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Emerging Commons and Tragic Institutions

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ARTICLES

EMERGING COMMONS AND TRAGIC INSTITUTIONS

BY
BRIGHAM DANIELS*

For the past forty years, scholars have developed an immense literature devoted to understanding and solving the tragedy of the commons. The most prominent solutions to this tragedy have focused on building and maintaining stable institutions. This Article reexamines this foundational literature by exploring the costs of stability. In many cases, far more than is generally recognized, the way we value the commons changes. When values change, stable institutions that once made perfect sense become rigid institutions that block change. This Article explains how institutions most able to solve the tragedy of the commons often cause a tragedy of another sort. To ground theory in practice, this Article examines three case studies: the United States' governance of the radio spectrum, the founding of Yellowstone National Park, and western water law. This Article ends by proposing a set of draft principles to help us overcome institutional rigidity. For decades, commons scholarship has focused on the tragedy of overuse. This Article re-frames the commons debate, explicitly taking into account not only the benefits of stable institutions but also their costs.

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I. INTRODUCTION

About forty years ago Garrett Hardin recounted what has become the world's most famous environmental fable: the story of a tribe of herdsmen who grazed their cows in an open field.¹ The herdsmen lived by a simple

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

rule: when a herdsman added a cow to the pasture, he took it home for the slaughter. For generations the herdsmen grazed their cows in relative peace. But, if one were looking, problems started to appear. As the herdsmen added more cows, grass became increasingly sparse, the terrain more trampled, and the cows a little crowded. The herdsmen slowly came to understand that adding cows meant more strain on the pasture and that this threatened the herd and their way of life. Yet, each herdsman continued to add cows to the pasture, all the while resenting others that did the same. No herdsman would cut back; each feared that if he did, others would simply continue adding cows.

This ends the story. We are left to wonder if the herdsmen eventually pushed the pasture over the brink and if so, at what cost. But Hardin's message rings clear: the individually rational interest to overuse the commons inevitably resulted in a collectively tragic outcome. Hardin famously termed this clash that threatened the pasture—and even the herdsmen—the *tragedy of the commons*.²

Scholars have applied Hardin's insight in a dizzying number of contexts to explain real-world problems,³ including air pollution,⁴ water use,⁵ water

² Others have made many of the points made by Hardin in *The Tragedy of the Commons*. Elinor Ostrom traces elements of Hardin's argument as far back as Aristotle. ELINOR OSTROM, GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION 2–3 (James E. Alt & Douglass C. North eds., 1990) [hereinafter OSTROM, GOVERNING THE COMMONS]. Hardin was not even alone among his contemporaries in identifying what has become known as the tragedy of the commons. See, e.g., H. Scott Gordon, *The Economic Theory of a Common-Property Resource: The Fishery*, 62 J. POL. ECON. 124, 124 (1954); Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 354–55 (1967). Nonetheless, “Hardin gave the problem a vivid and visceral name that quickly captures our attention and tells us much of what we need to know.” Barton H. Thompson, Jr., *Tragically Difficult: The Obstacles to Governing the Commons*, 30 ENVTL. L. 241, 242 (2000).

³ A LexisNexis search of “tragedy of the commons” produces 1,618 results in the Law Reviews, CLE, Legal Journals & Periodicals Combined Database (completed on June 28, 2007).

⁴ See WILLIAM D. NORDAUS, MANAGING THE GLOBAL COMMONS: THE ECONOMICS OF CLIMATE CHANGE 1 (1994); Tom Tietenberg, *The Tradable Permits Approach to Protecting the Commons: What Have We Learned?*, in THE DRAMA OF THE COMMONS 197, 202–03 (Elinor Ostrom et al. eds., 2002); Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1245 (“In a reverse way, the tragedy of the commons reappears in problems of pollution. Here it is not a question of taking something out of the commons, but of putting something in . . . noxious and dangerous fumes into the air.”); Thompson, *supra* note 2, at 253–55 (“The danger of global climate change presents a slightly different form of commons dilemma. Rather than taking something out of the commons, people are putting something in—CO₂ and other greenhouse gases.”).

⁵ See OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 146–49, 157–73 (explaining the overdrafting of California groundwater and problems associated with Sri Lankan irrigation efforts including the large number of farmers involved); Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1245 (explaining how the world's oceans are being unsustainably exploited); Thompson, *supra* note 2, at 249–53 (explaining that groundwater is a natural commons being exploited); David J. Hayes, *Privatization and Control of U.S. Water Supplies*, 18 NAT. RESOURCES & ENV'T. 19, 23 (2003) (also explaining that groundwater is being exploited).

pollution,⁶ fisheries,⁷ parkland and wildlife conservation,⁸ logging and other uses of forest products,⁹ grazing,¹⁰ and gas and oil extraction.¹¹ The tragedy of the commons is increasingly used to explain diverse non-environmental problems as well, including the ability of developing countries to raise and collect taxes,¹² the prevalence of telemarketing,¹³ administration of the criminal justice system,¹⁴ the provision of health care,¹⁵ and United States

⁶ See Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1245 (explaining the effects of factory pollution on water); Richard J. Lazarus, *Celebrating Tahoe-Sierra*, 33 ENVTL. L. 1, 4-5 (2003) (explaining that pollution of Lake Tahoe is a classic example of the tragedy of the commons); *Natural Res. Def. Council v. Costle*, 568 F.2d 1369, 1378 (D.C. Cir. 1977) explaining:

[T]he primary purpose of the effluent limitations and guidelines was to provide uniformity among the federal and state jurisdictions enforcing the NPDES program and prevent the "Tragedy of the Commons" that might result if jurisdictions can compete for industry and development by providing more liberal limitations than their neighboring states.

Id.

⁷ See OSTROM, GOVERNING THE COMMONS, *supra* note 2 at 144-46, 149-57, 173-78 (explaining the failures of institutions to overcome the tragedy of the commons in fisheries in Turkey, Nova Scotia, and Sri Lanka); E. N. Anderson, Jr., *A Malaysian Tragedy of the Commons*, in THE QUESTION OF THE COMMONS: THE CULTURE AND ECOLOGY OF COMMUNAL RESOURCES 327, 328-29 (Bonnie J. McCay & James M. Acheson eds., 1990) (discussing the overfishing of stocks in the west Malaysian fishery, evidenced through trawl-hauls made up almost entirely of undeveloped organisms, while attempted fishing is still abundant); Thompson, *supra* note 2, at 247-49 (describing the depletion of the world's fisheries as a tragedy of the commons).

⁸ See Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1245 ("The National Parks present another instance of the working out of the tragedy of the commons . . . they are open to all, without limit . . . The values that visitors seek in the parks are steadily eroded. Plainly, we must soon cease to treat the parks as commons or they will be of no value to anyone."); Thomas Lund, *Nineteenth Century Wildlife Law: A Case Study of Elite Influence*, 33 ARIZ. ST. L.J. 935, 936-38 (2001) (explaining the loss of wildlife in the United States in the late nineteenth century).

⁹ See Clark C. Gibson et al., *Explaining Deforestation: The Role of Local Institutions*, in PEOPLE AND FORESTS: COMMUNITIES, INSTITUTIONS AND GOVERNANCE 1, 6-7 (Clark C. Gibson et al. eds., 2000) (discussing the problems that arise from individuals treating forests as private goods and ignoring interests of the collective); Lee P. Breckenridge, *Protection of Biological and Cultural Diversity: Emerging Recognition of Local Community Rights in Ecosystems Under International Environmental Law*, 59 TENN. L. REV. 735, 751 (1992) (explaining effects of forest devastation).

¹⁰ See Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1245 (recounting how pressure is continually applied by cattlemen to increase head counts on national land leases, resulting in erosion and weed dominance); George C. Coggins et al., *The Law of Public Rangeland Management I: The Extent and Distribution of Federal Power*, 12 ENVTL. L. 535, 547 (1982) (arguing that the collapse of rangeland ecosystems in the late 19th century was partially due to their status as unregulated commons).

¹¹ See Richard J. Pierce, Jr., *State Regulation of Natural Gas in a Federally Deregulated Market: The Tragedy of the Commons Revisited*, 73 CORNELL L. REV. 15, 16 (1987) (applying Hardin's principles to natural gas reserves).

¹² See Daniel Berkowitz & Wei Li, *Tax Rights in Transition Economies: A Tragedy of the Commons?*, 76 J. PUB. ECON. 369, 370-71 (2000).

¹³ See Ian Ayres & Matthew Funk, *Marketing Privacy*, 20 YALE J. ON REG. 77, 87 (2003).

¹⁴ See A.C. Pritchard, *Auctioning Justice: Legal and Market Mechanisms for Allocating Criminal Appellate Counsel*, 34 AM. CRIM. L. REV. 1161, 1167-68 (1997).

¹⁵ See Michael Gochfeld, Joanna Burger & Bernard D. Goldstein, *Medical Care as a*

drug policy,¹⁶ among others. Certainly the broad application of the theory not only grows out of Hardin's piercing insight but also out of the realization that commons are almost everywhere we look. The power of the fable explains why more than one hundred anthologies in diverse disciplines have excerpted Hardin's article.¹⁷ Its vast application has made it a cornerstone of environmental scholarship.¹⁸

Hardin's simple story has also inspired a rich literature challenging and exploring a core assumption—that the herdsmen (or any other users of a commons)¹⁹ cannot craft a better resolution.²⁰ Are commons resources necessarily tragic? Relying primarily on empirical studies, scholars have explored a variety of tools that can support sustainable management, such as persuasion, coercion, bribes, and iterative interactions.²¹ Much of this literature, however, has focused on the role of institutions.²² We have learned that tragedy is not our only option, and in some cases we even find

Commons, in PROTECTING THE COMMONS: A FRAMEWORK FOR RESOURCE MANAGEMENT IN THE AMERICAS 253, 253 (Joanna Burger et al. eds., 2001).

¹⁶ See DAVID W. RASMUSSEN & BRUCE L. BENSON, THE ECONOMIC ANATOMY OF A DRUG WAR: CRIMINAL JUSTICE IN THE COMMONS 20–21 (1994).

¹⁷ The Garrett Hardin Society keeps a bibliography of Hardin's work. While not updated since September 2001, the bibliography purports that 111 anthologies have included THE TRAGEDY OF THE COMMONS. The Garrett Hardin Society, Garrett Hardin Bibliography, http://www.garretthardinsociety.org/docs/gh_bibliography_articles.pdf (last visited July 15, 2007).

¹⁸ See David Feeny et al., *The Tragedy of the Commons: Twenty-Two Years Later*, 18 HUM. ECOLOGY 1, 2 (1990).

¹⁹ By "commons" this article refers to resources with two traits: 1) rivalry, and 2) difficulties excluding others. For a more complete definition, see *infra* Part II.A.

²⁰ See e.g., OSTROM, GOVERNING THE COMMONS, *supra* note 2; CAROL M. ROSE, PROPERTY AND PERSUASION: ESSAYS ON THE HISTORY, THEORY, AND RHETORIC OF OWNERSHIP 37 (1994); ROBERT M. AXELROD, THE EVOLUTION OF COOPERATION 19–23 (1984); RUSSELL HARDIN, COLLECTIVE ACTION (1982); MICHAEL TAYLOR, THE POSSIBILITY OF COOPERATION 2 (Jon Elster & Gudmund Hernes eds., 1987); MAKING THE COMMONS WORK: THEORY, PRACTICE, AND POLICY (Daniel W. Bromley ed., 1992); PROPERTY RIGHTS AND THE ENVIRONMENT: SOCIAL AND ECOLOGICAL ISSUES 10 (Susan Hanna & Mohan Munasinghe eds., 1995); Anderson, *supra* note 7; COMMON PROPERTY RESOURCES: ECOLOGY AND COMMUNITY-BASED SUSTAINABLE DEVELOPMENT (Fikret Berkes ed., 1989); Tietenberg, *supra* note 4; ELINOR OSTROM, ROY GARDNER & JAMES WALKER, RULES, GAMES, & COMMON-POOL RESOURCES 19–20 (1994); Margaret A. McKean, *Success on the Commons: A Comparative Examination of Institutions for Common Property Resource Management*, 4 J. THEORETICAL POL. 247 (1992) [hereinafter McKean, *Success on the Commons*].

²¹ See generally AXELROD, *supra* note 20 (discussing strategies to encourage cooperation and particularly focusing on the importance of iterative interactions and reciprocity); HARDIN, COLLECTIVE ACTION, *supra* note 20 (discussing the power of expected future interactions in promoting cooperation); MICHAEL TAYLOR, ANARCHY AND COOPERATION 10 (1976) (stressing the importance of iterative interactions and the roles of norms); David M. Kreps & Robert Wilson, *Reputation and Imperfect Information*, 27 J. ECON. THEORY 253, 253–54 (1982) (discussing the role of reputation and esteem in shaping behavior).

²² The focus on institutions looks at mechanisms that restrict access to the commons without dividing the commons into pieces. Margaret A. McKean, *Common Property*, in PEOPLE AND FORESTS: COMMUNITIES, INSTITUTIONS AND GOVERNANCE, *supra* note 9, at 27, 36 [hereinafter McKean, *Common Property*]. For a more detailed explanation of institutions, see *infra* Part III.A.

what Carol Rose has called the "comedy of the commons."²³ Indeed, the most famous scholar in this field, Elinor Ostrom, has emphatically identified key design principles of stable institutions that, if employed, help users withstand the tragedy of the commons.²⁴ Due to their ability to protect commons and commons users, these institutions are much admired. In fact, Nobel Prize winner Douglass North calls Ostrom's design principles *commandments* rather than *principles*.²⁵ However, it turns out these principles, and stable institutions more generally, have an unexplored downside.

To make this clear, let's add another chapter to the herdsmen's story. Assume that the herdsmen created a governing institution that limited the herd to the maximum number of cows the pasture could maintain without showing signs of overgrazing. The herdsmen were given the ability to change the rules by majority vote. The institution also defined which herdsmen could use the commons and to what extent. The tribal chiefs approved of the arrangement, and the herdsmen abided by it. In fact, the herdsmen even began to work together to expand the pasture by clearing away non-edible ground cover, shrubs, and even small trees to make room for more grass. From the herdsmen's perspective, the institution was a great success.

Viewed more broadly, however, the institution's success is less clear. Expanding the pasture resulted in unintended consequences. Clearing away land for grasses increased erosion. Particularly when it rained, the stream that meandered through the pasture was visibly dirtier downstream from the pasture. And, many in the tribe suspected that the herdsmen's management of the pasture had muddied the stream. A band of fishers in the tribe complained that the dirty water hurt their fishing grounds and called for the herdsmen to take action.

The herdsmen met. They agreed that the rules governing the pasture had nothing to do with dirty water or fish. Additionally, many of the herdsmen remained skeptical that the pasture, or even the dirty water, had anything to do with the declining stock of fish. Others argued fish were not the concern of herdsmen. The herdsmen decided not to act. In fact, they continued grazing, expanding the pasture, causing erosion, and killing fish.

The herdsmen were unwittingly causing other problems too. The land cleared for pasture was an important breeding ground for several birds hunted by the tribe, and clearing away plants had made the area less desirable habitat. Further, by clearing away plants and reducing soil stability, the herdsmen made the entire tribe more vulnerable to landslide risks.

In terms of maintaining the level of forage in the commons, it is easy to call the herdsmen's institution a success. In fact, many probably would. After all, the tribe avoided a tragedy of the commons, cooperated to solve

²³ Carol Rose, *The Comedy of the Commons*, 53 U. CHI. L. REV. 711, 723 (1986).

²⁴ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 88-102.

²⁵ Douglass C. North, *Dealing with a Non-Ergodic World: Institutional Economics, Property Rights and the Global Environment*, 10 DUKE ENVTL. L. & POL'Y 1, 10 (1999) [hereinafter North, *Dealing with a Non-Ergodic World*].

their problems, and prospered because of it. In doing so, though, they held rival values of the commons hostage. Despite themselves, their institution became a *tragic institution*: the institution's most valuable characteristic—stability—maximized the herdsmen's values but at the same time obstructed efforts to protect rival values, such as the health of the fishery.²⁶ Viewed from the outside, the herdsmen's gain came at a steep social price. When society changes the way it values the commons, the way we might evaluate the herdsmen's stable institution might also change. While this stable institution spared the herdsmen from the tragedy of the commons, it later obstructed change and complicated problems for other commons users.

In fact, the pursuit to build stable commons institutions systematically creates four important barriers to emerging values. First, we often design institutions to govern the commons with a narrow vision of why a commons has value. Commons institutions are intentionally myopic. The herdsmen looked at a field and saw a pasture; salmon fishers see rivers and oceans in terms of salmon habitat; jurisdictions attempting to limit greenhouse gases look at forests as greenhouse gas sinks; wilderness advocates see remote places as areas "where the earth and its community of life are untrammelled by man."²⁷ Our tendency to focus on one use of a commons at a time sets institutions on a path-dependent course at the outset.

Second, we specifically design commons institutions to *resist* change. These institutions are inertial by design, not by accident. If commons users are going to give up specific liberties or other benefits (such as grazing as many cows as they want), they equally want assurances that the deal will stick over time. Also, stability breeds resistance to change by enhancing a shared worldview that favors and perpetuates the values the institution serves. In a dynamic world, stability is not only a virtue but also a vice. When we change the way we value the commons, stability transforms into rigidity.

Third, those with a stake in incumbent institutions often invest and cooperate to maintain, and ideally expand, their grip on the commons. This public choice problem amplifies the costs of institutional change. Examples are abundant: the American Petroleum Association, the National Association of Broadcasters, Trout Unlimited, and the Wilderness Society all work to assure that commons institutions work to the advantage of particular commons users. Furthermore, incumbent users often form symbiotic relationships with political power brokers: interest groups provide political constituencies and governments deliver political rewards. Rent-seeking, agency capture, and symbolic politics naturally follow, and disenfranchised stakeholders are often marginalized.

Fourth, sometimes a use of a commons physically alters the commons, making change more difficult. For example, logging a forest can create difficulties for alternative uses such as tourism, wildlife conservation, or preservation of old growth stands. If values shift, a logged forest will take a

²⁶ An institution is a "tragic institution" when, by protecting incumbents, it increases the transaction costs of forming institutions to protect rival values of a commons. See *infra* Part VII.B.

²⁷ Wilderness Act, 16 U.S.C. §§ 1131–1136, § 1131(c) (2000).

considerable amount of time and effort to restore, if restoration is possible at all; some old growth forests may not return for centuries—if ever—and some species within the forest may become extinct.

Stable institutions that govern commons are not in and of themselves problematic. Difficulties arise when they confront *emerging values*. Commons can provide different values to diverse sets of users—what seemed a bug infested swamp to some may be prized as an important buffer to flooding by others; lands the government was willing to give away are later cherished as a national treasure. We may value the same commons for many diverse—often conflicting—purposes, ranging from resource extraction to recreation to aesthetic enjoyment. Given competing values, defining what a commons *is* almost invariably results in tradeoffs. At the time governing institutions were created, a particular use may have dominated users' interest in the commons. As circumstances change, however, emerging values may come into view and existing commons institutions may stand in the way of protecting them.

Thus, emerging commons and tragic institutions come in pairs. The scholarship focused on the commons has surprisingly ignored this simple point. Yet, the commons have not: institutions built to address yesterday's problems become today's obstacles to change. Try as we might to address the tension between stability and responsiveness by reforming commons management in a piecemeal fashion, we often find that the stubborn institutions of the past act as formidable stumbling blocks. This problem is not of merely theoretical interest. The clash between institutions built to last and changing values lies at the heart of many of the most difficult resource conflicts in the recent past, from spotted owls in the Northwest's old growth forests to the debates over drilling in the Arctic National Wildlife Reserve. Nor is this confined to environmental conflicts, as the recent difficulties in unseating incumbent users of the analog radio spectrum makes clear.

Part II takes up the challenges of protecting the commons. It explains how management of open-access commons poses difficulties for restricting access and promoting cooperation among commons users. It also addresses the related difficulties of convincing commons users to cut back and the hurdles of promoting collective action to protect the commons.

Part III looks at the basic tools used to build and maintain stable institutions to protect the commons—in particular, credible commitments and threats. This Part ends with a discussion of institutional traits that tend to create stability in the commons.

