggest hybrid models that reintroduce ethics into first-in-time. One example suggests a sufficiency-based approach, demoting prior appropriation to assist only in life's essentials and treating excess water in some other manner.<sup>146</sup> Others have suggested that since prior appropriation fails to consider either merit or social values, it is fatally flawed as a social tool altogether.<sup>147</sup> That is, the system allocates property, and since property allocation is an exercise of governmental power, the distribution must be for a legitimate reason or else a sovereign will risk losing the faith of the people.<sup>148</sup> This reasoning suggests that grounding valuable property rights in early arrival (and hasty use) is destabilizing to society, especially when the resource is fundamental to life.<sup>149</sup>

### III. ANALYSIS

The scarce capacity for warming gases presents a challenge. Beneath this challenge's complexity lies a problem of scale and distribution.<sup>150</sup> Of course, a particular problem calls for a particular type of tool, one equipped to address its questions. How will society use this commons? Who gets to use it? At what rate? How much future risk is society willing and able to stomach for shorter-term concerns? Other ques-

---

140. *Id.*

141. *See* Butler, *supra* note 4, at 934–36.

142. *See* Hobbs, *supra* note 68, at 53.

143. *See* Schorr, *supra* note 97, at 14–20.

144. *Id.*

145. *See supra* note 102.

146. This would guarantee the senior appropriator a sufficiency-based amount of water (for example, the minimum amount needed to power a mill), but anything beyond that is continually open to new appropriators as a primary matter. Schorr, *supra* note 97, at 20.

147. For an analysis of various moral theories underlying private ownership of land (in particular, the beach), see Thompson, *supra* note 113, at 49, whose list includes “first-in-time, possession, labor theory, personality theory, and aggregate social utility.” *See also* FREYFOGLE, *THE LAND WE SHARE*, *supra* note 113, at 101–34.

148. *See* FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 108–09.

149. *E.g., id.*

150. *See* Kysar, *supra* note 5.

tions will arise: Given a limit, what goals are most important to retain and pursue? Also, why has society reached this limit to begin with? These questions surface in natural resources law as a matter of course.<sup>151</sup> In turn, allocation regimes inevitably provide answers, either consciously or by default.<sup>152</sup> Refusing to choose how to allocate a resource is a choice as well, one comfortable with risk and uncertainty.<sup>153</sup>

As a first step, any new regime must first grapple with historical allocation, together with its traditions and investments.<sup>154</sup> Here, development has led to a de facto first-in-time appropriation. As such, examining this fact may help frame choices to come. How it fits into the global commons may highlight special challenges, and the choices embedded in it may give pause.

#### A. *The Theoretical Fit*

In key ways, global carrying capacity is a natural resource: something from the Earth, something needed, something both limited and available from a common pool, and something that calls for effective sharing.

As suggested in Part II.C, the global North's use of the resource first gives it *senior*-user status. It relies on the resource like an appropriated property right because its infrastructure requires continued use of the capacity.<sup>155</sup> The global South is the *junior* user. It arrived later in time and now seeks the same resource.<sup>156</sup> But scientists now understand that the resource is "used up."<sup>157</sup> In terms of prior appropriation, the dilemma is that if the North intends to sustain its use and the limit is actual, then the South cannot also use the resource.<sup>158</sup> Also, the problem is one of enforcement: the South is unlikely to respect the North's first-in-time use voluntarily.<sup>159</sup>

The challenge is more intractable than the more familiar, smaller-scale, open access commons. For example, as with other natural commons, a spring will produce only a finite quantity of its resource (water). It cares nothing for the quantity of demand. True, technology can encourage more efficient water uses.<sup>160</sup> But neither money nor markets can

---

151. Cf. FREYFOGLE, *NATURAL RESOURCES LAW*, *supra* note 99, at 23.

152. *See id.*

153. Cf. Heinzerling & Ackerman, *supra* note 2, at 333 ("What climate science tells us, above all, is that the status quo is not going to remain one of the available options.").

154. *See, e.g.*, Jad Mouawad, *Industries Allied to Cap Carbon Differ on the Details*, N.Y. TIMES, June 2, 2008, at C1 ("The debate is not about the climate problem. Everybody could agree on the principles and still get the economics wrong." (quoting James E. Rogers, Chief Executive Officer of Duke Energy)).

155. *See supra* note 78 and accompanying text.

156. *See supra* Part II.B.ii.

157. *See supra* Part II.A.

158. *See supra* Part II.B.ii.

159. Cf. Hobbs, *supra* note 68, at 48 (discussing western states administering water rights).

160. *See* Kysar, *supra* note 5, at 55–60.

force the spring to produce more water past its last drop.<sup>161</sup> The supply is finite and demand may exceed that supply.