Part IV explores emerging commons and discusses how crowding causes values of the commons to change over time. A series of practical examples illustrate both how values change and the political economy of different groups driving this change.

Part V examines tragic institutions and illustrates clashes between stable institutions and emerging commons. It explains why tragic institutions occur and provides a framework to evaluate tragic institutions.

Moving from theory to practice, Part VI applies the framework to three real-life examples that highlight conflicts between emerging commons and

incumbent institutions. Specifically, it explores governance of the analog radio spectrum, the founding of Yellowstone Park and the subsequent eviction of Yellowstone's historic users, and the challenges of managing water use in the western United States. This Part ends by synthesizing the case studies and introducing four typologies of tragic institutions.

Part VII examines how a clearer understanding of emerging commons and tragic institutions should alter our approach to governing the commons. In designing institutions, we need to find ways to supplement stable institutions with responsive institutions: institutions that recognize complexities and evolve with new information, integrate piecemeal policies, allow trading of use rights within acceptable bounds, internalize the costs of incumbent users, and provide users the incentive to conserve the commons. Part VII recognizes that institutional fragility may limit opportunities to build responsive institutions and emphasizes that responsiveness introduces some risks. Yet, as a whole, it suggests more responsiveness and less stability would serve the broadest good.

II. CHALLENGES OF PROTECTING THE COMMONS

The first step in explaining the conflict between emerging commons and incumbent institutions lies in appreciating the well-documented challenges of building governance institutions in the first place. Recognizing the hurdles to effective governance of the commons helps explain why commons institutions tend to resist change and lock in benefits for select commons users. This Part summarizes the relevant literature and focuses on three major challenges to imposing rules in an open-access commons.²⁸ Part II.A looks at how the traits of commons make it hard to either restrict access to or promote cooperation among commons users. Part II.B explores the difficulties in convincing commons users to cut back their consumption. Finally, Part II.C examines difficulties facing those promoting collective action.

A. Challenges Imbedded in the Traits of a Commons

A commons is a natural or manufactured resource with two defining characteristics. First, one person using a commons diminishes the amount of commons available for others.²⁹ Thus, preserving a commons hinges on

²⁸ An "open-access commons" refers to a commons with no mechanism to restrict access to the commons. Daniel W. Bromley, *Commons, Property, and Common-Property Regimes*, in *MAKING THE COMMONS WORK: THEORY, PRACTICE, AND POLICY*, *supra* note 20, at 3, 4.

²⁹ The main difference between a commons and a public good is that a public good does not consume or diminish the resource. RICHARD CORNES & TODD SANDLER, *THE THEORY OF EXTERNALITIES, PUBLIC GOODS, AND CLUB GOODS* 6-7 (1986); Robert O. Keohane & Elinor Ostrom, *Introduction*, in *LOCAL COMMONS AND GLOBAL INTERDEPENDENCE: HETEROGENEITY AND COOPERATION IN TWO DOMAINS* 13-15 (Robert O. Keohane & Elinor Ostrom eds., 1995); C. Ford Runge, *Common Property and Collective Action in Economic Development*, in *MAKING THE COMMONS WORK: THEORY PRACTICE, AND POLICY*, *supra* note 20, at 17, 26. In practice, sometimes it is difficult to distinguish public goods from commons. Keohane & Ostrom, *supra* note 29, at 14.

restricting consumption. This is unfortunate because the second characteristic of a commons is the difficulty of excluding potential users.³⁰ Classic examples of commons include fisheries, public highways, parks, and public squares.³¹

Difficulties in excluding potential users of a commons pose significant challenges. First, a person acting alone and reducing his own consumption will not only fail to achieve much but also will create an opportunity for other users to consume that part of the commons instead.³² Second, and related, it is difficult to convince other users to cut back because commons users face constant "temptations to free-ride and shirk."³³ Indeed, this is Hardin's fundamental point: users have an incentive to continue using the commons even in the knowledge that continued use will lead to a collective tragedy. Because keeping users out is difficult, the costs of convincing commons users to cut back voluntarily—or due to coercion—are often substantial.³⁴

Given the difficulties in restricting access and in promoting cooperation, it sometimes seems entirely rational to keep a commons as an open-access commons.³⁵ When, for example, there is enough of the commons to meet the demands of all potential users, the costs of institutions

³⁰ See OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 30; TOM TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 598 (5th ed. 2000); Elinor Ostrom, *Reformulating the Commons*, in PROTECTING THE COMMONS: A FRAMEWORK FOR RESOURCE MANAGEMENT IN THE AMERICAS, *supra* note 15, at 17–18 [hereinafter Ostrom, *Reformulating the Commons*]; ORAN YOUNG, THE INSTITUTIONAL DIMENSIONS OF ENVIRONMENTAL CHANGE 140 (2002). While the definition of "commons" is straightforward, inconsistent use has somewhat muddled the term. McKean, *Common Property*, *supra* note 22, at 27, 30. Perhaps as an effort to remedy this, scholars have given commons different labels including "common-pool resources" (CPRs) and "common-pool goods." *Id.* at 28.

³¹ See Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1245 (asserting that fisheries and national parks both suffer from the tragedy of the commons); see also *supra* notes 4–16 and accompanying text.

³² See Ostrom, *Reformulating the Commons*, *supra* note 30, at 17, 35; Thompson, *supra* note 2, at 242.

³³ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 15.

³⁴ The costs referred to here are transaction costs, meaning the price of understanding, making, monitoring, and enforcing deals. See R. H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 15 (1960); JACK KNIGHT, INSTITUTIONS AND SOCIAL CONFLICT 31 (1992); DOUGLASS C. NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE, AND ECONOMIC PERFORMANCE 27 (1990) [hereinafter NORTH, INSTITUTIONS]; RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 35 (4th ed. 1992); Douglass C. North, *Transaction Costs Through Time*, in TRANSACTION COST ECONOMICS 149, 149 (Claude Menard ed., 1997) [hereinafter *Transaction Costs Through Time*]; Oliver E. Williamson, *Efficiency, Power, Authority and Economic Organization*, in TRANSACTION COST ECONOMICS AND BEYOND 11, 16–20 (John Groenewegen ed., 1996). From the view of the individual, we can say that transaction costs are "all those costs that cannot be conceived to exist in a Robinson Crusoe (one-man) economy." Steven N.S. Cheung, *On the New Institutional Economics*, in CONTRACT ECONOMICS 48, 51 (Lars Werin & Hans Wijkander eds., 1992). At a more global level, *transaction costs* are the costs extracted by institutions and the organizations, including the costs of creating, maintaining, and changing institutions. See Kenneth J. Arrow, *The Organization of Economic Activity: Issues Pertinent to the Choice of Market Versus Nonmarket Allocation*, in PUBLIC EXPENDITURES AND POLICY ANALYSIS 59, 60 (Robert H. Haveman & Julius Margolis eds., 1970).

³⁵ See *supra* note 28 and accompanying text.

may outweigh their perceived benefits.³⁶ Additional restrictions only begin to make sense when the users recognize limits and the reality of rivalry becomes tangible.³⁷

B. Challenges of Convincing Commons Users to Cut Back

Crowding in the commons does not necessarily mean commons users will want to cut back.³⁸ To the contrary, commons users often resist efforts to restrict access to the commons even when this would presumably benefit them.³⁹ Therein lies the seeds of the tragedy of the commons.

One difficulty in cutting back arises from the way the commons distribute costs and benefits. Protecting the commons is good for all users collectively. Yet, the costs of cutting back are distributed to individual commons users: fewer of his cows in the pasture or fish in her pan.⁴⁰ Given this reality, commons users may rationally fear that they will disproportionately bear the costs.

Additionally, time horizons may cause commons users to discount the benefits of cutting back more than they discount the costs because the costs of cutting back often accrue immediately whereas the payoff of reductions often looms in the future.⁴¹ Uncertainties surrounding benefits may also justify discounting.⁴² Some users may question whether cutting back is necessary at all.⁴³ The more complex the commons, generally the more difficult it is to forecast how foregoing consumption will benefit users. Additionally, long time horizons may introduce the possibility that sacrifices today will be undone by users in the future changing or skirting the rules of the game.⁴⁴

³⁶ See McKean, *Common Property*, *supra* note 22, at 30. Distinctions between public goods and commons fade when rivalry for a commons is not present. See *id.* at 28–29; Keohane & Ostrom, *supra* note 29, at 15.

³⁷ See Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1244 (identifying the driving force behind the tragedy of the commons as increasing resource use “without limit—in a world that is limited”).

³⁸ For a detailed discussion of crowding, see *infra* Part IV.A.

³⁹ See Thompson, *supra* note 2, at 243.

⁴⁰ See Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1244.

⁴¹ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 34–35; JEAN-MARIE BALAND & JEAN-PHILIPPE PLATTEAU, HALTING DEGRADATION OF NATURAL RESOURCES: IS THERE A ROLE FOR RURAL COMMUNITIES? 343–44 (1996).

⁴² See Martin L. Weitzman, *Just Keep Discounting, But...*, in DISCOUNTING AND INTERGENERATIONAL EQUITY 23, 28–29 (Paul R. Portney & John P. Weyant eds., 1999) (noting that “[w]hile there is uncertainty about almost everything in the deep future, perhaps the most fundamental uncertainty of all concerns the discount rate itself”); OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 35 (pointing out that those “who are uncertain whether or not there will be sufficient food to survive the year will discount future returns heavily when traded off against increasing the probability of survival during the current year”); Richard L. Revesz, *Environmental Regulation, Cost-Benefit Analysis, and the Discounting of Human Lives*, 99 COLUM. L. REV. 941, 945–47 (1999) (discussing discounting environmental regulatory benefit).

⁴³ See Margaret McKean, *Traditional Common Lands in Japan*, in MAKING THE COMMONS WORK: THEORY PRACTICE, AND POLICY, *supra* note 20, at 63, 88 [hereinafter McKean, *Common Lands in Japan*].

⁴⁴ *Id.*; Elinor Ostrom, *Rudiments of a Theory of Common-Property Institutions*, in MAKING THE COMMONS WORK: THEORY PRACTICE, AND POLICY, *supra* note 20, at 293, 303 [hereinafter

Lastly, a number of well-documented psychological effects also help explain why commons users often find cutting back difficult.⁴⁵ People often systematically fixate on potential loss more than they appreciate potential gains.⁴⁶ Similarly, once people possess something, they tend to place a higher value on it.⁴⁷ In other words, cutting back in the commons is difficult because cutting back benefits is always psychologically difficult—often to an economically irrational extent.

C. Problems of Engineering Collective Action

Because the traits of a commons make going it alone unattractive and because cutting back is so difficult, cooperation is essential in restricting access to the commons. Yet, engineering collective action is often difficult as well.⁴⁸

Difficulties creep in for several reasons. First, some commons users may attempt to free ride—willingly benefiting from restricted access while avoiding paying for it.⁴⁹ Free riding may arise in part because the commons invite such behavior,⁵⁰ in part because of the difficulties in cutting back,⁵¹ and in part because some people are just prone to free ride.⁵² Moreover, a small amount of free riding can have a catalytic effect and unravel efforts to build cooperation.⁵³

Ostrom, *Common-Property Institutions*].

⁴⁵ Daniel Kahneman & Amos Tversky, *Choices, Values and Frames*, 39 AM. PSYCHOLOGIST 341, 341 (1984) [hereinafter *Choices*]; Daniel Kahneman, Jack L. Knetsch & Richard Thaler, *Anomalies: The Endowment Effect, Loss Aversion and Status Quo Bias*, 5 J. ECON. PERSPECTIVES 193, 194 (1991); Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 ECONOMETRICA 263, 263 (1979) [hereinafter Kahneman & Tversky, *Prospect Theory*]; Amos Tversky & Daniel Kahneman, *The Framing of Decisions and the Psychology of Choice*, 211 SCI. 453, 453 (1981) [hereinafter Tversky & Kahneman, *Framing of Decisions*]. See also Thompson, *supra* note 2, at 256–57 (discussing cognitive psychology literature in the context of the commons).

⁴⁶ See Kahneman & Tversky, *Prospect Theory*, *supra* note 45, at 282.

⁴⁷ See Kahneman, Knetsch & Thaler, *supra* note 45, at 194; Cass R. Sunstein, *Behavioral Analysis of Law*, 64 U. CHI. L. REV. 1175, 1179 (1997); Richard Thaler, *Toward a Positive Theory of Consumer Choice*, 1 J. ECON. BEHAV. & ORG. 39, 42 (1980); Amos Tversky & Daniel Kahneman, *Loss Aversion in Riskless Choice: A Reference-Dependent Model*, 106 Q. J. ECON. 1039, 1039 (1991).

⁴⁸ “Collective action problems” are transaction costs that reflect the difficulties of coordinating actions that are not present when an actor acts alone. See MANCUR OLSON, *THE LOGIC OF COLLECTIVE ACTION* 1–2 (1965); PETER C. ORDESHOOK, *GAME THEORY AND POLITICAL THEORY: AN INTRODUCTION* 222 (1986); OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 5–7, 36.

⁴⁹ A “free rider” is someone who does not pitch in but benefits from the actions of others nonetheless. See ORDESHOOK, *supra* note 48, at 222.

⁵⁰ See *supra* Part II.A.

⁵¹ See *supra* Part II.B.

⁵² See OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 36.

⁵³ See *id.*; Armin Falk, Ernst Fehr & Urs Fischbacher, *Appropriating the Commons—A Theoretical Explanation*, in *THE DRAMA OF THE COMMONS*, *supra* note 4, at 157, 159–61 (noting “[a] large body of evidence indicate fairness and reciprocity are powerful determinants of human behavior”); Ronald Oakerson, *Analyzing the Commons*, in *MAKING THE COMMONS WORK*:

Additionally, coordinating behavior may prove more difficult in some commons contexts than in others. As group size increases, so do collective action costs.⁵⁴ This makes sense because two of the most significant collective action costs are spreading information and coordinating behavior: the larger the group, the more people to inform and coordinate.⁵⁵ Likewise, the more dispersed the benefits of the commons, the greater the transaction costs associated with collective action.⁵⁶ Collective action favors small, tight-knit groups that have a lot to gain and are able to muster the political resources to coordinate collective action.⁵⁷

Finally, it is generally presumed that the lower the geographic concentration of commons users, the more costly it is for them to coordinate collective action.⁵⁸ The same is true of societies with greater diversity of cultures, religions, or race.⁵⁹ Whether the distance between users is geographic, cultural, linguistic, or emotional, collective action costs increase.

III. BUILDING AND MAINTAINING STABLE INSTITUTIONS IN THE COMMONS

Part II discussed both the importance and difficulty in gaining the support of commons users to restrict access to the commons. This Part surveys the policy tools used to build and maintain institutions that restrict access, even in the face of disinterest or resistance.⁶⁰

Part III.A briefly defines "institutions" and discusses how institutions help govern the commons. Part III.B then turns to the role of credible commitments and threats in gaining the support of commons users. Part III.C discusses the design principles of stable institutions identified in the

THEORY PRACTICE, AND POLICY, *supra* note 20, at 41, 49–51 (arguing "[f]ree-riding behavior erodes reciprocity"); Hanoch Dagan & Michael A. Heller, *The Liberal Commons*, 110 *YALE L.J.* 549, 576–77 (2001) (noting parties may be motivated by "[n]ot wanting to be suckers").

⁵⁴ See, e.g., OLSON, *supra* note 48, at 44; OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 202–05; Richard A. Posner, *Theories of Economic Regulation*, 5 *BELL J. ECON. & MGMT. SCI.* 335, 345 (1974); George J. Stigler, *Free Riders and Collective Action: An Appendix to Theories of Economic Regulation*, 5 *BELL J. ECON. & MGMT. SCI.* 359, 360–62 (1974).

⁵⁵ See Demsetz, *supra* note 2, at 357 (discussing this problem in the collective negotiating context).

⁵⁶ See Oakerson, *supra* note 53, at 41–42.

⁵⁷ See HARDIN, *COLLECTIVE ACTION*, *supra* note 20, at 38–49 (discussing Olson's theory of the relationship between group size and probability of success in collective action). See also ARUN AGRAWAL, *GREENER PASTURES: POLITICS, MARKETS, AND COMMUNITY AMONG A MIGRANT PASTORAL PEOPLE* 59–60 (1999) (describing how disparate interests between shepherds and upper caste villagers led to a politically-driven Pareto inferior outcome among the people of Patawal).

⁵⁸ See OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 146–49 (describing difficulties of collective action in the context of groundwater basins in large San Bernardino County, California, despite the availability of institutional means); BALAND & PLATTEAU, *supra* note 41, at 302; ARUN AGRAWAL AND CLARKE C. GIBSON, *COMMUNITIES AND THE ENVIRONMENT* 1–12 (2001) (discussing different factors that contribute to group homogeneity, including size, social structure, shared interests, and norms).

⁵⁹ BALAND & PLATTEAU, *supra* note 41, at 302–04; OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 166.

⁶⁰ See *supra* Part II.A.

literature, which are often used to explain why some commons institutions survive while others fail.

A. Institutions and How They Govern the Commons

In everyday use, “institutions” often refer to organizations or to the buildings that house them. However, in the context of this Article, “institutions” is meant to refer to the formal and informal “rules of the game” that “shape human interaction.”⁶¹ Formal institutions are codified rules and informal institutions are unwritten rules and norms.⁶² Both formal and informal institutions play important roles in governing the commons. An example familiar to many law students concerns how Maine lobster harvesters rely on both state law and longstanding unwritten norms (enforced by the harvesters) to allocate the right to harvest lobsters.⁶³

Commons institutions generally restrict access to the commons without recourse to private property or dividing the commons into pieces.⁶⁴ Rather, institutions restrict access of users by changing their incentives to consume the commons.⁶⁵ For an institution to alter incentives, commons users must at least believe consequences flow when they break or follow the rules of the game.⁶⁶ Given the difficulty of excluding potential commons users,⁶⁷ monitoring and enforcement are no small tasks. How, though, do potential rules become the rules of the game?

B. Building Stable Institutions

While commons users may resist cutting back, institutions can alter their incentives to consume. However, this takes stability, meaning that in an ongoing way the institution must help commons users overcome “temptations to free-ride and shirk.”⁶⁸ Given the nature of commons resources, resistance—even passive resistance—increases the transaction

⁶¹ NORTH, INSTITUTIONS, *supra* note 34, at 3. *See also* OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 51; YOUNG, *supra* note 30, at 30. Importantly, this definition rejects a formalistic law/society distinction and instead focuses on the rules that motivate people. *See* KNIGHT, *supra* note 34, at 1–3.

⁶² NORTH, INSTITUTIONS, *supra* note 34, at 4; OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 51.

⁶³ *See* J. M. Acheson, *The Lobster Fiefs: Economic and Ecological Effects of Territoriality in the Maine Lobster Industry*, 3 HUMAN ECOLOGY 183, 187–92 (1975) (discussing the informal but effective system of rules and enforcement methods by which lobster fishermen in Maine limit entry into specific territories); James M. Acheson & Jennifer F. Brewer, *Changes in the Territorial System of the Maine Lobster Industry*, in THE COMMONS IN THE NEW MILLENNIUM 37, 38 (Nives Dolšak & Elinor Ostrom eds., 2003).

⁶⁴ *See* McKean, *Common Property*, *supra* note 22, at 36.

⁶⁵ *See* Runge, *supra* note 29, at 17, 27–32; HARDIN, COLLECTIVE ACTION, *supra* note 20, at 155.

⁶⁶ *See* OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 94–100; HARDIN, COLLECTIVE ACTION, *supra* note 20, at 173–87; THOMAS C. SCHELLING, THE STRATEGY OF CONFLICT 21–52 (1963).

⁶⁷ *See supra* Part II.A.

⁶⁸ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 15.

costs of establishing the institution. This means institutions often need to provide both carrots and sticks to promote and cajole cooperation. At a basic level, commons users must believe that an institution's promises to restrict access to the commons are credible. While virtually all institutions use both, for the sake of clarity, Part III.B.1 and Part III.B.2 respectively address commitments and threats separately.