A smaller-scale commons has enough challenges. The global commons, by definition, covers much more ground. Regardless, like a spring, the Earth's atmosphere can supply only a finite amount of its resource (storage space) for human use.<sup>162</sup> At some point, appropriation uses up all safe capacity. Scientifically, appropriating beyond this safe capacity will lead to *some* consequences; how serious they will be is debated.<sup>163</sup> As such, the question is not whether a limit exists but what that limit is.<sup>164</sup> The exact limit, in turn, is tied to how much risk society is willing to tolerate.<sup>165</sup>

As such, we arrive at the same place with both scarce water and scarce atmosphere. Some method of allocation is needed to select between prospective users. First, the spring—in times of scarcity, senior appropriators will take first. Assuming demand exceeds supply, some junior users will come up dry.<sup>166</sup> In other words, at some point the senior rights trump the junior user rights completely. Assuming someone enforces the senior rights, the junior users will either leave to find another source of water or do without it, suffering if they cannot.<sup>167</sup> Junior users cannot simply use the otherwise appropriated water. Though many see this as unjustifiable morally, it at least, in a sense, works.<sup>168</sup>

Consider the atmosphere: in times of scarcity—arguably now—who takes? Of course, unlike a spring, atmospheric capacity does not literally dry up. Instead of physically disappearing when used up, it instead produces physical consequences that are diffuse and remote (for now) as a sign of depletion.<sup>169</sup> This, then, is where global carrying capacity presents special challenges.

The global commons might be thought of as two resources. One is safe capacity, which is equipped to handle CO<sub>2</sub> discharge without serious-

---

161. *Id.*; see WORLD COMM'N ON ENV'T & DEV., *supra* note 84, at para. 10 (“The accumulation of knowledge and the development of technology can enhance the carrying capacity of the resource base. But ultimate limits are there.”).

162. See *supra* notes 14, 161.

163. See *supra* note 31 and accompanying text.

164. See *supra* note 1.

165. Of course, less cold-blooded articulations of this idea are possible. For example, surpassing a limit with substantial knowledge of great risk to future generations may be less of a policy decision than a moral decision. If this is the case, some assert that the crossing of natural limits is simply unjustifiable. Cf. FREYFOGLE, WHY CONSERVATION IS FAILING, *supra* note 6, at 154–55 (discussing the need for “acting cautiously toward nature”). See generally Maggio, *supra* note 38.

166. See *supra* Part II.C.i.

167. See *supra* Part II.C.i; see also Roy Whitehead et al., *The Value of Private Water Rights: From a Legal and Economic Perspective*, 9 ALB. L. ENVTL. OUTLOOK J. 313, 318 (2004) (Prior appropriation “can be extremely harsh on junior appropriators who may receive no water in dry years.”).

168. See *supra* Part II.C.i.

169. See Sachs, *supra* note 10, at 166–67.

ly disturbing the Earth's balance through radiation.<sup>170</sup> The other is unsafe capacity, the point past which use begins to significantly disturb the Earth's balance.<sup>171</sup> In a sense, there is no scarcity of the second variety.<sup>172</sup> Society must impose it.

### B. *The Tragedy of the Commons*

Global commons overuse does not have obvious costs to the appropriator—recall the tragedy of the commons.<sup>173</sup> In the tragedy, each farmer knows that additional cattle will *eventually* deplete the commons, but the cost of this is reduced by spreading the harm among the many commons users and the benefits accrue in the present—that is, until the commons becomes unusable for anyone.<sup>174</sup>

The potential global commons tragedy is rather more alarming. Global carrying capacity depletion offers no recourse to greener pastures, since the commons is worldwide. Its depletion transcends the problem of finding a substitute since it is felt not as a lack, but by its consequences.<sup>175</sup> Moreover, this commons is especially deceiving to the naked eye. It is as if a spring continues to produce water indefinitely, but with each new user after a certain point, the entire stock of water becomes increasingly poisoned.

As with any tragedy of the commons, this may mean that governments need to step in to enforce limits.<sup>176</sup> Regulation would impose a limit on the second variety of carrying capacity (the infinite, harmful type), but this is the easy part. The hard part is reaching agreement on what to do with the safe capacity (or what remains for use under that limit). At some key junction, there will be choices about an allocation strategy. What ethos should underlie it?<sup>177</sup>

---

170. Jouni Paavola, *Governing Atmosphere Sinks: The Architecture of Entitlements in the Global Commons*, 2 INT'L J. COMMONS 313, 327 (2008), available at <http://www.thecommonsjournal.org/index.php/ijc/article/view/43>.

171. See *supra* Part II.A.; cf. Freyfogle, *Ethical Strands*, *supra* note 3, at 841 (“[E]ven something as common as carbon dioxide can become a pollutant when there is simply too much of it.”).

172. See *supra* Part II.B.ii.

173. See *supra* Part II.B.i.

174. See *supra* Part II.B.i.

175. See DALY & FARLEY, *supra* note 54, at 109 tbl.6.2 (explaining that waste absorption capacity is nonsubstitutable). That said, technological innovation will likely play a large role in reducing discharge in the first place. See Sachs, *supra* note 10.

176. See Brian Donahue, *Reclaiming the Commons*, in *THE NEW AGRARIANISM* 197, 213 (Eric T. Freyfogle ed., 2001) (“Common ownership cannot guarantee good management, but it is a sensible choice for that part of the landscape where the highest priority is restraint, rather than productivity.”).

177. See, e.g., FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 8 (“Developers need to be told, clearly and firmly, to shape their visions to the land . . .”).

### C. *Prior Appropriation, or Accidental Allocation*

Prior appropriation has significant faults as a theory, and short work could be made of its usefulness in the global commons.<sup>178</sup> But, unfortunately, one rarely allocates on a clean slate; the heaping reliance on de facto prior appropriation will not disappear simply by noticing its imperfections.<sup>179</sup> That said, it is another matter to notice that prior appropriation is the wrong tool for the future. Fundamentally, it may fail to ask the right questions, ignoring choices about scope, distribution, priorities, and risk.<sup>180</sup> And, even if a system tends to ignore them, these choices still arise and demand attention.

Prior appropriation is not a fully functioning system in the global commons. It is merely there by default, or by accident, and, as such, matching and enforcement are primary concerns. No one controls international CO<sub>2</sub>-emitting actors in the same way that Colorado has power over its citizens' use of scarce water.<sup>181</sup> Arguably, no one ever will.<sup>182</sup> Accordingly, international judgment will not defer casually to overarching policy declarations, and restraints on national liberties will receive strict scrutiny.<sup>183</sup> An allocation method will have to answer for itself before it is enforceable. Also, a fair method will more readily produce a regulatory body to match the scope of the global commons.<sup>184</sup> A prior appropriation ethos offers little as answers to these concerns.

#### 1. *Expediency*

When a resource is scarce and conditions harsh, idealism withers. Means serve the end of survival. Some people arrive first to ungoverned land, and they may be risking much; they search for a toehold.<sup>185</sup> They seek water and naturally hope to keep this water once precariousness settles into community.<sup>186</sup> Expediency is at work. It may become the resource ethos: the fact that a group came first, needed the resource, and it

---

178. See Hobbs, *supra* note 68.

179. *Id.*

180. See Kysar, *supra* note 5.

181. Cf. Heinzerling & Ackerman, *supra* note 2, at 356 (“National and international coordination is essential, since climate change is a global problem, driven by the global total of greenhouse gas emissions.”).

182. Cf. ROBERTS & PARKS, *supra* note 23, at 1–5 (describing international tensions over development and the environment, and the global South’s resistance to northern policy preferences).

183. Cf. *id.*

184. Cf. *id.*; see *supra* note 68 and accompanying text (the matching principle).

185. Cf. Kenneth E. Boulding, *The Economics of the Coming Spaceship Earth*, reprinted in VALUING THE EARTH: ECONOMICS, ECOLOGY, ETHICS 297 (Herman E. Daly & Kenneth N. Townsend eds., 1993) (recounting the transition from thinking of Earth as a boundless frontier to thinking about it as a closed system, and suggesting the repercussions for economic and social models).

186. See Hobbs, *supra* note 68, at 42 (quoting John Wesley Powell’s views on prior appropriation in the arid West: “[T]his is as it should be from the necessities of the country.”).

was there is good enough.<sup>187</sup> Laws memorialize these expectations and standards.<sup>188</sup>

Frontiers come in a number of forms. If industrialization is one form, then some (the North) came to it prior to others (the South). Arriving first in an unregulated commons, the North used what it needed or wanted to get ever-stronger toeholds.<sup>189</sup> This path comes with certain assumptions about resources, and customs of use in the global commons may follow from these assumptions.<sup>190</sup> In the frontier, the idea of an economically vigorous North—with systems that make vigorous use of the Earth's resources—becomes part of the community ethos.<sup>191</sup>

But what is the substance of this ethos? Can it be explained to other users (the late arrivers) in a way that seems just, especially once precariousness diminishes? Generally, expediency is more of a description, or a nod to practicality, than a true justification based in morals or ethics.<sup>192</sup> True, it may brag of administrative ease, since it is easier to let those who already hold the more favorable position maintain the status quo. And this promotes continuity and perhaps satisfies the expectations of first arrivers, though one might question both the reasonableness and relevancy of that expectation.<sup>193</sup>

That is in general terms. What about applied to the global commons? First, the global commons is, arguably, a key resource, not unlike water.<sup>194</sup> Some maintain that allocating a fundamental resource requires substantial justification, especially if the value is to life itself.<sup>195</sup> Moreover, as competing ethical claims increase, expediency's power decreases.<sup>196</sup> In other words, prior appropriation's value may operate only in a rough and tumble frontier but cannot answer moral claims of a more settled community (which, one imagines, has higher moral expectations).<sup>197</sup>

187. See FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 109 (First-in-time “is the hallmark of invaders and conquerors at all times.”).