1. Credible Commitments

Getting commons users to support proposed institutions often requires not only inducements but also assurances that inducements will come to fruition: credible commitments.⁶⁹ But, how do we make credible commitments? The answer to this boils down to aligning the incentives of those governed by institutions with those charged with implementing them.⁷⁰

Credible commitments can help build institutions in many contexts.⁷¹ In the commons, making a credible commitment almost always entails giving some commons users preferred access to the commons: users not only want institutions to protect the commons but also—and perhaps primarily—to protect their interests.⁷² Particularly when a commons is experiencing crowding, commons users are likely to see institutions as a way to get protection from competitors. Examples of institutions providing such commitments in the context of commons include Internet domains, radio frequencies, BCS football bowl bids, and water rights. Additionally, grandfathering provisions, like those used in many environmental laws and land use regulations, give incumbent users benefits to the commons that are kept from others.⁷³

Credible commitments must also provide some assurances that the rules of the game will not change. Not surprisingly, potential benefactors often view such promises with suspicion.⁷⁴ A popular means to provide such an assurance is to give commons users the power to change and enforce the

⁶⁹ OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 43–45.

⁷⁰ OLIVER E. WILLIAMSON, *THE ECONOMIC INSTITUTIONS OF CAPITALISM* 48–49 (1985).

⁷¹ See David M. Kreps, *Corporate Culture and Economic Theory*, in *PERSPECTIVES ON POSITIVE POLITICAL ECONOMY* 90 (James E. Alt & Kenneth A. Shepsle eds., Cambridge University Press 1990); Douglas North & Barry Weingast, *Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth Century England*, 49 *J. ECON. HIST.* 803, 803 (1989); Barry R. Weingast, *Political Foundations of Democracy and the Rule of Law*, 91 *AM. POL. SCI. REV.* 245, 245 (1997); Oliver E. Williamson, *Credible Commitments: Using Hostages to Support Exchange*, 73 *AM. ECON. REV.* 519, 519 (1983).

⁷² See Ostrom, *Common-Property Institutions*, *supra* note 44, at 307; BALAND & PLATTEAU, *supra* note 41, at 232 (noting that supposed conservationist communities recounted in literature might simply have been acting in response to highly visible and localized effects).

⁷³ See George J. Stigler, *The Theory of Economic Regulation*, 2 *BELL J. ECON. & MGMT. SCI.* 3, 3–4 (1971); Robert W. Hahn & Roger G. Noll, *Barriers to Implementing Tradable Air Pollution Permits: Problems of Regulatory Interactions*, 1 *YALE J. REG.* 63, 64 (1983); Nathaniel O. Keohane et al., *The Choice of Regulatory Instruments in Environmental Policy*, 22 *HARV. ENVTL. L. REV.* 313, 315 (1998).

⁷⁴ See Weingast, *supra* note 71, at 261.

rules.⁷⁵ In many small-scale commons, resource users alter, monitor, and enforce the rules of the commons.⁷⁶ Another strategy involves giving control of an institution to a trusted third party, like an agency users believe has their interests at heart.⁷⁷ For example, fisheries in the United States are governed by councils that often are perceived as being dominated by fishing interests.⁷⁸

Commitments may also come in the form of simple rules that give benefits to particular users. It is thought that clear rules are harder to change because they permeate informal institutions.⁷⁹ Not surprisingly, clear rules are frequently found in the institutions governing the commons. For example, many commons regimes, including water, oil and gas, Internet domains, and others, allocate access on a "first in time, first in right" basis.

2. Credible Threats

While the commons literature rarely explicitly discusses the concept of credible threats (though they often are implied), credible threats are the flip-side of the same coin: monitoring, enforcement, and sanctions are necessary to make credible commitments.⁸⁰ Threats achieve the support of users by coercing "quasi-voluntary compliance."⁸¹ However, using the stick rather than the carrot raises a different set of challenges.

First, credible threats hinge on the ability to monitor and enforce the threat. In some commons, such as vast fisheries, this can be challenging.⁸² The need for adequate monitoring often forces those making threats to resort to clear, simple rules that are suboptimal to more precise restrictions.⁸³ For example, because they are easy to monitor, we see fishing seasons and gear restrictions instead of more precise catch limits.⁸⁴ Additionally, we find simple rules in many federal environmental laws that

⁷⁵ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 93–94; ROBERT WADE, VILLAGE REPUBLICS: ECONOMIC CONDITIONS FOR COLLECTIVE ACTION IN SOUTH INDIA 191 (1988); McKean, *Common Property*, *supra* note 22, at 45.

⁷⁶ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 64–65, 67–68, 73, 77, 80; WADE, *supra* note 75, at 96–105, 111–13, 192–94; BALAND & PLATTEAU, *supra* note 41, at 312–24.

⁷⁷ See Terry Moe, *The Politics of Bureaucratic Structure*, in FOUNDATIONS OF ADMINISTRATIVE LAW 89–95 (Peter H. Schuck ed., 1995).

⁷⁸ See JOSH EAGLE ET AL., TAKING STOCK OF THE REGIONAL FISHERY MANAGEMENT COUNCILS 21 (2003), available at http://www.pewtrust.com/pdf/pew_science_taking_stock.pdf; Peter Van-Tuyn, *Courage Without Conviction: Cause for Chaos in U.S. Marine Fisheries Management*, 28 VT. L. REV. 663, 666 (2004).

⁷⁹ Ostrom, *Common-Property Institutions*, *supra* note 44, at 305–06.

⁸⁰ See OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 45; WADE, *supra* note 75, at 192. See also SCHELLING, *supra* note 66, at 12, 15, 22, 160 (providing what is considered the preeminent discussion about credible threats).

⁸¹ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 94.

⁸² See *supra* Part II.A.

⁸³ See OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 96; Ostrom, *Common-Property Institutions*, *supra* note 44, at 305; Thomas C. Schelling, *An Essay on Bargaining*, 46 AM. ECON. REV. 281, 287–99 (1956).

⁸⁴ See Jon G. Sutinen & Peder Andersen, *The Economics of Fisheries Law Enforcement*, 61 LAND ECON. 387, 394 (1985).

regulate important commons. For example, the Clean Water Act simplifies monitoring by requiring various pollution control technologies.⁸⁵

Second, delegating monitoring and enforcement to a committed third party increases a threat's credibility.⁸⁶ For example, when Congress delegates oversight to an agency, it can provide some credibility by giving powers to an agency that is more likely to follow through with the threat.⁸⁷ Likewise, allowing for citizen suits helps make Congress' threats credible, something Congress has provided to protect various environmental commons, such as endangered species,⁸⁸ water bodies,⁸⁹ and airsheds.⁹⁰

Third, threats become credible if they are self-enforcing, meaning the target of the threat has the incentive to monitor itself.⁹¹ Examples of self-enforcing threats in the commons include record keeping and reporting violations for permit holders under the Clean Air Act⁹² and the Clean Water Act.⁹³ Because these requirements assume a violation if a regulated entity fails to keep records, the entity has the incentive to monitor itself.

Lastly, incremental threats may also add to the credibility of threats: enforcement of minor violations tends to increase the credibility of enforcement of significant violations.⁹⁴ Many commons institutions, including federal environmental laws, rely on graduated sanctions to punish those who break the rules.⁹⁵

C. Maintaining Stable Institutions

The commons literature contains several noteworthy attempts to generalize about why some institutions are stable and others are not. Among these efforts, Ostrom's "design principles . . . [of] . . . long-enduring institutions" is probably the hallmark.⁹⁶ These design principles have served as the road map for explaining and addressing many natural

⁸⁵ Clean Water Act, 33 U.S.C. § 1311(b)(2)(A) (2000).

⁸⁶ See SCHELLING, *supra* note 66, at 43.

⁸⁷ Cf. Moe, *supra* note 77, at 89, 92 (describing how such institutional structures are created mainly with only particularized control by Congress, as that is most conducive to the interests of members of Congress).

⁸⁸ Endangered Species Act of 1973, 16 U.S.C. § 1540(g) (2000).

⁸⁹ Federal Water Pollution Control Act, 33 U.S.C. § 1365 (2000).

⁹⁰ Clean Air Act, 42 U.S.C. § 7604 (2000).

⁹¹ NORTH, INSTITUTIONS, *supra* note 34, at 55.

⁹² 42 U.S.C. § 7414 (2000).

⁹³ 33 U.S.C. §§ 1318, 1321(b)(5), 1342 (2000).

⁹⁴ Schelling, *supra* note 83, at 297-98.

⁹⁵ See 42 U.S.C. § 7413(e) (2000); 33 U.S.C. § 1319(d), 1319(g)(3) (2006); OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 94-100; BALAND & PLATTEAU, *supra* note 41, at 345; McKean, *Common Lands in Japan*, *supra* note 43, at 63, 81-83.

⁹⁶ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 90-102. Other scholars have also made helpful though less well known contributions to identify these factors. BALAND & PLATTEAU, *supra* note 41, at 343-45; McKean, *Common Property*, *supra* note 22, at 43-50; WADE, *supra* note 75, at 215-16. See also Arun Agrawal, *Common Resources and Institutional Stability*, in THE DRAMA OF THE COMMONS, *supra* note 4, at 41-85 (providing a comprehensive review).

resource challenges, including transboundary water allocation,⁹⁷ irrigation systems,⁹⁸ subsistence farming,⁹⁹ forest management,¹⁰⁰ and wildlife management.¹⁰¹ Additionally, because commons are so abundant, these principles are increasingly applied to provide solutions to a diverse array of challenges. For example, these principles have been applied to intellectual property,¹⁰² computer-mediated communication systems,¹⁰³ and the radio spectrum.¹⁰⁴ Nobel Prize winner Douglass North has gone so far to label Ostrom's principles "commandments" in the context of the commons.¹⁰⁵ Stability is so important in this body of scholarship that scholars within it often use "institutional success" and "institutional stability" interchangeably.¹⁰⁶

Taken together, scholars have identified eight principles related to the design of stable institutions.¹⁰⁷ In reading over them, it is worth noting how these principles often discourage significant change or incorporation of competing values.¹⁰⁸

First, stability increases if the nature and identity of use rights to the commons—who can do what and to what extent—are clearly defined.¹⁰⁹ Stability is helped along by predetermining who will benefit from the

⁹⁷ See, e.g., Edmund J. Goodman, *Indian Tribal Sovereignty and Water Resources: Watersheds, Ecosystems and Tribal Co-Management*, 20 J. LAND RESOURCES & ENVTL. L. 185, 219–20 (2000) (assessing Ostrom's design principles and other management approaches for transboundary water resources involving tribal co-management).

⁹⁸ See Elinor Ostrom, *Design Principles in Long-Enduring Irrigation Institutions*, 29 WATER RESOURCES RESEARCH 1907 (1993) [hereinafter Ostrom, *Design Principles*].

⁹⁹ See Catherine Tucker, *Common Property Design Principles and Development in a Honduran Community*, 14 FLETCHER J. OF DEV. STUD. 1, 4–5 (1999) (focusing on Ostrom's design principles while exploring common property management in a case study of a Honduran community).

¹⁰⁰ See Clark C. Gibson, et al., *Forests, People and Governance: Some Initial Theoretical Lessons*, in PEOPLE AND FORESTS: COMMUNITIES, INSTITUTIONS AND GOVERNANCE, *supra* note 9, at 227, 228 [hereinafter Gibson, *Forests, People and Governance*].

¹⁰¹ See David Schmidt & Elizabeth Willott, *Reinventing the Commons: An African Case Study*, 27 ENVIRONS ENVTL. L. & POL'Y J. 203, 219–22 (2003).

¹⁰² See Robert P. Merges, *Contracting into Liability Rules: Intellectual Property Rights and Collective Rights Organizations*, 84 CAL. L. REV. 1293, 1358–61 (1996).

¹⁰³ See Peter Kollock and Marc Smith, *Managing the Virtual Commons: Cooperation and Conflict in Computer Communities*, in COMPUTER-MEDIATED COMMUNICATION: LINGUISTIC, SOCIAL, AND CROSS-CULTURAL PERSPECTIVES 109 (Susan Herring ed., 1996).

¹⁰⁴ See Stuart Buck, *Replacing Spectrum Auctions with a Spectrum Commons*, 2002 STAN. TECH. L. REV. 2, ¶¶ 43–77 (2002), available at http://stlr.stanford.edu/STLR/Articles/02_STLR_2/article_pdf.pdf.

¹⁰⁵ North, *Dealing with a Non-Ergodic World*, *supra* note 25, at 10.

¹⁰⁶ See, e.g., OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 90; WADE, *supra* note 75, at 215; McKean, *Common Property*, *supra* note 22, at 44; Bromley, *supra* note 28, at 3, 4.

¹⁰⁷ Scholars have identified principles not related to institutional design and governance that are not addressed here. See Arun Agrawal, *supra* note 96, at 41 (synthesizing scholarship).

¹⁰⁸ Very few commentators have pointed out that the commons literature's focus on stability may have a dark underbelly. *But see* Dagan & Heller, *supra* note 53, at 566 (noting that the success of Ostrom's approach requires strong limitations on liberty, which may be unacceptable to those who highly value personal autonomy).

¹⁰⁹ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 91–92; BALAND & PLATTEAU, *supra* note 41, at 344; see WADE, *supra* note 75, at 189.

institution: those advantaged by the institution tend to support and protect it.¹¹⁰

Second, stability is furthered if the commons' boundaries are clearly delineated.¹¹¹ The purpose of building commons institutions is to restrict access to the commons. Boundaries begin to answer the question, "access to what?" Monitoring the commons becomes much more difficult if those doing it do not have a clear idea of where to begin and end monitoring.

Third, we see more stability when commons users have some power over the rules that govern the commons.¹¹² This provides them at least some control to protect their interest in the commons and also make adjustments to the institution as necessary.

Fourth, stability increases when commons users make up a homogenous group (i.e., shared geography, culture, and background).¹¹³ An aspect of this is that of commons users valuing the commons for similar—or at least compatible—reasons.¹¹⁴ Agreement about the value of the commons eliminates the need to make tradeoffs among competing values and make institutional success simpler to define.

Fifth, institutional stability increases when resource users depend on the commons for economic gain.¹¹⁵ When a commons is managed in a way that results in economic gain, those who stand to gain find time and take extra care to assure their interests are served.

Sixth, enduring institutions generally rely on simple rules to maintain stability in the commons.¹¹⁶ Simple rules can serve the dual purpose of providing credible commitments and credible threats: they can lock in clear benefits for select users while at the same time making monitoring more feasible.¹¹⁷

Seventh, stable institutions often allow and even encourage organizations to form to unite resource users and increase

¹¹⁰ See *supra* Part III.B.1. See also Ostrom, *Common-Property Institutions*, *supra* note 44, at 293, 307 (discussing how those with interests view themselves as "co-owners," but that outsiders may not recognize this title).

¹¹¹ OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 91–92; WADE, *supra* note 75, at 189; McKean, *Common Property*, *supra* note 22, at 43–44.

¹¹² OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 93–94; McKean, *Common Property*, *supra* note 22, at 45. See WADE, *supra* note 75, at 191.

¹¹³ WADE, *supra* note 75, at 189–90; BALAND & PLATTEAU, *supra* note 41, at 302.

¹¹⁴ See WADE, *supra* note 75, at 189 (discussing when users want to use commons in the same way); BALAND & PLATTEAU, *supra* note 41, at 302–03 (discussing heterogeneity of interests); see also OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 143–45 (explaining how heterogeneity among types of fishery users made it difficult to find rules that restricted access to the commons without also serving the interests of one set of users over another); Gibson, *Forests, People, and Governance*, *supra* note 100, at 231 (describing a shared image of the forest and understanding of effects of their actions as important attributes of forest users).

¹¹⁵ See WADE, *supra* note 75, at 215–16; BALAND & PLATTEAU, *supra* note 41, at 343–44.

¹¹⁶ BALAND & PLATTEAU, *supra* note 41, at 344; WADE, *supra* note 75, at 192; McKean, *Common Property*, *supra* note 22, at 46.

¹¹⁷ See *supra* Part III.B.

cooperation.¹¹⁸ This helps reduce the transaction costs of collective action and builds social capital that engenders trust among commons users.

Lastly, stability increases when institutions receive the government's support or at least indifference.¹¹⁹ Having government as an ally helps lock in gains and neutralizes a potential threat: governments often have the power to modify or even supplant commons institutions along with the power to legitimize claims by recognizing rights or by providing enforcement.¹²⁰

IV. EMERGING COMMONS

The commons literature has largely ignored that how we value a commons can change.¹²¹ When circumstances change, dimensions of a commons that have been obscured can emerge and alter our opinion of what a commons is, what its limits are, and why and for whom it has value. Frequently we only come to appreciate different dimensions of a commons as the costs of our neglect become apparent.

Given the different values bundled within a commons, defining what a commons *is* almost invariably results in tradeoffs, whether consciously made or not; setting up commons institutions creates winners and losers. While some of the winners and losers are identifiable at the time an institution is conceived, others will only find that institutions implicate their interests after an under appreciated dimension of the commons emerges.

Commons institutions generally reflect our tendency to manage the commons for a single overarching value at a time. Why do we govern the commons by focusing on single sticks of the metaphorical bundle? Part IV.A attempts to answer this question by focusing on the role crowding plays in the way we value the commons. First, Part IV.A.1 explores how competing *users* can cause crowding of a commons. Second, Part IV.A.2 looks at how competing *uses* can crowd out each other. Part IV.B synthesizes when crowding is most apparent—the context where institutional protections are most likely to arise.

¹¹⁸ OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 101; McKean, *Common Property*, *supra* note 22, at 43.

¹¹⁹ WADE, *supra* note 75, at 190–92.

¹²⁰ See *infra* Part V.B.

¹²¹ While little has been written on emerging commons, this is not to say that the complexity of commons has received no attention at all. See Nives Dolšak and Elinor Ostrom, *The Challenges of the Commons*, in THE COMMONS IN THE NEW MILLENNIUM, *supra* note 63, at 3–5; see also, e.g., YOUNG, *supra* note 30, at 3–4; Fikret Berkes, From Community-Based Resource Management to Complex Systems: The Scale Issue and Marine Commons, <http://www.ecologyandsociety.org/vol11/iss1/art45/> (last visited July 15, 2007); Thomas Dietz, Elinor Ostrom & Paul C. Stern, *The Struggle to Govern the Commons*, 302 SCI. 1907, 1908–09 (2003).

A. Crowding

Scarcity of a commons, also known as crowding, is the primary force that changes the way we value commons.¹²² Many scholars have recognized this.¹²³ Crowding gives real bite to a commons' trait of rivalry: when there is enough to go around rivalry means little.¹²⁴ Until crowding rears its head, users generally show little interest in restricting access.¹²⁵ Once crowding sets in, commons users may see restricting access not only necessary to protect the commons but also to protect their consumption of it.

Users of a commons may use the commons in different ways. However, sometimes a particular use of a commons will dominate. For example, broadcasters dominated use of the radio spectrum for decades and sustaining agriculture is the primary use of most western rivers. Yet, most commons can be put to many uses. Relying on the examples just given, the radio spectrum also enables wireless devices like cell phones and laptop computers, and western rivers also provide habitat for wildlife and feed municipal water consumption.

In understanding crowding, it is useful to separate crowding among *users* and crowding among *uses*.

1. Crowding Among Users

Three interrelated factors influence crowding among users pursuing the same use of the commons: the number of commons users, the per capita consumption, and the amount of the commons available.

¹²² Crowding is not the only force of changing values, even if it is the dominant one. Sometimes particular commons are seen as having value distinct from use value (e.g., animal rights or ecosystem rights). Yet, such moral claims usually only have limited influence because many commons are ill suited for such judgments (e.g., airports, the radio spectrum, or public squares) and even where they do apply, we tend to see a diversity of opinions. In contrast, crowding increases the value we place on accessing the commons and tends to synchronize the actions of commons users.

¹²³ See, e.g., Ostrom, *Common-Property Institutions*, *supra* note 44, at 293, 299; James T. Thompson, David Feeny & Ronald J. Oakerson, *Institutional Dynamics: The Evolution and Dissolution of Common-Property Resource Management*, in *MAKING THE COMMONS WORK: THEORY PRACTICE, AND POLICY*, *supra* note 20, at 129, 133; Einar Eythórsson, *Stakeholders, Courts, and Communities: Individual Transferable Quotas in Icelandic Fisheries, 1991–2001*, in *THE COMMONS IN THE NEW MILLENNIUM*, *supra* note 63, at 129, 136; Clark C. Gibson, *Forest Resources: Institutions for Local Governance in Guatemala*, in *PROTECTING THE COMMONS: A FRAMEWORK FOR RESOURCE MANAGEMENT IN THE AMERICAS*, *supra* note 15, at 71, 73; McKean, *Common Property*, *supra* note 22, at 27, 51 n.5; Terry L. Anderson & P.J. Hill, *From Free Grass to Fences: Transforming the Commons of the American West*, in *MANAGING THE COMMONS* 119, 120 (John A. Baden & Douglas S. Noonan eds., 1998).

¹²⁴ See *supra* Part I.A.

¹²⁵ See AGRAWAL, *supra* note 57, at 40–60 (discussing political disputes in response to the decline of an Indian village's grazing common); Keohane & Ostrom, *supra* note 29, at 15 (explaining that "[r]ivalry is not a problem for abundant resources, but it is for scarce ones"); McKean, *Common Property*, *supra* note 22, at 27, 30 (providing that "[o]pen access is an acceptable method for resource management only when we need not manage resources at all: when demand is too low to make the effort worthwhile").

Crowding occurs when the following is perceived to be satisfied:

$$\Sigma [(user) \times (consumption)] > (\text{the perceived amount of commons resource available})^{126}$$

Given their importance, each factor warrants some attention.

First, consider the impact of crowds on crowding. Perhaps the paradigmatic example of this sort of crowding is the Earth's growing population. However, several factors influence the number of users of a commons, including the size of a population,¹²⁷ technological change,¹²⁸ levels of wealth, and market demands.¹²⁹ While these factors are self-explanatory, importantly, increases in all of these factors tend to increase strain on commons, yet there are some notable exceptions. For example, technology can make it less costly to access the commons (e.g., transportation improvements) or less costly to exclude others (e.g., the barbed-wire fence).¹³⁰ Likewise, wealth might mean more consumption or the willingness to invest to protect a commons.¹³¹

Second, consumption largely depends on the use in question, the technology employed, and the time horizon of commons users. The first two factors are self-explanatory. Yet, as suggested above, technology changes may increase or decrease the consumptiveness of a use of a commons. As for time horizons, generally speaking, the longer the time horizon, the less of a commons a user will consume.

Third, perception of crowding is more important than actual crowding. Sometimes we are unaware that crowding is taking place. For example, while greenhouse gas emissions have been cause for concern for the past two decades, they began to steadily increase at the onset of the industrial revolution.¹³² Similarly, foresight can help us see crowding in the distance. For example, when John Muir began lobbying to set aside Yosemite, he did so even though it faced no immediate threat: he believed potential threats loomed in the future.¹³³ Additionally, perceptions of threats need not be rational; they only

¹²⁶ This formula is a variant of a formula used by Knight to explain when social actors will demand institutional change due to the presence of conflict. KNIGHT, *supra* note 34, at 118.

¹²⁷ See Hardin, *The Tragedy of the Commons*, *supra* note 1, at 1246.

¹²⁸ See BARRY COMMONER, *THE CLOSING CIRCLE* 128–29 (1971) (indicating that because “technologies rapidly transformed the nature of industrial and agricultural production” there were significant changes after World War II in the “pace of environmental deterioration”).

¹²⁹ See GARY D. LIBECAP, *CONTRACTING FOR PROPERTY RIGHTS* 16–17 (1989) (providing that “an increase in relative prices . . . will raise the stream of rents attainable from ownership and encourage new competition,” and “market forces . . . can lead to new contracting for property rights”).

¹³⁰ Anderson & Hill, *supra* note 123, at 134.

¹³¹ See Simon Kuznets, *Economic Growth and Income Inequality*, 45 *AM. ECON. REV.* 1, 7 (1955); BJORN LOMBORG, *THE SKEPTICAL ENVIRONMENTALIST: MEASURING THE REAL STATE OF THE WORLD* 33 (1998).

¹³² See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, *CLIMATE CHANGE 2001: WORKING GROUP I: THE SCIENTIFIC BASIS* 6 (J.T. Houghton et al. eds., 2001); EPA, *Global Warming—Impacts*, http://www.grida.no/climate/ipcc_tar/wg1/pdf/WG1_TAR-Front.pdf (last visited July 14, 2006).

¹³³ JOHN MUIR, *THE YOSEMITE* 255–60 (1912).

need to exist. For example, some have argued that actions to protect some commons stem from the availability heuristic,¹³⁴ which refers to the tendency of people to overestimate the probability of an event because it is “vivid, well publicized, or more prevalent among a particular actor’s friends and acquaintances.”¹³⁵ A vivid example of problems in a particular commons (e.g., the spontaneous burning of the Cuyahoga River) may lead institutions to protect similar commons (e.g., the Clean Water Act).¹³⁶

Given that crowding must arise before we build institutions, it is not surprising we tend to protect the commons a value at a time—the value where crowding surfaces first.

2. Crowding Among Uses

While the commons literature overwhelmingly focuses on competition among users that rely on the commons for the same value, sometimes one use of the commons crowds out other uses. So, crowding can also occur when the following is satisfied:

$$\Sigma [(use) \times (consumption of use)] > (\text{amount of commons perceived to satisfy uses})^{137}$$

Examples of crowding among uses are many: building a fountain in a public square limits the space for protesters; using surface water for irrigation may reduce opportunities for whitewater rafting; use of the radio spectrum for broadcast media confines opportunities for other technologies that use radio waves.

Even when crowding emerges, it is often difficult to recognize for several reasons. First, complexity can obscure our ability to understand that different uses of the commons may implicate each other.¹³⁸ For example, it took years of

¹³⁴ See Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1518 (1998) (noting an individual’s judgment of the probability of a harmful event occurring is influenced by available examples of the harm); Sunstein, *supra* note 47, at 1188 (noting that the perception of probability often turns on how readily a risk comes to mind).

¹³⁵ Russell B. Korobkin & Thomas S. Ulen, *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CAL. L. REV. 1051, 1088–89 (2000); see also Paul Slovic et al., *Facts Versus Fears: Understanding Perceived Risk*, in JUDGMENT UNDER UNCERTAINTY: HEURISTICS AND BIASES 463, 466–67 (Daniel Kahneman et al. eds., 1982) (outlining a study showing participants’ tendency to over or underestimate the number of deaths per year due to different causes based largely on availability); Amos Tversky & Daniel Kahneman, *Judgment Under Uncertainty: Heuristics and Biases*, 185 SCI. 1124, 1127–28 (1974).

¹³⁶ See Cass R. Sunstein, *Precautions Against What? The Availability Heuristic and Cross-Cultural Risk Perception*, 57 ALA. L. REV. 75, 98 (2005) (noting the use of availability by various groups including terrorists to persuade people to believe risks are much higher than in reality); Timur Kuran & Cass R. Sunstein, *Availability Cascades and Risk Regulation*, 51 STAN. L. REV. 683, 691–98 (1999) (discussing the role of availability in the Love Canal environmental disaster which lead to the creation of CERCLA).

¹³⁷ This formula is another variant of the formula used by Knight to explain when social actors will demand institutional change due to the presence of conflict. KNIGHT, *supra* note 34, at 118.

¹³⁸ See Joanna Burger, *Common-Pool Resources and Commons Institutions*, in PROTECTING

acid rain on the eastern seaboard before we understood the impact of coal-fired power plants in the Midwest.¹³⁹ Second, costs begin accruing among uses even before we recognize competing values. Consider the mining operations throughout the American West that spread during the 1800s. Only a clairvoyant could have foreseen how this use of public lands would later interfere with recreational uses, such as skiing and hiking, or how it would impact future settlement interests by contaminating ground water and decreasing slope stability. Third, often the forums used to make decisions are not designed to take into account conflicting values. Likewise, those pursuing conflicting uses may be unfamiliar with the issues facing their counterparts.

Even when we recognize competing values, institutions often fail to take into account conflicting values. In the rush to lock up the commons, users neglect competing uses. For example, we pump groundwater and forget the risks of surface subsidence or fill wetlands without taking into account their benefits for flood protection. Additionally, when one set of users can export the costs of their consumption to others, users may have little incentive to change.

To some degree, emerging commons are unavoidable: we are blinded by the uncertainties, ignorance, and complexities. Still, when we do recognize crowding, it can catalyze change because crowding tends to similarly impact multiple, discrete users of the commons at once, which helps in mobilizing and creating the will to seek change.

B. Recognizing Crowding

The earlier users recognize crowding, the more likely they will form institutions to address it. As illustrated above, crowding among homogenous users is generally more transparent than crowding among heterogeneous users. While understanding this dynamic is fundamental to understanding emerging commons, it is not the only reason that crowding is more transparent in some circumstances than in others.

A number of factors contribute to our ability to recognize crowding. First, as compared to less consumptive uses, more consumptive uses can create crowding with fewer users. Second, transparency of consumption varies not only according to the use but also according to the technology employed. For example, in the mining context, the mining implements (shovels as opposed to steam shovels) and mining methods (open pit mining as opposed to underground mining) influence the degree to which mining is apparent. Third, the more users rely on and spend time using the commons, the more likely it is that they will notice signs of crowding. Generally speaking, this factor works to help those users with economic interests in consuming the commons. Fourth, the less complex the use and the smaller and simpler the dimensions of the commons, the more likely commons users will notice crowding. Dimensions of a commons vary enormously: they may

THE COMMONS: A FRAMEWORK FOR RESOURCE MANAGEMENT IN THE AMERICAS, *supra* note 15, at 1, 10.

¹³⁹ See Acid Rain in New England: A Brief History, <http://www.epa.gov/region01/eco/acidrain/history.html> (last visited July 17, 2007).

be small like a bus bench or vast like the global atmosphere. Lastly, complexity makes some types of consumption more apparent than others. For example, it would be apparent if a boat attempted to tow away even a sliver of an iceberg.¹⁴⁰ Yet, the massive consumption of the polar ice caps arising from worldwide emissions of greenhouse gases went unnoticed for decades.

These observations suggest that we would often expect to see crowding—and related demands for protection of uses—when uses are more consumptive, time consuming, and market-driven, and along smaller dimensions of a commons. On the other hand, we do not see crowding as effortlessly when uses are less consumptive, less time intensive, or in pursuit of non-market values or when a commons has larger dimensions. Because recognizing crowding almost always precedes building institutions, not surprisingly, we often find that commons institutions favor those uses noticed first. As discussed in the remainder of the Article, this has important consequences.

V. TRAGIC INSTITUTIONS

Crowding drives institutional change in the commons and results in a tendency of those building commons institutions to fixate on dimensions of the commons experiencing crowding. Furthermore, to get commons users to support these institutions, we often provide select users privileged access to the commons and control over the governance of the institution. Additionally, we build institutions to maximize stability. These generalizations characterize some of the most substantial findings of the commons literature.

However, when the way we value the commons changes, stability loses some of its sheen. With a change of circumstances, aspects of the commons we previously neglected take on import. Where we find changing values, institutions built to protect one value of the commons often stand in the way of protecting competing values. Stability becomes rigidity: incumbent institutions stand in the way of protecting emerging values.

This Part discusses institutional change and how incumbent institutions create burdens for emerging values. Part V.A discusses the lack of attention paid to institutional change in the commons scholarship. Part V.B discusses the main factors driving tragic institutions. Part V.C puts forward a framework that explains the interactions between stable institutions and emerging commons.

A. Relative Neglect of Institutional Change within the Commons Scholarship

Particularly in the context of changing values, institutional resistance to change has received little attention in the commons literature.¹⁴¹ This is a

¹⁴⁰ In fact, even proposals to tow icebergs and use them for freshwater has received attention for decades. See, e.g., Peter Gwyn et al., *Antarctica's Icy Assets*, NEWSWEEK, Oct. 3, 1977, at 91.

¹⁴¹ Some authors exploring the challenge of solving the tragedy of the commons have focused on path dependency. See LIBECAP, *supra* note 129, at 116.

significant oversight. While attention to institutional change in the commons literature is sparse, many commons scholars have made convincing arguments to study institutional change. One of the most convincing came from Dolšák and Ostrom:

Most traditional common-pool resources have already been governed by one regime or another The challenge in managing such resources is to devise more effective institutions when the remnants of the previous regimes are still present [and] to devise institutions that reallocate the common-pool resources in the presence of political action by those who would lose in the process of reallocation.¹⁴²

While the commons literature generally neglects institutional change, probably the most well known discourse is Ostrom's chapter on the subject in *Governing the Commons*.¹⁴³ She observes that sometimes institutional change comes easy while other times it is costly.¹⁴⁴ She explains that institutional change often occurs by adding layers of institutions "each built on the base of prior rules."¹⁴⁵ While this glimpse of institutional change begins to grapple with institutional inertia, unfortunately, Ostrom leaves the topic almost as quickly as she raises it.

However, as a generalization, discussions of institutional change within the commons literature are most notable for their absence rather than contribution. This neglect leaves important stones unturned, such as the importance of credible commitments in the literature. While commitments help induce commons users to support commons institutions, commitments providing select privileged access makes change difficult even when our values evolve.

Moreover, the much acclaimed "design principles of enduring institutions" often cut against protecting emerging commons. For example, when institutions define who can use the commons and to what extent, this predetermines winners and losers and makes institutional change difficult unless it happens to benefit incumbent users. The same is true of giving users control of the institutions that govern the commons. Additionally, encouraging users to form user organizations creates social capital, which can be used to rally incumbents to curtail change.¹⁴⁶

Even if the literature has ignored the issue of changing values, the commons have not. Stability, of course, is important. However, this focus on stability has made it all too easy to ignore the import of institutional responsiveness. Our heavy investment in stability comes at a cost.

¹⁴² Dolšák & Ostrom, *supra* note 121, at 3, 5–6.

¹⁴³ See Ostrom, *Governing the Commons*, *supra* note 2, at 103–39.

¹⁴⁴ *Id.* at 141.

¹⁴⁵ *Id.*

¹⁴⁶ See Ostrom, *Common-Property Institutions*, *supra* note 44, at 293, 308–09; North, *Institutions*, *supra* note 34, at 112.

B. Tragic Institutions

When emerging values cross the interests of incumbents, existing institutions increase the costs of change or even prohibit change all together. This grows out of four phenomena. First, those building institutions tend to narrowly define a common's value—often protecting one value of a commons at a time. As discussed above, this is often due to the role of crowding influencing decisions to build institutions.¹⁴⁷ Institutions provide a platform for those with a stake in the commons to try to solidify why a commons has value and who will benefit from it. Once created, commons institutions entrench the interests of those who create and maintain them.¹⁴⁸

Second, we frequently engineer commons institutions to resist change. In large part, this occurs due to the use of credible commitments to create institutions: we promise select users privileged access to the commons to induce their support.¹⁴⁹ Once promised institutional advantages, commons users generally use institutions to attempt to lock in privileged access, making it all but impossible to renege on these promises.¹⁵⁰ Incumbent users have some power to both maintain their access to the commons and to fend off change contrary to their interests.

Third, once the rules of the game are in place, those who benefit from the incumbent institutions invest in political, economic, and social organizations to protect their interests.¹⁵¹ Not surprisingly, however, when emerging values conflict with the interests of incumbent users, these organizations increase the costs of change.

Lastly, some uses of the commons change the commons physically. When a value calls for restoring a commons to how it was before, this is an additional cost for those attempting to further emerging values. For example, the consequences of surface mining, clear cutting forests, and bottom trawling on the ocean's floor are often difficult to reverse. This equally applies to the human-built landscape: each building and piece of infrastructure is costly to remove or change. Sometimes, an emerging value calls for physical restoration in addition to political engineering.

C. Tragic Institutions Framework

How do existing commons institutions interact with efforts to protect emerging dimensions of the commons? The answer to this question turns on

¹⁴⁷ See *supra* Part IV.A.

¹⁴⁸ See Martha E. Geores, *The Relationship between Resource Definition and Scale: Considering the Forest*, in *THE COMMONS IN THE NEW MILLENNIUM*, *supra* note 63, at 77, 79.

¹⁴⁹ See *supra* Part III.B.1.

¹⁵⁰ See *supra* Part III.A.

¹⁵¹ In contrast to institutions, *organizations* "are groups of individuals bound by some common purpose to achieve objectives." NORTH, INSTITUTIONS, *supra* note 34, at 5; see also KNIGHT, *supra* note 34, at 3. Organizations and institutions interact with each other and often reinforce each other. See NORTH, INSTITUTIONS, *supra* note 34, at 7; Elinor Ostrom, *Community and the Endogenous Solution of Commons Problems*, 4 J. THEORETICAL POL. 343, 348 (1992) [hereinafter Ostrom, *Solution of Commons Problems*].

three factors: demands of those with a stake in the commons to pursue institutional change or stability; the relative power of parties with an interest in institutional change or stability; and the role of institutions in shaping outcomes. So, we find the following relationship of factors influencing change:

$$\text{Crowding} \times \text{Power} \times \text{Institutions}^{152}$$

Similarly, the factors relating to stability include the following:

$$\text{Conflict with Incumbents' Interests} \times \text{Power} \times \text{Institutions}^{153}$$

Tragic institutions reflect the drag of the forces favoring stability on the forces favoring change.

Each factor included in the framework deserves attention. First, the inclusion of crowding and conflicts with incumbents' interests amplifies that competition and conflict often explain institutional arrangements¹⁵⁴ and reflects that parties use institutions to realize gains.¹⁵⁵ The demand for change grows out of crowding, whereas the interests behind stability depends on whether change impacts the interests of incumbents, including the benefits they extract and the degree to which they control commons institutions.¹⁵⁶ In determining the degree of conflict, the framework assumes the parties' perceptions are what matter: ignorance, uncertainty, and discounting may alter an incumbent's assessment of the situation.¹⁵⁷

The framework takes a broad conception of the relative power of incumbents and those pushing emerging values. Power comes from access to wealth and resources,¹⁵⁸ political allies, ability to overcome collective action problems, and from the physical traits of the commons. While most of these factors are self explanatory, note that political allies might include those with goals only tangentially related to the commons, such as building political

¹⁵² This framework is a variation of Plott's Equation: Preferences \times Institutions = Outcomes. See Charles R. Plott, *Will Economics Become an Experimental Science?*, 57 S. ECON. J. 901, 905 (1991) (setting forth a simplified economic model of Preferences \times Beliefs \times Feasible Set \times Institutions = Outcomes, while cautioning that "[s]implicity should not be confused with reality."); MELVIN J. HINICH & MICHAEL C. MUNGER, *ANALYTICAL POLITICS* 17 (1997) (calling Plott's Equation the "fundamental equation of politics") (emphasis omitted).

¹⁵³ See *id.*

¹⁵⁴ See KNIGHT, *supra* note 34, at 19; AGRAWAL, *supra* note 57, at 59-60; Demsetz, *supra* note 2, at 355; Armen A. Alchian & Harold Demsetz, *Production, Information Costs, and Economic Organization*, 62 AM. ECON. REV. 777, 795 (1972); Armen A. Alchian, *Uncertainty, Evolution and Economic Theory*, 58 J. POL. ECON. 211, 211 (1950).

¹⁵⁵ See NORTH, *INSTITUTIONS*, *supra* note 34, at 86.

¹⁵⁶ See LIBECAP, *supra* note 129, at 19-20.

¹⁵⁷ See *supra* Part II.A.

¹⁵⁸ See Robert A. Dahl, *A Critique of the Ruling Elite Model*, 52 AM. POL. SCI. REV. 462, 466 (1958); RICHARD POSNER, *THE PROBLEMS OF JURISPRUDENCE* 354 (1990) (observing that interest groups "trade the votes of [their] members and [their] financial support . . . in exchange for an implied promise of favorable legislation"); LIBECAP, *supra* note 129, at 17 (arguing that wealthier interest groups are more effective lobbyists because they have at their disposal abundant resources with which to garner political influence).

constituencies¹⁵⁹ or an interest reason to appease rent seekers.¹⁶⁰ As far as overcoming collective action problems, this generally favors incumbents, who have created organizations to pursue their shared political, economic, and social interests.¹⁶¹ But, collective action may also depend on other factors such as group size,¹⁶² availability of technology,¹⁶³ and leadership.¹⁶⁴ As far as the physical characteristics of a commons, sometimes they favor one user over another. For example, the upstream user of a river can impact downstream quantity and quality of water but not the other way around.¹⁶⁵ Similarly, decisions might have different impacts at different geographic scales. For example, local government land use policy is often seen as contributing to regional urban sprawl.¹⁶⁶ The decision that serves local interests presumably best then often cuts against regional interests.