188. See *supra* Part II.C (describing prior appropriation of water in the arid West).

189. See *supra* Part II.B.ii (describing development disparities).

190. Cf. FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 2 (describing property rights idealists who take the view that there are inherit social rights to develop intensively); ROBERTS & PARKS, *supra* note 23, at 10 (describing the disproportionately large CO<sub>2</sub> output of the United States given its population).

191. See *supra* note 190. Chief Justice Marshall poeticizes this frontier ethos in *Johnson v. McIntosh*: “[The new world’s] vast extent offered an ample field to the ambition and enterprise of all.” 27 U.S. (8 Wheat.) 543, 572–73 (1823).

192. Cf. Hobbs, *supra* note 68, at 44 (noting the importance of governmental action in a functioning prior appropriation system). *But see* Rodgers, *supra* note 102, at 227–28 (animal morality).

193. See *supra* Part II.C.iii (describing the failings of prior appropriation).

194. See *supra* note 91 and accompanying text (describing the perceptions that CO<sub>2</sub> emitting practices are necessary for some developing countries to reach reasonable life expectancies for their society).

195. Freyfogle, *Ethical Strands*, *supra* note 3, at 845 (“When the entitlement being allocated is far more valuable . . . first-in-time is far harder to justify, if not simply impossible.”).

196. *Id.*

197. Cf. FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 108–24 (describing first-in-time as the least substantial of private property’s four possible justifications: first-in-time, labor, personality, or aggregate social utility).

These competing claims are explored more below. For now, it is enough to observe that expediency's ethical argument appears slight and slippery.

## 2. *Enforcement, Security, and Reliability*

A second critique turns on enforcement power. Enforcement is a practical problem, but its difficulties may stem from ideas about fairness. First, the global commons is an open access commons with enormous scope. Potential users have great populations and expanses of developable land.<sup>198</sup> Recall that the tragedy of the commons arises in an open access commons. Scarcity breeds self-help. And enforcement is practically difficult over large areas. In the global commons, this is further complicated by its many sovereigns. Who will enforce senior user rights in this scenario?

To compare, consider the famous Supreme Court case *Johnson v. McIntosh* and its articulation of property and power.<sup>199</sup> *McIntosh* concerned competing claims to land under two overlapping but otherwise valid grants (but for the fact that one flowed from a Native American title).<sup>200</sup> Perhaps stating the obvious, Chief Justice John Marshall observed that it is "the right of society, to prescribe those rules by which property may be acquired and preserved," and that this right is unquestionable.<sup>201</sup> The right flowed from discovery and is maintained "by force."<sup>202</sup> In *McIntosh*, the Native Americans had to lose: it was the only result the conqueror's Court could return.<sup>203</sup> It was an enforceable result so long as force maintained the conqueror's power.

*McIntosh* tells us two things about the global commons, one clear, one subtle. The subtle lesson from *McIntosh* relates to community ethos. The ideas of conquering, force, and power are part of Northern beginnings; they both provoke and are shaped by frontier mentality,<sup>204</sup> arguably including prior appropriation and the ethos of expediency. In a similar sense, the conqueror's worldview may have helped shaped the North's use of the global commons to date. That said, a conqueror's worldview is not very helpful in the modern global commons, and this is the second, simple lesson from *McIntosh*.

---

198. ROBERTS & PARKS, *supra* note 23, at 10–11 (explaining that nations are developing rapidly in Africa, Asia, and Latin America, including major countries such as China, India, Mexico, and Brazil).

199. 21 U.S. (8 Wheat.) 543, 568–71 (1823).

200. *Id.* at 571–72.

201. *Id.* at 572.

202. *Id.* at 588–89.

203. *See id.* at 604–05.

204. *See supra* notes 165–68 and accompanying text.

Power matters in the enforcement of property rights.<sup>205</sup> Clearly, developed countries do not hold power over developing countries to the same extent as the United States dominated the Native Americans. No one discovered the global commons; no force controls it. As such, short of a new agreement or warfare, any one senior appropriator cannot maintain senior rights to the global commons if other appropriators claim conflicting rights.<sup>206</sup> For example, some developing nations, such as China and India, presently (or will very soon) have international stature on par with the United States.<sup>207</sup> If the United States is a senior appropriator and China a junior, and if China helps itself to the global commons beyond a safe limit, who will stop it?

When enforcement suffers, or is nonexistent, predictability and security must suffer as well. Though prior appropriation has weak moral underpinnings (expediency), it does have the virtue of stability once in place, which allows users to invest with the knowledge that their investment is safe.<sup>208</sup> As such, first-in-time provides incentives.<sup>209</sup> Clarity in quantity and location of the rights helps to make this security reliable and quantifiable. Fuzzy issues, such as reasonableness, are usually left aside.<sup>210</sup>

Without enforcement, this post hoc justification disappears. As commentators note, no matching authority exists that is coextensive with the global commons, much less is there a comprehensive, enforceable allocation regime.<sup>211</sup> As such, global commons allocation is reduced to rhetoric. But that is not the end of the story. True, the senior user theoretically should feel none of the security and enjoy little of the reliability of a healthy prior appropriation scheme; yet senior users do in fact act as if security exists.<sup>212</sup> This is a problem. It may stem from the uniqueness of the global commons: the fact that capacity does not dry up but rather becomes unsafe; and the unsafe commons has no limit.<sup>213</sup> The sense of security rests on risk.

Practically, the tragedy of the commons speaks to this uncertainty; ethically, intergenerational concerns also must enter the conversation.<sup>214</sup> In other words, an end to security is in the future tense and involves a

---

205. See *McIntosh*, 21 U.S. (8 Wheat.) at 589; FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 107.

206. See *supra* Part II.C.i for the mechanics of a functional prior appropriation system.

207. Cf. ROBERTS & PARKS, *supra* note 23, at 11 (“[M]any Western policy makers and scientists believe that countries like China and India . . . should cut their greenhouse gases before or at the same time as rich countries.”).

208. See Hobbs, *supra* note 68, at 45.

209. See *id.*

210. Cf. *id.* at 47 (providing a list of recognized beneficial uses with no mention of reasonableness).

211. See *supra* notes 46–50 and accompanying text.

212. See Lynda L. Butler, *Allocating Consumptive Water Rights in a Riparian Jurisdiction: Defining the Relationship Between Public and Private Interests*, 47 U. PITT. L. REV. 95, 131 n.96 (1985).

213. See *supra* notes 168–71 and accompanying text.

214. See *supra* note 165.

choice.<sup>215</sup> Again, these are questions of scope, distribution, and tolerance for risk: How much should society use? When? How much risk are we willing to tolerate? How much risk can we impose on future generations? Individual choices may never reach the content of these larger issues.<sup>216</sup> Big decisions of scope and distribution may require big views from high positions, addressing hard choices directly.<sup>217</sup> For example, if a tragedy of the commons effect may fall upon future generations, what should society do now to prevent it, if anything?<sup>218</sup>

### 3. *Planning Ahead and Distributive Justice*

At some point, an ethos of expediency may become a liability to senior users.<sup>219</sup> This is because, in a sense, developing countries now claim the same frontier status: they want the toehold, the perceived health and lifestyle advantages that developed countries have.<sup>220</sup> If they cut some corners to do so, what ethical or moral authority do developed countries have to respond with? Moreover, since global carrying capacity has undergone de facto (or unplanned) prior appropriation, social expectations are ill-equipped to deal with post hoc reallocations.<sup>221</sup>

Traditional prior appropriation often fails to produce the hoped-for distribution. Ideally, some commentators see prior appropriation as a potential form of egalitarianism.<sup>222</sup> For instance, prior appropriation detached water rights from those fortunate enough to have adjoining land, breaking up what would otherwise be a monopoly on a scarce and vital resource.<sup>223</sup> Theoretically, then, the scheme would allocate rights more widely, or at least based on some sort of meritorious use.<sup>224</sup> But, in reality, the trends of monopoly, happenstance, and hoarding were reintroduced after the initial prior appropriation allocation in the American West.<sup>225</sup> In modern times, local custom often trumps larger social need through an ossification of what is beneficial.<sup>226</sup> An individual focus together with the human tendency toward ossified values presents a problem for collective goals, since values will solidify around fractionalized, small-scale, and incomplete conceptions.<sup>227</sup>

---

215. See Kysar, *supra* note 5, at 44 (arguing that current choices involve an “essentially moral decision of how best to regulate economic life to ensure sustainability for succeeding generations”).

216. See Odum, *supra* note 76, at 728.

217. See *id.*

218. See Kysar, *supra* note 5, at 43–44.

219. Cf. Sachs, *supra* note 10, at 164 (stating that developing nations often use the “rich world” as a model of how to develop).

220. See *supra* notes 185–91 and accompanying text.

221. Cf. Hobbs, *supra* note 68, at 53–54.

222. Schorr, *supra* note 97, at 6–7.

223. *Id.* at 67.

224. *Id.* at 67–68.

225. *Id.* at 50–54.

226. *Id.* at 9.