Finally, institutions can also impact outcomes in several ways. First, institutional inertia can complicate efforts to bring about change.¹⁶⁷ This often

¹⁵⁹ See DOUGLAS ARNOLD, *THE LOGIC OF CONGRESSIONAL ACTION* 10 (1990); Arthur T. Denzau & Michael C. Munger, *Legislators and Interest Groups: How Unorganized Interests Get Represented*, 80 AM. POL. SCI. REV. 89, 90 (1986).

¹⁶⁰ Rent seeking does not expand the pie, rather it redistributes it. See POSNER, *supra* note 34, at 9–11, 37 n.3; James M. Buchanan, *Rent Seeking and Profit Seeking*, in *TOWARD A THEORY OF THE RENT-SEEKING SOCIETY* 3, 4 (James M. Buchanan et al. eds., 1980). Government rents can come in many forms but might include exclusive access to particular benefits, tariffs that restrict competitors, lax enforcement, entitlements, and subsidies. See William C. Mitchell & Michael C. Munger, *Economic Models of Interest Groups: An Introductory Survey*, 35 AM. J. POL. SCI. 512, 525 (1991). Rent seekers often overuse the commons. See MICHAEL ROSS, *TIMBER BOOMS AND INSTITUTIONAL BREAKDOWN IN SOUTHEAST ASIA* 3–5 (2001); YOUNG, *supra* note 30, at 72–74, 79–80 (discussing rent-seekers' tendency to "rape, ruin, and run") (citation omitted); Fikret Berkes, *Marine Coastal Fisheries in Turkey*, in *MAKING THE COMMONS WORK: THEORY PRACTICE, AND POLICY*, *supra* note 20, at 161, 175.

¹⁶¹ See *supra* Parts II.C & V.B; Demsetz, *supra* note 2, at 357; OLSON, *supra* note 48, at 27.

¹⁶² See *supra* Part II.C.

¹⁶³ See LIBECAP, *supra* note 129, at 16 (identifying changes in enforcement technology as a motivating factor for individuals to contract to change property rights); Anderson & Hill, *supra* note 123.

¹⁶⁴ See James Q. Wilson, *The Politics of Regulation*, in *THE POLITICS OF REGULATION* 357, 370 (James Q. Wilson ed., 1980) (discussing policy entrepreneurs); NORTH, *INSTITUTIONS*, *supra* note 34, at 87 (discussing "trade associations, lobbying groups, [and] political action committees"); LIBECAP, *supra* note 129 at 16–17, 27–28 (discussing politicians and bureaucrats); Stigler, *supra* note 73, at 3–4 (discussing interest groups); DANIEL CARPENTER, *THE FORGING OF BUREAUCRATIC AUTONOMY: NETWORKS, REPUTATIONS AND POLICY INNOVATION IN EXECUTIVE AGENCIES 1862–1928*, at 353 (2001) (discussing agency officials); Denzau & Munger, *supra* note 159, at 90 (discussing legislators).

¹⁶⁵ See ERIKA WEINTHAL, *STATE MAKING AND ENVIRONMENTAL COOPERATION: LINKING DOMESTIC AND INTERNATIONAL POLITICS IN CENTRAL ASIA* 35–36 (2002); John P. Dwyer, *The Role of State Law in an Era of Federal Preemption: Lessons from Environmental Regulation*, 60 LAW & CONTEMP. PROBS. 203, 223 (1997) (discussing bargaining power of downwind and downstream states).

¹⁶⁶ See Robert E. Burchell & Naveed A. Shad, *The Evolution of the Sprawl Debate in the United States*, 5 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 137, 139–40 (1999); William W. Buzbee, *Urban Sprawl, Federalism, and the Problem of Institutional Complexity*, 68 FORDHAM L. REV. 57, 92–94 (1999); Lee R. Epstein, *Where Yards Are Wide: Have Land Use Planning and Law Gone Astray?* 21 WM. & MARY ENVTL. L. & POL'Y REV. 345, 378 (1997); Peter D. Salins, *Metropolitan Visions*, 26 REASON 60, 60 (Dec. 1994).

¹⁶⁷ See NORTH, *INSTITUTIONS*, *supra* note 34, at 112; Paul A. David, *Clio and the Economics of*

means that incremental change is the dominate form of institutional change.¹⁶⁸ As mentioned previously, this is only compounded by the fact that commons institutions are often designed to resist change.¹⁶⁹ Second, uncertainty over institutions deters those seeking change and emboldens those committed to the status quo.¹⁷⁰ Third, institutions provide tools that can often be useful in fending off change and sometimes useful in promoting it.¹⁷¹ These tools might come in the form of legally enforceable rights or other mechanisms to draw on government enforcement.¹⁷² Lastly, changing some aspects of institutions may be more difficult than others.¹⁷³ We would expect those pursuing new values to look to the least costly way of achieving change.¹⁷⁴

VI. FROM THEORY TO APPLICATION

So far, this Article has focused much on theory. This Part attempts to root this discussion in three real world examples. The examples were selected because they provide useful vantage points to examine tragic institutions. Additionally, the diversity of the examples underscores the broad applicability of the theory to real-world situations.

We begin with the past century's incremental change of the United States' approach to the analog radio spectrum. The second case looks at the first decades of Yellowstone National Park, and how the creation of a park supplanted other users of Yellowstone, specifically uses by Native Americans, fur trappers, and entrepreneurs. The final case explores western water law in the context of the changing West.

QWERTY, 75 AM. ECON. REV. PAPERS & PROC., May 1985, 332, 333; OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 141; Richard A. Posner, *Path-Dependency, Pragmatism, and a Critique of History in Adjudication and Legal Scholarship*, 67 U. CHI. L. REV. 573, 573 (2000) (asserting that law venerates and depends on the past).

¹⁶⁸ See NORTH, INSTITUTIONS, *supra* note 34, at 89 (arguing incremental change the "most important point" in understanding institutional change); Charles Lindblom, *The Science of "Muddling Through"*, 19 PUB. ADMIN. REV. 79, 86 (1959) (noting public policy can limit risk though incremental change); LIBECAP, *supra* note 129, at 116.

¹⁶⁹ See *supra* Part III and V.B.

¹⁷⁰ See Oran R. Young, *Regime Dynamics: The Rise and Fall of International Regimes*, 36 INT'L ORG. 277, 280 (1982); Kenneth A. Shepsle, *Institutional Equilibrium and Equilibrium Institutions*, in POLITICAL SCIENCE: THE SCIENCE OF POLITICS 51, 51 (Herbert F. Weisberg ed., 1986) (asserting that fear of upsetting the status quo "is the characteristic feature of politics").

¹⁷¹ See LIBECAP, *supra* note 129, at 18-19.

¹⁷² Bradley C. Karkainen, *Information as Environmental Regulation: TRI and Performance Benchmarking, Precursor to a New Paradigm?* 89 GEO. L.J. 257, 321 n.269 (2001); Michael S. Greve, *The Private Enforcement of Environmental Law*, 65 TUL. L. REV. 339, 339 (1990).

¹⁷³ See OSTROM, GOVERNING THE COMMONS, *supra* note 2, at 52 (discussing hierarchy of rules).

¹⁷⁴ See NORTH, INSTITUTIONS, *supra* note 34, at 67; WILLIAMSON, *supra* note 70, at 1; R.H. Coase, *The Nature of the Firm*, 4 ECONOMICA 386, 387 (1937); George A. Akerlof, *The Market for Lemons: Quality Uncertainty and the Market Mechanism*, 84 Q. J. Econ. 488, 488 (1970).

*A. Case Studies**1. Bringing the Radio Spectrum into the Information Age*

The radio spectrum is a classic commons: users are difficult to deter and too much use of a frequency jams the air waves.¹⁷⁵ Time has brought enormous challenges to accommodate innovative uses of the spectrum.

The beginning of the twentieth century saw a growing number of ships at sea begin to use the spectrum for Morse code messages.¹⁷⁶ However, as more and more used the air waves, we began to see congestion. This congestion received much attention in 1912, as the result of communication problems surrounding the sinking of the Titanic.¹⁷⁷ The most publicized of these was the garbling of two unrelated messages from two ships that resulted in the misimpression that the Titanic was safely being towed to Halifax.¹⁷⁸

Shortly thereafter, Congress passed the Radio Act of 1912,¹⁷⁹ which charged the Secretary of Commerce with some responsibility to license use of the spectrum.¹⁸⁰ In substantial part, the Act relied on a first-in-time, first-in-right allocation of licenses.¹⁸¹

However, Congress's solution did not foresee that by the 1920s voice radio would come to dominate the spectrum.¹⁸² As this became clear, then-Secretary of Commerce Herbert Hoover attempted to use the Radio Act to facilitate the growth of commercial broadcast radio by reserving more desirable parts of the spectrum for commercial broadcast, relegating amateur radio to less desirable segments, and even providing protections for incumbent broadcasters from interference from others.¹⁸³

The popularity of radio grew, the waves were saturated, and in 1925, Hoover stopped issuing new licenses.¹⁸⁴ But, in 1926, a federal court ruled that

¹⁷⁵ Nat'l Broad. Co. v. United States, 319 U.S. 190, 213 (1943).

¹⁷⁶ Yochai Benkler, *Overcoming Agoraphobia: Building the Commons of the Digitally Networked Environment*, 11 HARV. J.L. & TECH. 287, 299 (1998). Due to the import and prospect of crowding, the U.S. Navy advocated regulation of the spectrum and even made some attempts to appropriate it for its use. Ronald Coase, *The Federal Communications Commission*, 2 J.L. & ECON. 1, 2. (1959); Thomas W. Hazlett, *The Rationality of U.S. Regulation of the Broadcast Spectrum*, 33 J.L. & ECON. 133, 135 (1990) [hereinafter Hazlett, *The Rationality of U.S. Regulation*].

¹⁷⁷ STUART MINOR BENJAMIN ET AL., TELECOMMUNICATIONS LAW AND POLICY 16 (2d ed. 2006).

¹⁷⁸ *Id.*

¹⁷⁹ *Id.* at 17; Ellen P. Goodman, *Spectrum Rights in the Telecosm to Come*, 41 SAN DIEGO L. REV. 269, 281 n.33 (2004); Benkler, *supra* note 176, at 301; Radio Act of 1912, Pub. L. No. 264, 37 Stat. 302 (1912).

¹⁸⁰ See BENJAMIN ET AL., *supra* note 177, at 19.

¹⁸¹ Thomas W. Hazlett, *Assigning Property Rights to Radio Spectrum Users: Why Did FCC License Actions Take 67 Years?*, 41 J.L. & ECON. 529, 532 (1998) [hereinafter Hazlett, *Assigning Property Rights*]; Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 136.

¹⁸² See Benkler, *supra* note 176, at 308 (outlining the "blossoming" of radio during the 1920s); Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 139-41.

¹⁸³ BENJAMIN ET AL., *supra* note 177, at 18; Benkler, *supra* note 176, at 309-10; Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 152-58.

¹⁸⁴ Benkler, *supra* note 176, at 310.

Hoover had no authority to stop.¹⁸⁵ So, in the summer of 1926, Hoover began reissuing licenses, and within several months more than two hundred new radio stations made their way onto the air waves.¹⁸⁶ However, with so many stations on air, "nobody could be heard."¹⁸⁷ This represented the second radio tragedy of the commons in as many decades.

In February 1927, Congress responded to public outcry concerning the overcrowded spectrum and passed the Radio Act of 1927.¹⁸⁸ The Act in significant part parroted the scheme put forward by Hoover¹⁸⁹ with one important caveat—it cut Hoover out of the picture and created the Federal Radio Commission,¹⁹⁰ later to become the Federal Communications Commission (FCC).

In large part, the Radio Act of 1927 established several rules that have largely shaped regulation of the spectrum to the present.¹⁹¹ First, the Act presumed that the government owned the spectrum and that ownership would not change hands.¹⁹² Second, those administering the Federal Radio Act would not charge licensees for their use of the spectrum.¹⁹³ Rather, licensees "paid for" their use of the spectrum by adhering to government dictates and facilitating activities that were thought to have benefited the public (e.g., airing of children's programming and political debates).¹⁹⁴ Third, the Act gave much discretion to the implementing agency, only requiring that the agency's regulation conform to the amorphous "public interest."¹⁹⁵ Fourth, the Act protected licensees from interference from others.¹⁹⁶

With time, these institutions became entrenched. Why?

First and foremost, the government did not relinquish its ownership claim and incumbents have worked hard to maintain their privileged access. This is hardly surprising, as the radio spectrum is an increasingly scarce and valuable commodity.

¹⁸⁵ *United States v. Zenith Radio Corp.*, 12 F.2d 614, 617 (N.D. Ill. 1926); *See also* Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 141 (analyzing *United States v. Zenith Radio Corp.*).

¹⁸⁶ Benkler, *supra* note 176, at 299.

¹⁸⁷ *Nat'l Broad. Co. v. United States*, 319 U.S. 190, 212 (1943).

¹⁸⁸ 47 U.S.C. §§ 81–84, 85, ch. 652, § 602(a), 48 Stat. 1102 (repealed 1934); *id.* §§ 84a–84b, 80 Stat. 647 (repealed 1966). *See also* Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 141.

¹⁸⁹ Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 166.

¹⁹⁰ Benkler, *supra* note 176, at 314.

¹⁹¹ Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 136; Benkler, *supra* note 176, at 299.

¹⁹² 47 U.S.C. § 301 (2000). *See also* Goodman, *supra* note 179, at 286–87 (describing the Act's specific denial of ownership rights to licensees).

¹⁹³ This point has largely captured the interest—if not the ire—of many. *See* Coase, *The Federal Communications Commission*, *supra* note 176, at 25–26; Hazlett, *Assigning Property Rights*, *supra* note 181, at 534–35, Table 2.

¹⁹⁴ *See* Hazlett, *Assigning Property Rights*, *supra* note 181, at 545, 566.

¹⁹⁵ BENJAMIN ET AL., *supra* note 177, at 23; Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 136.

¹⁹⁶ *See* FED. RADIO COMM'N, *THIRD ANNUAL REPORT OF THE FEDERAL RADIO COMMISSION TO THE CONGRESS OF THE UNITED STATES* 32 (1929); Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 167; Goodman, *supra* note 179, at 310, 340–46.

Second, Congress and the FCC have developed strong relationships with incumbent users. Incumbents solidified their relationship with regulators by attempting to comply with federal mandates and goals. In a more cynical light, relationships have strengthened due to intelligent lobbying.¹⁹⁷ The National Association of Broadcasters has made itself into a substantial political force in Washington, D.C.¹⁹⁸ While perhaps somewhat overstated, many commentators have claimed that the broadcasters have “captured” the FCC.¹⁹⁹ Regardless, leaving so much discretion in the hands of the FCC at least made it an attractive target for rent seeking.²⁰⁰

Despite—or some might argue because of—the broad “public interest” standard and the federal government’s position that it owns the spectrum, incumbent users have become entrenched political winners: the FCC almost always renews and almost never revokes licenses.²⁰¹

Over the past fifteen years, we have seen much innovation and increasing public demand for new technologies reliant on the spectrum—cellular phones, WiFi, and palm pilots. Of course, all of this demand comes in a context where the Internet, cable television, and satellite television and radio have arguably made broadcast uses of the spectrum relatively less important than they once were. Society’s changing values with regards to the spectrum provides some interesting insights into how institutional inertia in the commons bumps up against the demands of a dynamic world.

Consider three different examples that illustrate efforts to take into account the escalating demand for new technologies where incumbents have increased the costs of change—often resulting in complaints that change came too slowly and in too small of quantities.²⁰² First, historically, licensees have not paid for their use of the spectrum. Yet, in the 1990s, we saw a great deal of pressure to rely on auctions rather than comparative hearings.²⁰³ For the

¹⁹⁷ See, e.g., Stuart Minor Benjamin, *Spectrum Abundance and the Choice Between Private and Public Control*, 78 N.Y.U.L. REV. 2045–50 (2003) (detailing lobbying efforts); Hazlett, *The Rationality of U.S. Regulation*, *supra* note 176, at 168–69 (discussing “quid-pro-quo” arrangements); Hazlett, *Assigning Property Rights*, *supra* note 181, at 546 (discussing benefits such as favorable publicity and campaign donations).

¹⁹⁸ See Louis Jacobson & Bara Vaida, *Broadcast Blues*, 35 NAT’L J. 2560, 2560 (2003) (calling the National Association of Broadcasters a “lobbying juggernaut”); Alicia Mundy, *Big John Takes Charge*, *MEDIAWEEK*, Dec. 16, 1996, at 17, 20 (calling the National Association of Broadcasters “one of the most powerful influences here in Washington”).

¹⁹⁹ See Wendy M. Rogovin, *The Regulation of Television in the Public Interest: On Creating a Parallel Universe in Which Minorities Speak and Are Heard*, 42 CATH. U. L. REV. 51, 70 n.68 (1992); Ralph Nader & Claire Riley, *Oh, Say Can You See: A Broadcast Network for the Audience*, 5 J.L. & POL. 1, 66–67 (1988).

²⁰⁰ See Hazlett, *Assigning Property Rights*, *supra* note 181, at 561; Carol M. Rose, *Crystals and Mud in Property Law*, 40 STAN. L. REV. 577, 591 (1988); Linda R. Hirshman, *Postmodern Jurisprudence and the Problem of Administrative Discretion*, 82 NW. U. L. REV. 646, 649 (1988).

²⁰¹ See Hazlett, *Assigning Property Rights*, *supra* note 181, at 553; David Bazelon, *The First Amendment and the “New Media”*—*New Directions in Regulating Telecommunications*, in *FREE BUT REGULATED: CONFLICTING TRADITIONS IN MEDIA LAW* 52, 55 (Daniel L. Brenner & William L. Rivers eds., 1982).

²⁰² See, e.g., Goodman, *supra* note 179, at 312–14 (describing some of the complaints with the FCC in making spectrum allocation decisions).

²⁰³ See *id.* at 306; Benkler, *supra* note 176, at 318.

most part, this pressure arose from the Clinton Administration's attempt to reduce the federal deficit.²⁰⁴ Not surprisingly, incumbent licensees cringed at the idea of paying for licenses and lobbied against the proposed auctions.²⁰⁵ The political compromise reached made auctions only applicable to new licenses and not renewals.²⁰⁶ Still, supporters of the bill had to stomach key members of Congress adding a number of pork barrel projects before it could pass.²⁰⁷

Second, in the 1990s, Congress attempted to begin relocating broadcast television from the analog radio spectrum to the digital bandwidth.²⁰⁸ Obviously, this transfer would free up much space on the analog spectrum.²⁰⁹ Not surprisingly, broadcast television wanted to claim space on the digital spectrum—where broadcast quality could improve dramatically—but resisted giving up privileged access to the analog spectrum. Again, Congress settled this matter by striking a compromise. First, Congress gave broadcasters access to the digital spectrum without charge.²¹⁰ Second, Congress pushed off the date broadcasters would have to surrender the analog spectrum to December 31, 2006,²¹¹ later postponed again until February 2009.²¹² Third, Congress provided a loophole: even after broadcasters transferred to the digital spectrum, they would still have access to the analog spectrum until at least eighty-five percent of the market affected had access to digital television.²¹³ Many commentators suspect that this eighty-five percent threshold will mean that broadcast television will hold its claim to the analog spectrum longer than the 2009 cutoff date.²¹⁴ Until the eviction, broadcasters can use both the analog and digital spectrums.

²⁰⁴ See Hazlett, *Assigning Property Rights*, *supra* note 181, at 562–63.

²⁰⁵ See Anthony E. Varona, *Changing Channels and Bridging Divides: The Failure and Redemption of American Broadcast Television Regulation*, 6 MINN. J.L. SCI. & TECH. 1, 7–8 (2004); Hazlett, *Assigning Property Rights*, *supra* note 181, at 561.

²⁰⁶ Balanced Budget Act of 1997, 47 U.S.C. § 309(j)(1), (2)(b) (2000); Hazlett, *Assigning Property Rights*, *supra* note 181, at 535; see also Paul Taylor, *Superhighway Robbery*, NEW REPUBLIC, May 5, 1997, at 20 (calling this the “lobbying coup of the decade”).