227. Cf. Odum, *supra* note 76, at 728.

Distribution problems are even more problematic in global carrying capacity. Briefly, three distribution problems may exist. First, since enforcement authority does not match the scope of the commons, distribution is uncontrolled: nations can access the commons at any time.<sup>228</sup> Second, developed nations rely on the distribution as it now stands; since no preexisting allocation scheme exists, any changes will meet resistance.<sup>229</sup> And, third, the distribution of consequences is inequitable.<sup>230</sup> If predicted global warming consequences do occur from overuse, the nations that will arguably suffer “worst and first” from environmental disasters are the poorest, least developed countries lacking the infrastructure to deal with droughts, floods, and storms.<sup>231</sup>

These three distribution problems conspire to create a tougher dilemma. Developing countries have access to the commons, even though use of that access is unsafe globally. But to forbid development is to sentence certain societies to greater risks of disaster.<sup>232</sup> This creates a circular problem: to develop is to create global risk, but to develop is also to insulate from that risk as an individual nation. Moreover, developed countries have grown accustomed to their perceived insulation.<sup>233</sup> If crisis looms, it is possible that old users will cling all the more desperately to traditional uses and infrastructure as it now stands. This could lead to a downward, compounding spiral of effects and reactions.

With the foregoing in mind, it becomes increasingly apparent that prior appropriation is a poor model for carrying capacity allocation; and, more importantly, its ethos is a liability. Whatever historical advantages prior appropriation might have had for water allocation (expediency, security, efficiency, and distribution), they fail to transfer meaningfully to the modern commons or are mutually defeating. As such, other resource allocation models may provide better touchstones for the future.

#### IV. RECOMMENDATION: ETHICS AND OPPORTUNITY

The global warming challenge may require rethinking some basics.<sup>234</sup> To allocate effectively, views about appropriate scope, allocation,

---

228. See Engel & Saleska, *supra* note 39, at 190 (“The commons at issue in this examination, the atmosphere, is global, freely accessible to the entire world population.”).

229. See ROBERTS & PARKS, *supra* note 23, at 3 (discussing the conflict between the developed and developing worlds with regard to implementing climate change agreements).

230. See *id.* at 1–2 (comparing the developing world’s experience with global warming with a new landowner having a dump open on an adjacent property).

231. See *id.*

232. See *id.*

233. See *id.* at 3 (“[T]he American lifestyle is not open to negotiation” (quoting President George H.W. Bush)).

234. Cf. FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 1–2 (“Complexities of modern life” have brought us to a point of rethinking fundamental approaches to community and land practices.).

distribution, priority, and risk demand attention.<sup>235</sup> Moreover, society cannot shape these views mechanically, as the choices inevitably reflect preferences and ethical beliefs. Practically, allocating the global commons requires global cooperation,<sup>236</sup> and cooperation may require something like a community instinct, a sense of shared purpose and value.<sup>237</sup> It is this sense of community that an ethos of expediency lacks.

A good allocation ethic needs to acknowledge limits and address them forthrightly.<sup>238</sup> Prior appropriation is only one of many possible allocation methods of a natural resource, and its failings tend to disqualify it here, if not generally. Other allocation paradigms could provide better touchstones, a more cooperative ethos, and a more direct way to set limits and prioritize under them. Correlative allocation (allocation based on a factor such as population) and accommodation (altering practices to produce overall gains) provide two useful perspectives.

#### A. *Correlative Rights*

Correlative rights are a way to divide the resource supply among users according to some objective factor.<sup>239</sup> For example, landowners over a common aquifer might have a right only to an amount of that water in proportion to their amount of overlying land.<sup>240</sup> Other ways to allocate easily come to mind: for example, distributing a resource according to land mass or population or even GNP. Or else, a correlative rights scheme might grandfather uses in. For example, a cap-and-trade system must make an upfront allocation decision: who gets rights under the cap and how many.<sup>241</sup> One method of initially allocating these rights would be to give some of them to current users (an allocation correlating with some percentage of current use), withholding the remainder of the rights to give to prospective users based on some other correlation, such as population.

Correlative allocation has some nice advantages, at least in theory. For example, correlative allocation is a direct response to distribution. A

---

235. For an example of this point of view applied, see INTERGOVERNMENTAL PANEL, *supra* note 11, at 120 (“The importance of consistent and transparent treatment of uncertainties is clearly recognized by the IPCC in preparing its assessments of climate change.”).

236. See Heinzerling & Ackerman, *supra* note 2, at 353–55 (trying to deal with global externalities is a “detour”; rather, society should focus on “common causes”).

237. A land use ethic—a way of thinking about and interacting with nature and its resources—is “a kind of community instinct in-the-making.” ALDO LEOPOLD, *A SAND COUNTY ALMANAC WITH ESSAYS ON CONSERVATION FROM ROUND RIVER* 239 (1949); see Erik Schlenker-Goodrich, *Moving Beyond Public Lands Council v. Babbitt: Land Use Planning and the Range Resource*, 16 J. ENVTL. L. & LITIG. 139, 139 (2001) (“[Public] lands are a crucial component of a deeply interwoven environment that provides us with our basic needs and also defines our purpose as a species.”).

238. See, e.g., FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 108–10; Newton & Sullivan, *supra* note 43; Wenig, *supra* note 1, at 248.

239. See, e.g., *Baker v. Ore-Ida Foods, Inc.*, 513 P.2d 627, 630 (Idaho 1973).

240. See *Spear T Ranch, Inc. v. Knaub*, 691 N.W.2d 116, 131 (Neb. 2005) (citing *Olson v. City of Wahoo*, 248 N.W. 304, 308 (Neb. 1933)).

241. See *supra* notes 46–48 and accompanying text.

fundamental question (who should get how much) must be addressed upfront, and reaching an agreement inevitably includes the question, *why*. This gives space to questions left behind by piecemeal decision making: scope (what to set a cap at), priorities (what objective factor to peg to), and distributive ethics (whether and how the correlation should skew to account for future generations' and developing countries' needs).<sup>242</sup> It also has the potential to move the conversation away from incendiary historical circumstance and toward current limits. Of course, agreement is another matter altogether,<sup>243</sup> but the questions are right.

Assuming an agreement emerged, correlative rights could provide the opportunity for creating a matching regulatory body. The matching principle states that enforceable protocols should match the scope of the commons.<sup>244</sup> If an agreed-upon objective factor emerged (together with a cap), then a coextensive regulatory body would feel more like a natural fit, rather than a post hoc imposition. Also, at least on paper, correlative allocation may improve security and reliability, clarifying who owns what.

No doubt, finding the factors, setting the limits, and prodding reluctant nations into a meaningfully enforceable agreement would be difficult. The undeveloped South would likely suggest that the proper factors would be some index of population, land mass, and objective need.<sup>245</sup> These factors would be keyed to minimum quality of life and greater life expectancy.<sup>246</sup> In contrast, a developed country—with an independent, consumerist ethos—may find restrictions insulting to liberty, and might take fright at economic uncertainty.<sup>247</sup> As such, these countries would likely favor traditional use as the significant factor.

That said, correlative thinking puts the right foot forward. It suggests a community-wide goal—for example, less global risk or a healthy planet. These mindsets at least present opportunities for overcoming shortsighted local preferences.<sup>248</sup> If the mindset shifts, so too might some of the practical barriers.

---

242. See *supra* notes 46–50 and accompanying text.

243. For example, currently the United States, though only comprising 4% of global population, releases 20% of the world's emissions. ROBERTS & PARKS, *supra* note 23, at 10. If the United States was asked to release only 4% of the world's emissions, the effected economic interests, especially in certain sectors, would be significant, at least in the short term. See *id.*; Mouawad, *supra* note 154.

244. See *supra* notes 67–68 and accompanying text.

245. See ROBERTS & PARKS, *supra* note 23, at 3–4.

246. As such, the South would expect the North to “take the lead by cutting their own emissions and transferring large sums of environmental assistance to the South.” ROBERTS & PARKS, *supra* note 23, at 3.

247. *Id.* at 4 (citing “[d]iametrically opposed perceptions of ‘climate justice’ among rich and poor nations”).

248. See *id.* at 8 (highlighting the need for “bridge building prospects”); see also *supra* note 237.

### B. Accommodation

Accommodation asks if shifting practices can account for and reconcile competing uses, allowing both interests to coexist.<sup>249</sup> Compared to prior appropriation and correlative rights, accommodation is a vaguer touchstone for policy,<sup>250</sup> but an appealing one. Like correlative rights, accommodation may direct social attention to fundamental questions. For example, a general formulation asks which user of the common resource could more easily change in order to avoid the most harm overall.<sup>251</sup> With this, opportunities could arise to probe scope, priority, and risk tolerance as well as to focus on overall good, or a community-sized ethic.

The advantage of vagueness is flexibility in practice. Accommodation suggests an all-things-considered approach to conflict resolution.<sup>252</sup> Various responses to conflict are encouraged—a give and take—depending on the particular circumstances and the relative position of the users.<sup>253</sup> In this spirit, a historical appropriator of global carrying capacity would stand a chance of keeping its relied-upon infrastructure, at least up to a point. The spirit is one of compromise, not coercion.<sup>254</sup> And, overall, this compromise could lead to more efficient use of what capacity there is, since it provides incentives to dispose of anachronistic practices in favor of the essential.

An example might help illustrate the doctrine, though by no means is the doctrine limited to one example. Between two users, one might be better positioned to end reliance on coal-fired power plants without quality of life impacts,<sup>255</sup> while the other might move to install mass transit in its capital city. Put another way, accommodation may ask mutual users, given certain harmful practices, which can you do without?

The spirit of accommodation—the user who can most easily change its behavior to avoid harm should—suggests that developed countries are under a mandate to act in ways that undeveloped countries may not be. For example, if a minimum amount of CO<sub>2</sub> discharge is necessary for an undeveloped country's population to achieve a reasonable life expectancy, then accommodation would suggest that the undeveloped country should get the resource first, at least up to some minimally necessary level for that vital purpose.<sup>256</sup> The accommodation would then come from

---

249. FREYFOGLE, *NATURAL RESOURCES LAW*, *supra* note 99, at 23.

250. *Id.* at 450.

251. *Id.* at 462.