²⁰⁷ Hazlett, *Assigning Property Rights*, *supra* note 181, at 562–63. Some of the line items prompted President Clinton to at least attempt to exercise the line item veto. See *City of New York v. Clinton*, 985 F. Supp. 168, 171–73 (D.D.C. 1998), *aff'd*, 524 U.S. 417 (1998).

²⁰⁸ Balanced Budget Act of 1997, Pub. L. No. 105–33, § 3003, 111 Stat. 251, 265–66 (1997) (codified as amended at 47 U.S.C. § 309(j)(14)(B) (2000)). See also Goodman, *supra* note 179, at 343.

²⁰⁹ Consumer & Governmental Affairs Bureau, Digital Television (DTV): FCC Consumer Facts, <http://www.fcc.gov/cgb/consumerfacts/digitaltv.html> (last visited July 15, 2007).

²¹⁰ 47 U.S.C. § 336(a). See also Cass R. Sunstein, *Television and the Public Interest*, 88 CALIF. L. REV. 499, 503 (2000).

²¹¹ Balanced Budget Act of 1997, Pub. L. No. 105–33, § 3003, 111 Stat. 251, 265 (1997) (codified as amended at 47 U.S.C. § 309(j)(14)(A)).

²¹² Digital Television Transition and Public Safety Act of 2005, Pub. L. No. 109–171, § 3002, 120 Stat. 21 (2006) (codified as amended in various sections of 47 U.S.C.).

²¹³ Balanced Budget Act of 1997, Pub. L. No. 105–33, § 3003, 111 Stat. 251 at 265–66 (1997) (codified as amended at 47 U.S.C. § 309(j)(14)(B)(iii)).

²¹⁴ See, e.g., Angela J. Campbell, *A Public Interest Perspective on the Impact of the Broadcasting Provisions of the 1996 Act*, 58 FED. COMM. L.J. 455, 458–59 (2006).

Third, in 1997, the FCC issued an order that created what it called the “Unlicensed National Information Infrastructure.”²¹⁵ This order increased access to the spectrum of wireless technologies by allowing them to use the spectrum, so long as they did not interfere with incumbents’ use.²¹⁶ Technical innovations designed to minimize interference made it possible for wireless technologies to utilize this leeway.²¹⁷ Of course, incumbents did not enjoy the prospect of additional competition but could not complain too loudly because the rights of these users were qualified to the extent that impinged on incumbents’ licensed use. While many unlicensed users have found at least temporary relief by this order, some have voiced concerns that incumbents have no incentive to make themselves less prone to interference and—in fact—may intentionally make themselves more prone to interference to keep out competitors.²¹⁸ Additionally, this liberalization of the spectrum only applies to small niches of the spectrum, leaving most of the spectrum as is.²¹⁹

How does this narrative relate to the framework discussed in Part V? In answering this question, it is necessary to compare the factors that promote a resolution that favor incumbents (i.e., crowding, power, and institutions) with that of factors that favor rivals (i.e., the degree of conflict between the new value and incumbents, power, and institutions).

Beginning at the turn of the twentieth century, we see crowding but not necessarily the need to exclude many users of the spectrum: with some organization the spectrum could facilitate that time’s major use of the spectrum, Morse code. As broadcast radio and then television came onto the scene, it became much more important for users of the commons to lock in their gains and seek protection from rival users. This translated into individual and collective efforts to lobby the federal government for a stable right to the spectrum. This pressure along with the public import of broadcast radio and television helped bolster incumbents’ claims to the spectrum. The institutions did much to favor broadcasters. However, spectrum institutions did not explicitly give incumbents long-term, secure access to the commons: to get this sort of access, incumbents invested a great deal of effort in appeasing and lobbying the federal government.

Overtime, incumbents increased their power and tightened their grip of the commons as they secured a place of prominence in American culture.

²¹⁵ Amendment of the Commission’s Rules to Provide for Operation of Unlicensed NII Devices in the 5 GHz Frequency Range, Report and Order, 12 F.C.C.R. 1576 (1997) (to be codified at 47 C.F.R. pts. 1, 2 & 15).

²¹⁶ *Id.* See also Stuart Minor Benjamin, *The Logic of Scarcity: Idle Spectrum As a First Amendment Violation*, 52 DUKE L.J. 1, 10 (2002) (stating that the FCC has allowed flexible uses, not requiring a license on high-frequency bands); Benkler, *supra* note 176, at 294 (describing unlicensed transmission); Kevin Werbach, *Supercommons: Toward a Unified Theory of Wireless Communication*, 82 TEX. L. REV. 863, 947 (2004) (describing the FCC’s interference proposal, which would define peak noise floor levels and allow unlicensed devices to operate below this floor).

²¹⁷ See LAWRENCE LESSIG, *THE FUTURE OF IDEAS: THE FATE OF THE COMMONS IN A CONNECTED WORLD* 221–22 (2001); Yochai Benkler, *Some Economics of Wireless Communications*, 16 HARV. J.L. & TECH. 25, 78–80 (2002).

²¹⁸ See, e.g., Goodman, *supra* note 179, at 301 n.96; Benkler, *supra* note 176, at 339.

²¹⁹ BENJAMIN, ET AL., *supra* note 177, at 11.

Additionally, it became increasingly clear to political actors that broadcasters served an important role in politics. Broadcasters had the ability to finesse the news of the day and to shine the spotlight—either to enhance or to tarnish—on political actors. At the same time, broadcasters had amassed a robust lobbying apparatus to protect their interests. So, by the time rivals users who wanted to use the spectrum for wireless came on the scene, broadcasters had developed a great deal of power and created much security in their continued right to use the spectrum.

Still, the rival use of the spectrum for wireless devices only grew at the tail end of the twentieth century. Increasingly, society demanded and in fact relied upon wireless devices. At the same time, the importance of broadcast media perhaps began to wane as alternatives to broadcasters reliant on the spectrum made headway on media other than broadcast television, such as the Internet, cable, and satellite. Still, in significant part incumbent users withstood rival interests.

Yet, in the 1990s, rivals received a significant boost as the Clinton administration and members of Congress came to link the use of the spectrum commons with a political strategy to help reduce the federal deficit.

In the end, even with the institutional advantages and significant power that incumbents enjoyed, it was not enough to keep new rivals out of the spectrum commons. But, rivals did not get everything that they wanted, and incumbents were able to cut their losses. As the framework would suggest, this occurred by incumbents finding ways to allow rivals access to the commons while at the same time minimizing conflict with their own claims. Specifically, the new rules only opened limited parts of the spectrum to rivals, incumbents did not have to pay for their continued use whereas rivals had to pay to access the spectrum, and rivals were barred from interfering with incumbent users. Additionally, broadcasters received a carrot in form of free access to the digital spectrum to compensate them for losses that they might accrue to accommodate rival uses.

2. Creation of Yellowstone National Park and the Eviction of Historic Users

Yellowstone National Park is among the world's most celebrated commons. Its national park status only dates back to 1872, but people have used and enjoyed Yellowstone for much longer. While visitors today may see Yellowstone—despite its persistent flow of traffic—as nature untamed, for centuries before Yellowstone became a park, it was a place where people hunted and even lived. The coming of the park closed an era for Native Americans and fur trappers. Yet, these established uses did not fade away the moment that President Grant signed the bill that made Yellowstone a national park. Even though the federal government was much more powerful than these traditional users, rooting them out took decades.

Most retellings of how Yellowstone became a national park begin with events that occurred in 1870 specifically surrounding a small group of influential citizens of Montana. These Montanans took a trip to what is now

called Yellowstone National Park to verify what they had heard about Yellowstone from trappers and miners.²²⁰ As they toured Yellowstone, they not only saw many natural wonders but also an opportunity to bring the area the railroad, tourists, and an infusion of money.²²¹ While the actual motivations spurring their actions remain unclear,²²² the group determined to spread excitement about the natural wonders they saw on their trip.²²³

Shortly after their trip, Nathaniel Langford (later to become the first superintendent of Yellowstone) convinced Jay Cooke, president of the Northern Pacific Railroad, to support efforts to protect and promote Yellowstone as a way to further investment in his railroad.²²⁴ Then, on the railroad's dime, Langford made his way to Washington, D.C. to tell those in the government what his group saw in Yellowstone.²²⁵ Among those who met Langford was Dr. Ferdinand Hayden of the U.S. Geological Survey.²²⁶ Hayden was enthralled with what he heard and successfully lobbied several members of Congress to fund him to complete a survey of Yellowstone.²²⁷ When Hayden later returned to Washington, overwhelmed with the majesty of Yellowstone, he brought with him photographs, sketches, and the scientific credibility to help lobby for Yellowstone's protection.²²⁸ His trip also documented some commercial exploitation of the area: during his journey he ran across a number of entrepreneurs attempting to profit from the "healing waters" of Yellowstone.²²⁹ Additionally, upon returning, he found a letter on his desk from Cooke's company encouraging Hayden to lobby to protect Yellowstone.²³⁰

Langford, Hayden, and the Northern Pacific Railroad joined forces and lobbied Congress to make Yellowstone a national park.²³¹ The prospect that entrepreneurial efforts might somehow ruin Yellowstone's beauties became the sounding bell for action—the tragedy of the commons spotted far on the horizon. Congressional debate went briskly. The bill to create the park passed easily—though Congress appropriated little money to fulfill its

²²⁰ See MARK DANIEL BARRINGER, *SELLING YELLOWSTONE: CAPITALISM AND THE CONSTRUCTION OF NATURE* 12 (2002) ("The trappers' tales of the place 'where Hell bubbled up' circulated widely."); CHRIS J. MAGOC, *THE CREATION AND SELLING OF AN AMERICAN LANDSCAPE, 1870-1903* 2 (1999); PAUL SCHULLERY, *SEARCHING FOR YELLOWSTONE: ECOLOGY AND WONDER IN THE LAST WILDERNESS* 51 (1997).

²²¹ See BARRINGER, *supra* note 220, at 14; MAGOC, *supra* note 220, at 9; STEPHEN GERMIC, *AMERICAN GREEN: CLASS, CRISIS, AND THE DEPLOYMENT OF NATURE IN CENTRAL PARK, YOSEMITE, AND YELLOWSTONE* 85-86 (2001).

²²² See PAUL SCHULLERY & LEE WHITTLESEY, *MYTH AND HISTORY IN THE CREATION OF YELLOWSTONE NATIONAL PARK* 1-34 (2003).

²²³ See BARRINGER, *supra* note 220, at 14; SCHULLERY, *supra* note 220, at 59.

²²⁴ SCHULLERY & WHITTLESEY, *supra* note 222, at 31.

²²⁵ *Id.*

²²⁶ BARRINGER, *supra* note 220, at 14; MAGOC, *supra* note 220, at 14-15; SCHULLERY, *supra* note 220, at 60.

²²⁷ SCHULLERY, *supra* note 220, at 45-47.

²²⁸ BARRINGER, *supra* note 220, at 14-15; MAGOC, *supra* note 220, at 15.

²²⁹ BARRINGER, *supra* note 220, at 16.

²³⁰ SCHULLERY, *supra* note 220, at 60; MAGOC, *supra* note 220, at 17.

²³¹ SCHULLERY, *supra* note 220, at 60-61; DAVID RAINS WALLACE, *YELLOWSTONE: OFFICIAL NATIONAL PARK HANDBOOK* 48-49 (2000).

mandate.²³² By March 1, 1872, President Grant signed the legislation into law.²³³ The Act declared Yellowstone “a public park or pleasuring-ground for the benefit and enjoyment of the people” and instructed the Secretary of the Interior to protect the park’s wildlife.²³⁴

In charting the course for Yellowstone, it appears that Congress showed little or no concern for those who then-currently used Yellowstone. If anything, action was furthered—not set back—by these users, particularly the entrepreneurs attempting to profit from Yellowstone. And, throughout Congress’s proceedings, it appears virtually no thought was given to the long established stakes of the Shoshoni, Crow, Blackfeet, Flathead, Kootenai, Bannock, and Nez Perce tribes or to the trappers who regularly hunted in Yellowstone.²³⁵

Despite the power and resources of the federal government, creation of a national park did not immediately change things on the ground. The next several decades were characterized by the federal government’s attempts to remove the Native Americans, trappers, and unauthorized entrepreneurs from the park.²³⁶ So, even in this case, the drag of institutions of the past increased the cost of change.

The most senior users of the parks received the most hostile ejection from Yellowstone. Native Americans, who had been using the park for centuries,²³⁷ for the most part tried to avoid tourists.²³⁸ However, in the early years of the national park, several bloody confrontations departed from this generalization, most notably an infamous 1877 attack by Nez Perce Indians.²³⁹ In 1879, the park superintendent “removed” all Native Americans from Yellowstone,²⁴⁰ which even though in many ways ineffectual, seemed to help lure in more tourists.²⁴¹ However, while the park management made some efforts to forcibly evict the Native Americans, this campaign was not successful in the most frequented parts of the park until near the end of the nineteenth century when the United States Army built a fort in Mammoth Hot Springs.²⁴²

The creation of Yellowstone may have accompanied a mandate to evict trappers, yet initially, park management lacked the tools required to accomplish this task. In fact, in the years following the creation of the

²³² SCHULLERY, *supra* note 220, at 61.

²³³ Yellowstone National Park Protection Act, ch. 24, sec. 1, 17 Stat. 32 (1872).

²³⁴ *Id.*

²³⁵ PETER NABOKOV & LAWRENCE LOENDORF, RESTORING A PRESENCE 38–39 (2004); MARK DAVID SPENCE, DISPOSSESSING THE WILDERNESS 45–49 (1999); GERMIC, *supra* note 221, at 94.

²³⁶ BARRINGER, *supra* note 220, at 19–33; SPENCE, *supra* note 235, at 61.

²³⁷ WALLACE, *supra* note 231, at 39–41; SPENCE, *supra* note 235, at 43; GERMIC, *supra* note 221, at 94; SCHULLERY, *supra* note 220, at 8–11.

²³⁸ GERMIC, *supra* note 221, at 93–94.

²³⁹ BARRINGER, *supra* note 220, at 18–19; WALLACE, *supra* note 231, at 41; SPENCE, *supra* note 235, at 56; MAGOC, *supra* note 220, at 5; SCHULLERY, *supra* note 220, at 105.

²⁴⁰ BARRINGER, *supra* note 220, at 19.

²⁴¹ *Id.* at 20; NABOKOV & LOENDORF, *supra* note 235, at xi; WALLACE, *supra* note 231, at 50–51, 107; SPENCE, *supra* note 235, at 56–58.

²⁴² SPENCE, *supra* note 235, at 56–57; SCHULLERY, *supra* note 220, at 112.

park, hunting increased tremendously,²⁴³ almost obliterating Yellowstone's bison herd. This resulted in outrage from the press, the general public, and many sportsmen.²⁴⁴ The boiling point came in 1894 when park management caught a poacher with several bison pelts within the park boundaries.²⁴⁵ After media and public outcry, Congress passed the Lacey Act,²⁴⁶ which provided park management tools to curb hunting, including the ability to fine and imprison violators.²⁴⁷ Granted, the bison decline did not end immediately.²⁴⁸ But, with this hefty tool and the assistance of the United States Army to enforce it, hunting began to disappear from Yellowstone.²⁴⁹ However, this was not enough to save the bison. Ultimately, park managers turned their attention to exterminating predators, particularly wolves,²⁵⁰ and to introducing domesticated bison to the park.²⁵¹

While ridding the park of entrepreneurs may have helped inspire the creation of Yellowstone, it took time. Once it occurred, it was more of an exchange than an eviction. The creation of the park only increased the desires of speculators to use the park. Still, with time, park management managed to evict those entrepreneurs that had "illegitimate" stakes in Yellowstone.²⁵² However, ouster of these was followed by installation of "legitimate" entrepreneurs who had the support of park management.²⁵³ In fact, one entrepreneur early in the park's history convinced park management to give him substantial portions of Mammoth Hot Springs—something that was later invalidated by Congress.²⁵⁴ As the twentieth century came, and the park was firmly implanted, the most influential entrepreneurial interests were aligned with the railroads, which competed fiercely to provide concessions, road transportation, and lodging.²⁵⁵

Turning to the framework, again it is necessary to compare the factors that promote a resolution that favor incumbents (i.e., crowding, power, and institutions) with that of factors that favor rivals (i.e., the degree of conflict between the new value and incumbents, power, and institutions). At first blush it might seem surprising that for decades, incumbent users—the Native Americans, trappers, and early entrepreneurs—withstood the federal government's attempt to expel them from Yellowstone. Yet, the framework helps expose why incumbents had the foothold they did.

²⁴³ SCHULLERY, *supra* note 220, at 74–75; WALLACE, *supra* note 231, at 64–65.

²⁴⁴ SCHULLERY, *supra* note 220, at 74–75.

²⁴⁵ SPENCE, *supra* note 235, at 65; WALLACE, *supra* note 231, at 65; SCHULLERY, *supra* note 220, at 121.

²⁴⁶ Lacey Act, ch. 553, 31 Stat. 187 (1900) (codified as amended at 16 U.S.C. § 3372 (2000)).

²⁴⁷ See MAGOC, *supra* note 220, at 160.

²⁴⁸ *Id.*

²⁴⁹ SCHULLERY, *supra* note 220, at 121.

²⁵⁰ WALLACE, *supra* note 231, at 65.

²⁵¹ SCHULLERY, *supra* note 220, at 121.

²⁵² BARRINGER, *supra* note 220, at 24.

²⁵³ *Id.*

²⁵⁴ *Id.* at 27–28.

²⁵⁵ *Id.* at 23–40; WALLACE, *supra* note 231, at 56–57.

The law passed by Congress and the informal institutions that had created patterns of use of the park over a long period of time were unavoidably at odds with each other. This stark clash of institutions put in place a clash between incumbent and rival users. While a decree in Washington D.C. did not automatically alter the incumbents' use of Yellowstone, the federal government's track record in the nineteenth century showed that it had the ability to remove Native Americans—the most substantial group of incumbents—when those in power determined to do so.

So, how were incumbents able to remain in Yellowstone as long as they did? The answer to this differs across incumbent users. For the incumbent entrepreneurs—the entities Congress focused upon when making Yellowstone into a national park—their staying power is largely a reflection in the time lag between Congress making Yellowstone a park and federal land managers and rival entrepreneurs getting a foothold in Yellowstone. Until this occurred, at least in a limited way rivals and incumbent entrepreneurs had a manageable—and perhaps at times even a symbiotic—relationship. This, of course, changed as rival entrepreneurs got a stronger foothold within the park and made headway with park management. This ultimately led to the eviction of incumbent entrepreneurs.

What about the trappers and the Native Americans? As mentioned in the context of discussing the framework, sometimes the physical traits of the commons favors one user over another. This plays out here. Even with the federal government promoting tourism, Yellowstone was big enough for hunters and Native Americans to find plenty of places where tourists did not frequent much. Unlike the entrepreneurs, these incumbents had the ability to relocate quite easily. So, even though these incumbents would have noticed conflicts between their traditional use and the desires to make Yellowstone a national park, from the incumbents' perspective they still had ample opportunities to use the commons as they desired. For the federal government to close off the commons to these incumbent users, it took a great deal of effort and resources: the extended attention and presence of the United States Army within the park.

So, despite what seems an obvious advantage in the power to call upon resources, rivals had to make significant commitments to transform Yellowstone from a place that people had used for centuries to the desired façade that Yellowstone was nature untouched. While here too, rivals users prevailed, the ability of incumbents to hold on as long as they did shows the staying power of institutions.

3. Western Water Law and the Changing West

Major water bodies are a quintessential commons resources.²⁵⁶ In the arid interior of the western United States, they are also very important commons

²⁵⁶ Edella Schlager, *Water Resources: The Southwestern United States*, in PROTECTING THE COMMONS: A FRAMEWORK FOR RESOURCE MANAGEMENT IN THE AMERICA, *supra* note 15, at 133–36.

resources: lack of water defines the West's natural and built landscapes.²⁵⁷ Not surprisingly, water proved paramount as settlers attempted to move into the interior West. In the modern West—one of the fastest growing areas of the United States—the thirst for water only grows.²⁵⁸ Despite all the changes the West has seen over the past 150 years, the rules allocating water have hardly changed at all.