252. *See, e.g.*, RESTATEMENT (SECOND) OF TORTS § 850A (1979).

253. *See, e.g.*, *Spear T Ranch, Inc. v. Knaub*, 691 N.W.2d 116, 129 (Neb. 2005).

254. *Cf.* FRIEDMAN, *supra* note 91, at 390 (discussing the international opportunity for cooperation in the overlapping areas of economics and the environment).

255. *See* Seth Borenstein, *Scientist: Bulldoze Coal Plants*, *LIVESCIENCE*, Feb. 26, 2007, [http://www.livescience.com/environment/070226\\_ap\\_coal\\_plants.html](http://www.livescience.com/environment/070226_ap_coal_plants.html).

256. *See* Sachs, *supra* note 10, at 164 (explaining the notion that the economic development desired in poor countries inevitably necessitates increased energy consumption).

developed countries by, for example, more quickly and systematically employing new technology at home. A logical next step would have the developing country then implement the same technology as development reaches a stable threshold. To achieve this kind of behavior, accommodation helps point users toward a common goal and away from the short-sighted ethos of expediency.

Given the vagueness of the accommodation method, no single policy is clearly mandated. Accommodation, understood broadly, could come from related but distinct policy areas. A question like this might arise: given that an undeveloped country is subject both to restriction of its own development and the harms from those already developed, what can a developed nation do to accommodate an undeveloped country?

One answer might be to integrate a resource allocation ethic into a related policy area. Direct aid is one example, as well as technology transfers. Also, immigration is a natural corollary (especially given a potential rise in sea levels or a future reduction in usable water resources in arid places).<sup>257</sup> An example of the latter approach might be found in Tuvalu Island, located in the Pacific Ocean. The island is believed to be highly threatened as sea levels rise; already in recent years, it has lost alarming amounts of land.<sup>258</sup> The Prime Minister of Tuvalu asked for environmental refugee status for Tuvalu's citizens, and New Zealand responded by giving seventy-five of the island's inhabitants refugee status a year.<sup>259</sup> Though not formalized, this provides an example of accommodation's wide-ranging implications.

In addition, the spirit of accommodation may go beyond economic models to lifestyle choices and cultural norms.<sup>260</sup> Both a correlative mindset and an accommodation ethos are partial answers to reckless individualism, which is a barrier to community-sized benefits everywhere.<sup>261</sup> Limits to scope threaten the adolescent individualist, the citizen without barriers, she who lives by an ethos of expediency. If a limit is real, then a community ethos that deplores excess and considers true overall cost becomes an asset.<sup>262</sup>

---

257. For some ideas about appropriate measures by already developed countries, see ROBERTS & PARKS, *supra* note 23, at 9–24.

258. Lopez, *supra* note 19, at 372; see Anna Gosline, *Where Will They Go When the Sea Rises?*, *NEW SCIENTIST*, May 7, 2005, at 8–9.

259. This is an example of a possible accommodation, broadly speaking (though New Zealand's cap of seventy-five refugees is far below what is needed to clear the island). See Lopez, *supra* note 19, at 372–73.

260. See Eilperin, *supra* note 7; *supra* notes 234–37 and accompanying text.

261. See, e.g., Kysar, *supra* note 5, at 55; Odum, *supra* note 76, at 728.

262. This ethic of prudent management might include “the use of solar energy sources, stabilization of population sizes, reduction of consumption habits, and other policy measures.” Kysar, *supra* note 5, at 15–16.

## V. CONCLUSION

What humankind learns about the world often reveals flaws in assumptions of the past.<sup>263</sup> Contemplating these assumptions can be a difficult and frightening task for a society to engage in. Moreover, the task is frustrating: the best ideas still must fight the devils of implementation. That said, this Note suggests that reexamining the *should* of allocation is useful. The questions raised have no easy answers, yet the questions must be raised as a preliminary matter, and the types of questions matter. Commons management systems pull from the nature of a resource, the nature of a commons, and human nature. Human ideas of fairness influence whether users then agree to ratify those systems. This requires conversation, prioritizing, and choice.

In this sense, the global warming dilemma provides an opportunity to ask questions—is the world fundamentally different than some of its rules and goals assume?<sup>264</sup> Handling complexity, seizing opportunity, and asking fundamental questions are all activities best done from solid ground. For this reason, understanding global warming as a resource problem may help.

Ecologists have known for some time that the Earth's potential to serve human needs is not infinite. That said, the assumptions of the past are alive, entrenched in social institutions. An allocation system that assumes infinite growth—either explicitly or implicitly—is flawed, perhaps dangerously. Rather, understanding nature's limits is key to living well and effectively; limits define workable institutions. Ethics and ecology meet, bringing along uncertainty, discord, and chances for accommodation. Can a community ethic be found that promotes prudence and longevity in this and other troubled commons?

---

263. See FREYFOGLE, *THE LAND WE SHARE*, *supra* note 13, at 1–2.

264. See *id.*