Before the emergence of western water law, however, history reflects that water was a source of great uneasiness and conflict: hoarding, diversions, and even out-and-out brawls. In fact, all this caused Mark Twain to purportedly observe: "In the west, whiskey is for drinkin' and water is for fightin'."²⁵⁹ Uncertainty over water made it difficult to settle in the West and added a barrier to entice settlers and investors²⁶⁰—in other words, a tragedy of the commons.

Not surprisingly, given the importance of water, western settlers attempted to close off access by creating commons institutions. These institutions began as informal norms among the settlers and boiled down to two simple principles. First, seniority mattered: first in time, first in right.²⁶¹ Second, water users had to put water to a continued "beneficial use."²⁶² The concept of beneficial use has two parts: a prohibition against waste and a requirement that water users had to use their claims on a continual basis,²⁶³ both making it more difficult to hold water for speculative purposes.

²⁵⁷ See WALLACE STEGNER, *WHERE THE BLUEBIRD SINGS TO THE LEMONADE SPRINGS* 46 (1992) ("Aridity, more than anything else, gives the western landscape its character."); MARC REISNER, *CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER* 1-14 (1993) (detailing the western history of water and its effects on habitation).

²⁵⁸ See JOSEPH L. SAX ET AL., *LEGAL CONTROL OF WATER RESOURCES* 12-13 (3d ed. 2000); Holly Doremus, *Water, Population Growth, and Endangered Species in the West*, 72 U. COLO. L. REV. 361, 363 (2001); John D. Leshy, *Shaping the Modern West: The Role of the Executive Branch*, 72 U. COLO. L. REV. 287, 301 (2001).

²⁵⁹ See Sandra Postel, *The Looming Water Wars: Farms vs. Cities*, USA TODAY, Mar. 2000 (attributing quotation to Twain, although worded differently: "whiskey's for drinking, water's for fighting about"). However, while this quotation is attributed to Twain, it is not clear that he actually said it.

²⁶⁰ See A. DAN TARLOCK ET AL., *WATER RESOURCE MANAGEMENT* 24 (5th ed. 2002); WILLIAM GOLDFARB, *WATER LAW* 15 (1984); Jennie L. Bricker and David E. Filippi, *Endangered Species Act Enforcement and Western Water Law*, 30 ENVTL. L. 735, 737 (2000). See generally Charles F. Wilkinson, *In Memoriam: Prior Appropriation 1848-1991*, 21 ENVTL. L. v, v-ix (1991) (explaining the growth of the "prior appropriation" doctrine in the West).

²⁶¹ See JOSEPH L. SAX ET AL., *LEGAL CONTROL OF WATER RESOURCES: CASES AND MATERIALS* 9-10 (2nd ed. 1991).

²⁶² See, e.g., ALASKA STAT. § 46.15.260(3) (2006) (defining "beneficial use" as "a use of water for the benefit of the appropriator, other persons or the public, that is reasonable and consistent with the public interest"); CAL. WATER CODE § 1240 (West 1971) (explaining that appropriation "must be for some useful or beneficial purpose, and when the appropriator or his successor in interest ceases to use it for such a purpose the right ceases"); COLO. REV. STAT. § 37-92-103(4) (2006) (defining "[b]eneficial use"); TEX. WATER CODE ANN. § 11.002 (4) (Vernon 2006) (providing the Texas definition).

²⁶³ See, e.g., NEV. REV. STAT. § 533.035 (2005); N.M. STAT. ANN. § 72-1-2 (West 1997); UTAH CODE ANN. § 73-1-3 (1989); ARIZ. REV. STAT. ANN. § 45-141(c) (1956); IDAHO CODE ANN. §§ 42-104 (2003); Joseph L. Sax, *The Constitution, Property Rights and the Future of Water Law*, 61 U. COLO. L. 257, 260 (1990); Steven J. Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 OR. L. REV. 483, 499 (1982).

These simple institutions served nineteenth century settlers and their time well. They provided settlers with the certainty they desired, allowed for increased investment in the West, and provided a system that helped the West grow and flourish.²⁶⁴

As such, it is not surprising to find that western society invested resources to help bolster and entrench these rules. In fact, every settler who had a place in line arguably had an interest to assure that the institution translated into a right to use water. Additionally, the settlers' shared stake in the rules helped spur collective action: water user organizations built irrigations ditches and devoted resources to monitor the resource and its users. Social organizations bolstered the institutions. For example, the Mormon Church—which helped settle hundreds of communities throughout the West—not only encouraged members of the community to honor the rules but even enforced water rules in ecclesiastical courts.²⁶⁵

Significantly, these institutions found the support of state and territorial governments. As early as the 1850s, state courts began to rely on the settlers' rules as the common law. Legislatures soon followed and made common law statutory law. By the beginning of the twentieth century, most states west of the Mississippi had formed administrative agencies to administer the rules, to keep track of the seniority of different users, and to consider applications by those who wanted a place at the back of the line. State governments became western water's line monitors. For the past century, these institutions also received tremendous support from the federal government, which has invested billions of dollars to dam and distribute western water.²⁶⁶

While things may look fine from the perspective of incumbents, as the queue for water has only grown, the rationales for the West's water institutions have become increasingly tenuous. This is true particularly in light of the changing face of the West: once home to sparsely populated agrarian communities but now increasingly populated by urbanites and suburbanites.²⁶⁷

Consider three examples of how institutions governing the water commons have stood in the way of changing values held by much of the changing West. While eighty to ninety percent of the inhabitants of the western United States live in urban areas—such as Phoenix, Los Angeles, Denver, Salt Lake City, and Las Vegas—approximately eighty to ninety

²⁶⁴ See *Arizona v. California*, 460 U.S. 605, 620 (1983).

²⁶⁵ See EDWIN BROWN FIRMAGE & RICHARD COLLIN MANGRUM, *ZION IN THE COURTS: A LEGAL HISTORY OF THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS, 1830–1900* 314–21 (1988).

²⁶⁶ See, e.g., David H. Getches, *The Metamorphosis of Western Water Policy: Have Federal Laws and Local Decisions Eclipsed the States' Role?*, 20 STAN. ENVTL. L.J. 3, 11 (2001); Barton H. Thompson, Jr., *What Good is Economics?*, 27 ENVIRONS ENVTL. L. & POL'Y J. 175, 181 (2003).

²⁶⁷ See U.S. CENSUS BUREAU, *DEMOGRAPHIC TRENDS IN THE 20TH CENTURY: CENSUS 2000 SPECIAL REPORTS* 43 (2002) (noting the dramatic increase in the population living in metropolitan areas in the West); KENNETH T. JACKSON, *CRABGRASS FRONTIER: THE SUBURBANIZATION OF THE UNITED STATES* 139 (1985); Timothy Egan, *Get Used to New West, Land Managers Tell the Old West*, N.Y. TIMES, Feb. 12, 1998, at A10.

percent of the water used in the West feeds agriculture and mining interests.²⁶⁸ Rural-urban transfer of water has progressed at a slow pace.²⁶⁹ In large part, this is due to resistance from rural water users and communities, who see transfers as potentially threatening to rural communities, economies, and irrigation districts.²⁷⁰

Second, the requirement of beneficial use has also proved both too broad and too narrow to meet the challenges of the modern day West. It is too broad because the concept of beneficial use is static.²⁷¹ The bar against wasting water in the context of incumbent uses has not progressed as demand for water has increased or as the technologies for consuming water have blossomed.²⁷² On the other hand, it is too narrow because the institutions have only begrudgingly recognized many of the emerging values of the water in the West as beneficial.²⁷³ Additionally, even though most states have now recognized—at least in a limited way—the value of keeping water in rivers and streams for recreation, wildlife, and scenic values, states have done little to pursue these values.²⁷⁴

Third, the use-it-or-lose-it aspect of beneficial use has only encouraged use of water. When a user is inclined to not use water, she has to consider whether this may result in losing the right to use water in the future.²⁷⁵

²⁶⁸ See WESTERN WATER POLICY REVIEW ADVISORY COMM'N, *WATER IN THE WEST: THE CHALLENGE FOR THE NEXT CENTURY* 2–22 to 2–24 (1998); Barton H. Thompson, Jr., *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671, 702 (1993).

²⁶⁹ See Owen L. Anderson, *Reallocation*, in 2 *WATERS AND WATER RIGHTS* 233, 247–53 (Robert E. Beck ed., 1991).

²⁷⁰ See Gary D. Libecap, *Chinatown: Owens Valley and Western Water Reallocation—Getting the Record Straight and What It Means for Water Markets*, 83 TEX. L. REV. 2055, 2056 (2005) (quoting *Liquid Assets*, THE ECONOMIST, July 19, 2003, at 15); Thompson, *supra* note 2, at 245; C. Carter Ruml, *The Coase Theorem and Western U.S. Appropriative Water Rights*, 45 NAT. RESOURCES J. 169, 197–98 (2005).

²⁷¹ See CHARLES F. WILKINSON, *CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST* 235 (1992); Eric T. Freyfogle, *Water Justice*, 1986 U. ILL. L. REV. 481, 497–98 (1986). While the case law has been slow to evolve, some courts have seemed to indicate that they are willing to consider beneficial use in relative rather than objective terms. See, e.g., *Butler, Crockett, and Walsh Dev. Corp. v. Pinecrest Pipeline Operating Co.*, 98 P.3d 1, 11–12 (Utah 2004); *Imperial Irrigation Dist. v. State Water Res. Control Bd.*, 225 Cal. App. 3d 548, 570 (Cal. Ct. App. 1990). Despite this, courts have been unwilling to impose relative standards in a meaningful way.

²⁷² Gregory A. Hicks & Devon G. Peña, *Community Acequias in Colorado's Rio Culebra Watershed: A Customary Commons in the Domain of Prior Appropriation*, 74 U. COLO. L. REV. 387, 474 (2003); Janet C. Neuman, *Beneficial Use, Waste, and Forfeiture: The Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 937 (1998); George W. Pring & Karen A. Tomb, *License to Waste: Legal Barriers to Conservation and Efficient Use of Water in the West*, 25 ROCKY MTN. MIN. L. INST. 25–1, 25–14 (1979).

²⁷³ See Jesse A. Boyd, *Hip Deep: A Survey of State Instream Flow Law from the Rocky Mountains to the Pacific Ocean*, 43 NAT. RESOURCES J. 1151, 1152–53 (2003).

²⁷⁴ See Jack Sterne, *Instream Rights and Invisible Hands: Prospects for Private Instream Water Rights in the Northwest*, 27 ENVTL. L. 203, 204–05 (1997) (bemoaning the inability of state agencies to protect instream rights).

²⁷⁵ Hope M. Babcock, *Reserved Indian Water Rights in Riparian Jurisdictions: Water, Water Everywhere, Perhaps Some Drops for Us*, 91 CORNELL L. REV. 1203, 1213, 1215 (2006); Pring & Tomb, *supra* note 272, at 25–10.

Additionally, because conservation may result in non-use, it discourages users to institute efficiency gains.²⁷⁶

The greatest changes to western water management over the past century have not come from changes to the institutions formed by the original settlers, but rather from the creation of institutions that challenge western water law. For example, while western water law has made no real progress in increasing the amounts of instream flows, enforcement of the Endangered Species Act²⁷⁷ and Clean Water Act²⁷⁸ have.²⁷⁹

Many scholars and commentators have highlighted the slow evolution of western water institutions.²⁸⁰ The lesson to take away from all this, however, is not just that these institutions need updating. Rather, by solving the tragedy of the commons more than a century ago, the West began down a path of creating and bolstering a tragic institution.

This story harmonizes well with the framework discussed above. In fact, the factors laid out in the framework helps parse out why incumbents have dominated rivals. Beginning with the influence of institutions, more than the context of the spectrum or of Yellowstone, the institutions at work here—western water rules—were explicitly designed to strongly favor incumbents over the long term. Unlike the spectrum where first in time, *de facto* meant first in right, under the prior appropriations doctrine, this has been explicit from the beginning.

The power of incumbents increased as the water institutions became increasingly embedded in the power structure of the West: starting as informal norms among miners and settlers, these rules were accepted by society generally and even written into the case law and statutes of state governments. This full embrace of the West's water institutions have made it very difficult to change rules when other uses of the commons emerged.

The most substantial changes to the West's water rules has occurred along the lines—so as it might be—of rural to urban water transfers. Here incumbents have resisted change to a large degree, and when change has occurred, very often incumbents have received impressive compensation for their willingness to transfer what has become a recognized property right to use water.

²⁷⁶ James N. Corbridge, Jr., *Historical Water Use and the Protection of Vested Rights: A Challenge for Colorado Water Law*, 69 U. COLO. L. REV. 503, 528–29 (1998); Karen A. Russell, *Eliminating Waste As a Way of Restoring Instream Flow*, 27 ENVTL. L. 151, 156 (1997).

²⁷⁷ Endangered Species Act of 1973, 16 U.S.C. §§ 1531–1544 (2000).

²⁷⁸ Federal Water Pollution Control Act, 33 U.S.C. §§ 1251–1387 (2000).

²⁷⁹ See Bricker & Filippi, *supra* note 260, at 737; Katherine P. Ransel, *The Sleeping Giant Awakens: PUD No. 1 of Jefferson County v. Washington Dep't of Ecology*, 25 ENVTL. L. 255, 256 (1995); Gregory S. Weber, *The Endangered Species Act: New Weapon Enters Sixty-year Fish Fight*, 3 RIVERS 276 (1992).

²⁸⁰ See, e.g., DONALD J. PISANI, WATER, LAND, AND LAW IN THE WEST: THE LIMITS OF PUBLIC POLICY, 1850–1920 23 (1996); Reed D. Benson, *Maintaining the Status Quo: Protecting Established Water Uses in the Pacific Northwest, Despite the Rules of Prior Appropriation*, 28 ENVTL. L. 881, 885–87 (1998); Barton H. Thompson, Jr., *Markets for Nature*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 261, 288–90 (2000).

However, while some efforts to challenge incumbents have arisen within the context of the western water law, rivals have more commonly avoided that battle and tried to reform western water law by latching onto rival institutions, such as the Clean Water Act and the Endangered Species Act. While incumbents' desire to stifle such change is no different in the context of rival institutions, an alternative forum to address claims to the commons has compromised incumbents' ability to resist change. This conforms to a major assumption built into the framework: in securing change rivals will attempt to reduce the transaction costs change—in this context which often comes in the form of resistance from incumbents.

B. Four Typologies of Tragic Institutions

Can we make any generalizations about tragic institutions based on these cases? In these cases and in examples of the commons more generally, we see four faces of tragic institutions. As suggested in the framework discussed above, the key question revolves around the extent to which the interests of incumbents or those pushing emerging values dominate, and to what extent.

When an incumbent institution dominates the influence of an emerging commons, we often find that those pushing emerging values cannot alter the incumbent institution. This may mean that we see no change or that a rival institution embodies the value, leaving the incumbent institution—at least for the time—untouched. On the other hand, when an emerging value dominates the influence of an incumbent institution, we do see changes of the incumbent institution—the only question is how much. We generally only see incremental change, but in rare circumstances we find an emerging value completely dominating an incumbent value. However, even in those rare cases we often find that—despite this dominance—relics of prior institutions remain. While each of these typologies are examined in more detail below, the following table illustrates the categories of tragic institutions.

Table 1: Tragic Institution Typologies		
	Relative Domination	Complete Domination
Incumbent Institution Dominates	Rival Institution	Static Institution
Emerging Value Dominates	Layered Institution	Residual Institution

1. Rival Institutions

When incumbents manage to secure a strong foothold over those pursuing emerging values, incremental change—if it comes at all—

generally takes the form of a rival institution. Rival institutions create an avenue for potential change without directly altering existing institutions. This, for example, seems to explain what happened in the context of western water and reliance on federal laws (e.g., the Endangered Species Act and the Clean Water Act) to protect instream flows rather than relying on western water law. This observation is furthered by speculation that that instream flows may not have received such protections if drafters of the Endangered Species Act and the Clean Water Act understood what they had unleashed.²⁸¹

Further, those attempting to protect emerging values may look to rival institutions when the geographic reach of an existing commons institution differ significantly from the dimensions of the emerging value at stake. In fact, when problems are larger than the boundaries of the governed dimension of a commons, there might even be some economies of scale for those promoting changes to look for ways to vest rival institutions within entities with a broader geographical outlook. An example that illustrates this point is the regulation of a classic commons—our urban landscapes.²⁸² Direct land use controls are often perceived as a matter for local government zoning. Yet, local control is often blamed for regional problems, such as isolation of the poor²⁸³ and environmental challenges related to urban sprawl.²⁸⁴ The strength of local government regulation—ability to hone in on local problems—does not add much when the problems are regional in nature and have dimensions that extend beyond the jurisdiction of the local government.²⁸⁵ While local land use has been slow to change, it is not uncommon to see those attempting to protect the rival values rely on federal laws and—to a lesser extent—state laws to push their agenda.²⁸⁶ Perhaps because local

²⁸¹ See Barton H. Thompson, Jr., *Water Law as a Pragmatic Exercise: Professor Joseph Sax's Water Scholarship*, 25 *ECOLOGY L.Q.* 363, 373–74 (1998).

²⁸² See McKean, *Common Property*, *supra* note 22, at 52 n.8.

²⁸³ See BANK OF AMERICA ET. AL, *BEYOND SPRAWL: NEW PATTERNS OF GROWTH TO FIT THE NEW CALIFORNIA* 7 (1995); MYRON ORFIELD, *METROPOLITICS: A REGIONAL AGENDA FOR COMMUNITY AND STABILITY* 2–8 (1997); PETER CALTHORPE, *THE NEXT AMERICAN METROPOLIS: ECOLOGY, COMMUNITY, AND THE AMERICAN DREAM* 20 (1993); Myron Orfield, *Land Use and Housing Policies to Reduce Concentrated Poverty and Racial Segregation*, 33 *FORDHAM URB. L.J.* 877, 888–89 (2006); Paul A. Jargowsky, *Sprawl, Concentration of Poverty, and Urban Inequality*, in *URBAN SPRAWL: CAUSES, CONSEQUENCES & POLICY RESPONSES* 39, 40–42, 60–68 (Gregory D. Squires ed., 2002); Owen Fiss, *What Should be Done for Those Who Have Been Left Behind*, 27 *BOSTON REV.* 4–9 (Summer 2000), available at <http://bostonreview.net/BR25.3/issue.pdf>; Paul A. Jargowsky, *Metropolitan Restructuring and Urban Policy*, 8 *STAN. L. & POL'Y REV.* 47, 48 (1997).

²⁸⁴ JAMES HOWARD KUNSTLER, *HOME FROM NOWHERE: REMAKING OUR EVERYDAY WORLD FOR THE TWENTY-FIRST CENTURY* 43 (1996); Francesca Ortiz, *Biodiversity, the City, and Sprawl*, 82 *B.U. L. REV.* 145, 179 (2002); Nicolas M. Kublicki, *Innovative Solutions to Euclidean Sprawl*, 31 *ENVTL. L. REP.* 11,001, 11,003 (2001).

²⁸⁵ See Andrew Achincloss Lundgren, *Beyond Zoning: Dynamic Land Use Planning in the Age of Sprawl*, 11 *BUFF. ENVTL. L.J.* 101, 128 (2004) (“The virtue of zoning—its local purview—was transforming into its vice.”).

²⁸⁶ See JAMES M. MCELFISH, JR. & SUSAN CASEY-LEFKOWITZ, *SMART GROWTH AND THE CLEAN WATER ACT* 3 (2001); William F. Pedersen, *Using Federal Environmental Regulations To Bargain for Private Land Use Control*, 21 *YALE J. ON REG.* 1 (2001); Buzbee, *supra* note 166, at 114–15;

governments have proven so slow to embrace rival values, some have even turned to market and private solutions, such as working with homeowners' associations.²⁸⁷ While these rival institutions have not fully remedied the tragic dimensions of local land use, they have at least made some difference.

Rival institutions found in different levels of government can also arise as a refuge for those in the commons smarting of political defeats from incumbent institutions at a different level of government. For example, we might see rival institutions formed at the state level attempt to reign in a local government or rival institutions at the federal level attempt the same to a state. A classic example of this is the institutions built within the federal government to address discriminatory practices that worked to exclude people of color from many important common pool resources: access to the electoral franchise, access to the public marketplace, access to public schools, access to the provision of state and local government services, and access to employment opportunities.

Those seeking to create or latch onto rival institutions may also look to the courts. In fact, courts have at times provided those pushing rival values assistance when other branches of the government failed to do so. Court enforcement of substantive and administrative laws often acts as a last line of defense.

Creation or use of a rival institution generally does not immediately resolve matters. Instead rival institutions generally translate into a prolonged conflict. When used effectively, they can begin to channel, constrain, and perhaps even begin to reshape existing institutions. The conflict generally only subsides once those vested in rival institutions find some way to stomp out the other value or make their interests coincide.

2. Layered Institutions

When those pushing for protection of emerging values have the clout to force existing institutions to undergo incremental change, what results is a layered institution. The cases explored illustrate several examples of layered institutions: changes made in the 1990s to allow for new uses of the radio spectrum; minor changes to western water laws to begin to recognize instream flows as a beneficial use; and, the endorsement of particular commercial interests within Yellowstone National Park.

The cost of incremental change generally relates back to resistance of incumbents. For this reason, we often find that incremental change provides some sort of concession for incumbent users, which obviously works to reduce resistance from incumbents. Perfect examples of this are all the changes made in the 1990s to facilitate new uses of the radio spectrum:

Neal Roberts & Otto Hetzel, *The Inevitable Accretion: Federal and State Takeover of Land Use Control*, 3 URB. L. & POL'Y 105, 108-10 (1980).

²⁸⁷ See Wayne S. Hyatt, *Common Interest Communities: Evolution and Reinvention*, 31 J. MARSHALL L. REV. 303, 329-32 (1998).

limiting auctions to only new licenses; allowing unlicensed users to use underutilized parts of the spectrum so long as this does not interfere with incumbent uses; and only forcing television broadcasters to cease using the analog spectrum once the vast majority of television viewers had made the switch themselves. Examples of facilitating change without harming incumbents are pervasive in the commons: the Clean Air Act—which protects the air shed commons—grandfathers in emitters who built plants prior to the passage of the Act; land use plans that permit existing nonconforming uses; new wilderness designations often grandfather in existing uses.²⁸⁸

When we find layered institutions harming incumbent users, we generally find incumbents giving up relatively weak, dispersed benefits to those seeking to use a commons in a way that provides concentrated benefits to a small number of users. This is essentially the story of how a single railroad company became the major benefactor of Yellowstone Park's concessions, transportation, and lodging at the turn of the twentieth century.

In other cases, incremental change confronts advantages of incumbents more directly and provides a pathway for institutional change that in some ways negotiates between the interests of incumbents and that of those supporting emerging values. This is the story of institutional change that Elinor Ostrom tells in *Governing the Commons*.²⁸⁹ She explains what seems to be a hopeless tragedy of the commons of overused groundwater aquifers in southern California and explains how a somewhat surprising decision by a state court essentially altered the rules of the game to force groundwater conservation.²⁹⁰ We also see this sort of change in the new found flexibility mechanisms employed in the administration of the Endangered Species Act, which have been used to shed the more unpredictable—by some accounts even draconian—features of the Act.²⁹¹ Yet, of course, the more a change alters the power of incumbents, the more resistance we expect to find from incumbents opposing that change.

3. Static Institutions

We see the face of tragic institutions most clearly when incumbent institutions lock out emerging values. Those attempting to protect emerging values can face significant hurdles: collective action, informal norms, established organizations, and institutional remedies. In the case of western water law, the institution that locked up the West's waters—"first in time-

²⁸⁸ See, e.g., Mitchel P. McClaran, *Livestock in Wilderness: A Review and Forecast*, 20 ENVTL. L. 857, 858 (1990) (citing non-conforming uses allowed by the Wilderness Act).

²⁸⁹ OSTROM, *GOVERNING THE COMMONS*, *supra* note 2.

²⁹⁰ *Id.* at 103-42.

²⁹¹ See Endangered Species Act Amendments of 1982, Pub. L. No. 97-304, sec. 6, 10(a), 96 Stat. 1411, 1422-25 (codified as amended at 16 U.S.C. § 1538 (2000)); Habitat Conservation Plan Assurances ("No Surprises") Rule, 63 Fed. Reg. 8859 (Feb. 23, 1998) (to be codified at 50 C.F.R. pt. 17); see also J.B. Ruhl, *Regulation by Adaptive Management: Is It Possible?*, 7 MINN. J. L. SCI. & TECH. 21, 41-42 (2005); Joseph L. Sax, *Environmental Law at the Turn of the Century: A Reportorial Fragment of Contemporary History*, 88 CAL. L. REV. 2375, 2380-81 (2000).

first in right"—still remains unchanged. The same is true of the radio spectrum: since the time of Herbert Hoover broadcasters have held the strongest bandwidths of the radio spectrum.

We often find commons with static institutions, where we do not expect to see commons at all. The reason we do not see commons is because incumbents have captured them so successfully that they hardly resemble commons anymore. Take the example of the commons to split up voters among congressional districts: gerrymandering is essentially as old as the districts themselves.²⁹² These institutions have become increasingly static as tools to carve up districts have become more robust.²⁹³ One might tell a similar story about the creation of the BCS bowl bid system to determine college football's national champion.

We have seen an impressive ability of institutions created to preserve designated wilderness and even the Artic National Wildlife Refuge (ANWR) to withstand change. While these institutions are clearly static institutions, they are somewhat unique because the benefits that they provide are diffuse and generally only enjoyed in small doses. Factors to explain such institutions include the import of symbolic politics, willingness of the public to pursue expressive interests where no instrumental interest is available to them,²⁹⁴ and existence of non-use values.

4. Residual Institution

The final type of tragic institutions is the residual institution. These institutions crop up in the rare circumstance that those attempting to protect an emerging value have the power to supplant incumbent institutions. Yet, typically even when emerging commons completely dominate existing institutions, it takes some persistence to stomp out the last relics of the incumbents' institutions. Of the cases examined above, we see the residual institution most clearly in the difficulties of the federal government to stomp out the interests of Native Americans, trappers, and unauthorized entrepreneurs in Yellowstone. This sort of tragic institution—though quite rare—does appear occasionally in the commons literature, most often when an aggressive government attempts to take away the benefits of a commons from a small group of users.²⁹⁵

Sometimes, residual institutions result in relocating incumbent institutions rather than supplanting them. This explains what has happened with global whaling institutions over the past few decades. The International

²⁹² See AMERICAN BAR ASSOCIATION, CONGRESSIONAL REDISTRICTING 2 (1981); MARK E. RUSH & RICHARD L. ENGSTROM, FAIR AND EFFECTIVE REPRESENTATION?: DEBATING ELECTORAL REFORM AND MINORITY RIGHTS 9 (2001).

²⁹³ See Jeffrey C. Kubin, *The Case for Redistricting Commissions*, 75 TEX. L. REV. 837, 854 (1997); Samuel Issacharoff, *Judging Politics: The Elusive Quest for Judicial Review of Political Fairness*, 71 TEX. L. REV. 1643, 1696–1702 (1993).

²⁹⁴ See H. GEOFFREY BRENNAN & LOREN LOMASKY, DEMOCRACY AND DECISION: THE PURE THEORY OF ELECTORAL PREFERENCE 23–24 (1997).

²⁹⁵ See, e.g., MICHAEL L. ROSS, TIMBER BOOMS AND INSTITUTIONAL BREAKDOWN IN SOUTHEAST ASIA 54–86 (2001).

Whaling Commission (IWC) came about to regulate harvesting of whales and to maintain the whaling stocks.²⁹⁶ However, by the 1980s, enough countries that opposed harvesting whales signed onto the commission to prevail in an effort to get the IWC to take on a moratorium on whaling.²⁹⁷ For a time, it appeared that non-whaling countries had successfully hijacked whaling decisions made on the international stage. However, by the 1990s, countries that favored whaling began leaving the IWC.²⁹⁸ Some of these countries created a new commission—the North Atlantic Marine Mammal Commission—and others disengaged in the international forum or did so only with extremely lax enforcement and robust use of the IWC's loopholes.²⁹⁹ While the IWC continues advocating for whale preservation, it does so with substantial difficulties because it has little sway over whaling countries and what have now become rival institutions.³⁰⁰

Finally, it is important to note that given the prospect of complete defeat, incumbent users, compared to others, will put up more resistance than when faced with other sorts of change, thereby increasing the costs of change.³⁰¹ In the face of eminent domination by those pushing emerging values, incumbent users have resorted to extreme measures to salvage what value of the commons they can or even destroy the commons in protest.³⁰²

VII. MANAGING EMERGING COMMONS AND TRAGIC INSTITUTIONS

While institutional stability may help solve the tragedy of the commons, stability also may create rigidity when values change. In some ways, recognizing that the major solution to the tragedy of the commons leads to yet another tragedy may leave us with a sense of futility. This Part attempts to provide policy makers and others with influence over commons with some advice about navigating this difficult tension.

²⁹⁶ International Convention for the Regulation of Whaling arts. IV–V, Dec. 2, 1946, 62 Stat. 1716, 161 U.N.T.S. 72; Protocol to the International Convention for the Regulation of Whaling, Nov. 19, 1956, 10 U.S.T. 952.

²⁹⁷ *Review of the 33rd International Whaling Commission Meeting: Hearing Before the Subcomm. on Human Rights and International Organizations of the H. Comm. on Foreign Affairs*, 97th Cong., 1st Sess. 11 (1981); International Whaling Commission, *Schedule to International Convention for the Regulation of Whaling, 1946*, as amended by the Commission at the 35th Annual Meeting, July 1983, and replacing that dated February 1983, at 13 (1983). See also INTERNATIONAL REGULATION OF WHALING: FROM CONSERVATION OF WHALING TO CONSERVATION OF WHALES AND REGULATION OF WHALE-WATCHING 575–634 (Patricia Birnie ed., 1985); DAVID DAY, *THE WHALE WAR* 98–99 (1987); David D. Caron, *The International Whaling Commission and the North Atlantic Marine Mammal Commission: The Institutional Risks of Coercion in Consensual Structures*, 89 AM. J. INT'L L. 154, 156 (1995).

²⁹⁸ See ABRAM CHAYES & ANTONIA HANDLER CHAYES, *THE NEW SOVEREIGNTY: COMPLIANCE WITH INTERNATIONAL REGULATORY AGREEMENTS* 101–02 (1995).

²⁹⁹ See Sarah Suhre, Note, *Misguided Morality: The Repercussions of the International Whaling Commission's Shift From a Policy of Regulation to One of Preservation*, 12 GEO. INT'L ENVTL. L. REV. 305, 312–16 (1999); Caron, *supra* note 297, at 160–64.

³⁰⁰ See Suhre, *supra* note 299, at 314–16; Caron, *supra* note 297, at 160–64.

³⁰¹ See OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 200.

³⁰² See, e.g., ROSS, *supra* note 295, at 54–86.

Part VII.A briefly discusses the difficulties associated with balancing two often conflicting goals: institutional stability and institutional responsiveness. In cases where stability has become or threatens to become rigidity, this Part proposes several design principles for responsive institutions. These principles are meant to supplement—not supplant—Ostrom’s “design principles . . . [of] . . . long-enduring institutions.”³⁰³ In significant ways, these proposed principles connect the literature with several other bodies of literature, particularly the political ecology literature on resilience and the adaptive management literature.

Part VII.B attempts to draw some general conclusions about the sorts of circumstances that may shift the optimal balance of institutional stability and adaptability. This discussion looks at factors that can shift the feasibility and desirability of altering the balance between stability and responsiveness.

A. Design Principles for a Changing World

The “design principles . . . [of] . . . long-enduring institutions” put forward by Ostrom³⁰⁴ and others help address the tragedy of the commons. Yet, these principles ignore that with a change of circumstances and values sensible institutions can morph into tragic institutions. So, even though the traditional measuring stick may suggest an institution is successful, once we take into account multiple uses of a commons, we may decide the same institutions are failing. A theme of this Article is that design principles that do not allow for institutional evolution spells trouble in a changing world. Yet, it is difficult to find pathways that avoid tragedies of the commons and tragic institutions because stable institutions and responsive institutions are often uneasy companions.

The road to responsive institutions is not an easy one. First, in institutional design, specifics have great import; it is a complex task.³⁰⁵ And, as the case study regarding regulation of the radio spectrum illustrates, merely providing an agency broad discretion generally does not solve the problem.³⁰⁶ Second, changes generally work against incumbent users and are therefore often politically difficult. Third, efforts to create responsiveness and stability sometimes conflict.

This article—of course—is not the first to focus on the benefits of responsive institutions. In fact, threads of this insight are found in the

³⁰³ OSTROM, *GOVERNING THE COMMONS*, *supra* note 2, at 90.

³⁰⁴ *Id.*

³⁰⁵ *See id.* at 22.

³⁰⁶ *See* Josh Eagle, *Regional Ocean Governance: The Perils of Multiple Use-Management and the Promise of Agency Diversity*, 16 *DUKE ENVTL. L. & POL'Y F.* 143, 158 (2006) (“Agency balancing is a flawed concept for several reasons. First, many resource uses are truly incompatible and thus cannot be ‘balanced,’ in the common sense of the word. For example, it is impossible for a backcountry hiker to enjoy a wilderness experience in the middle of a forest clear-cut.”).

sometimes overlapping literatures of new institutionalism,³⁰⁷ political ecology,³⁰⁸ and adaptive management.³⁰⁹ Yet, significantly, this is the first real introduction to the topic rooted in the commons literature. In the commons, the goal of institutional stability is often so lofty that we have overlooked the threat of potential rigidity.

Recognizing the difficulty of supplementing stable institutions with increased adaptability, the following draft principles provide some guidance to decision makers. These principles are meant to start the conversation. Particularly, given the substantial literature that these principles draw upon, it is likely these principles would benefit if they were revisited by those who are much more vested in those academic projects.

The following principles are a starting point for the next chapter of the commons literature:

Help institutions evolve by continually exposing them to competing values. Most stable commons institutions are governed by those good at seeking and adapting to new information: it is vital for institutional survival. Yet, those charged with maintaining institutions—particularly incumbents—often resist information that conflicts with their interests. The first step to remedying tragic institutions is to provide an outlet to highlight rifts between incumbents and competing values. Procedural features that allow for robust public participation, governance transparency, and disclosure of impacts of

³⁰⁷ See, e.g., NORTH, INSTITUTIONS, *supra* note 34; KNIGHT, *supra* note 34; OLSON, *supra* note 48; JAMES G. MARCH & JOHAN P. OLSEN, REDISCOVERING INSTITUTIONS: THE ORGANIZATIONAL BASIS OF POLITICS (1989); The New Institutionalism in Organizational Analysis (Walter W. Powell & Paul J. DiMaggio eds., 1991); Ronald H. Coase, The Firm, The Market, and The Law (1990); Oliver E. Williamson, The Economic Institutions of Capitalism (1985); ThrAinn Eggertsson, Economic Behavior and Institutions (1990); JAMES BUCHANAN, JAMES & GORDON TULLOCK, THE CALCULUS OF CONSENT: LOGICAL FOUNDATIONS OF CONSTITUTIONAL DEMOCRACY (1962).

³⁰⁸ See e.g., NAVIGATING SOCIAL-ECOLOGICAL SYSTEMS: BUILDING RESILIENCE FOR COMPLEXITY AND CHANGE (Fikret Berkes et al. eds., 2003); LINKING SOCIAL AND ECOLOGICAL SYSTEMS: MANAGEMENT PRACTICES AND SOCIAL MECHANISMS FOR BUILDING RESILIENCE (Fikret Berkes et al. eds., 1998); BARRIERS AND BRIDGES TO THE RENEWAL OF ECOSYSTEMS AND INSTITUTIONS (Lance H. Gunderson, et al, eds., 1995); DANIEL B. BOTKIN, DISCORDANT HARMONIES: A NEW ECOLOGY FOR THE TWENTY-FIRST CENTURY (1990); C.S. Holling & Lance H. Gunderson, *Resilience and Adaptive Cycles*, in PANARCHY: UNDERSTANDING TRANSFORMATIONS IN HUMAN AND NATURAL SYSTEMS 25 (Lance H. Gunderson & C.S. Holling eds., 2002); Lance H. Gunderson, *Ecological Resilience: In Theory and Application*, 31 ANN. REV. OF ECOLOGY AND SYSTEMATICS 425 (2000); C. S. Holling, *Resilience and Stability of Ecological Systems*, 4 ANN. REV. OF ECOLOGY AND SYSTEMATICS 1 (1973).

³⁰⁹ See, e.g., ADAPTIVE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT (C.S. Holling ed., 1978); KAI N. LEE, COMPASS & GYROSCOPE: INTEGRATING SCIENCE AND POLITICS FOR THE ENVIRONMENT (1993); C.J. WALTERS, ADAPTIVE MANAGEMENT OF RENEWABLE RESOURCES (1986); ADAPTIVE MANAGEMENT: FROM THEORY TO PRACTICE (J.A.E. Oglethorpe ed., 2002). Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of "New Age" Environmental Protection*, 41 WASHBURN L.J. 50 (2001); Gerald Andrews Emison, *The Potential for Unconventional Progress: Complex Adaptive Systems and Environmental Quality Policy*, 7 DUKE ENVTL. L. & POL'Y F. 167 (1996); Daniel A. Farber, *Environmental Protection as a Learning Experience*, 27 LOY. L.A. L. REV. 791 (1994); John M. Volkman & Willis E. McConaha, *Through a Glass, Darkly: Columbia River Salmon, The Endangered Species Act, and Adaptive Management*, 23 ENVTL. L. 1249 (1993).

policy decisions expose these rifts.³¹⁰ In addition to conflict, this can lead to the consideration of creative solutions and alternatives.³¹¹

Avoid credible commitments that tie up the commons. Often commons users require some inducement to accept an institution that reduces short-term consumption in favor of long-term sustainability.³¹² Providing privileged access to the commons often seems like an easy way, and sometimes an unavoidable prerequisite, to induce commons users to accept institutions. Yet, where viable options remain, it may be worthwhile to consider providing alternative incentives (e.g., side payments or credible threats). Even when commitments are given, they can be included with caveats, such as sunset provisions or reservations for other foreseeable uses.³¹³

Work toward integrating piecemeal policies. Because we often let crowding dictate when we govern the commons, we tend to build institutions to protect one value of the commons at a time.³¹⁴ Integrated institutions that reflect multiple values are often more apt to grapple with the complexities of the commons.³¹⁵ "Successful" institutions that maximize a single or a few values may actually cause tragedies along other dimensions of the commons. In suggesting this, it is obvious that it is not enough to merely provide that an agency recognize multiuse. Integration means tying policies together in sensible ways and not just expanding the purview of an entity overseeing a commons.

Within sensible bounds, allow trading among users and uses. Many commons institutions often specifically forbid trading of any institutional advantages provided to commons users.³¹⁶ Not surprisingly, this use-it-or-lose-it approach tends to entrench incumbents. Trading among users can loosen the grip of the past's institutions over today's decisions. Yet, trading can lead to unintended and undesired consequences, so we should still monitor trading regimes closely.³¹⁷

³¹⁰ See generally CARL WALTERS, *ADAPTIVE MANAGEMENT OF RENEWABLE RESOURCES* (1986) (advocating for an adaptive management style with respect to renewable resources "where management activities themselves are viewed as the primary tools for experimentation" and "errors can be detected and used as a basis for further learning"); ADAPTIVE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT 19-20 (C.S. Holling ed., 1978) (discussing an adaptive style of both assessment and management and advocating for an "adaptive process of policy design" specifically involving an influx of knowledge to spur innovation and increase consideration of possible effects).

³¹¹ See KAI N. LEE, *COMPASS AND GYROSCOPE: INTEGRATING SCIENCE AND POLITICS FOR THE ENVIRONMENT* 87-88 (1993).

³¹² See *supra* Part III.B.

³¹³ Moe, *supra* note 77, at 89-95.

³¹⁴ See *supra* Part VI.A.

³¹⁵ See C.S. Holling, *What Barriers? What Bridges?*, in *BARRIERS AND BRIDGES TO THE RENEWAL OF ECOSYSTEMS AND INSTITUTIONS* 3, 6-9 (Lance H. Gunderson et al. eds., 1995).

³¹⁶ See Dagan & Heller, *supra* note 53, at 566.

³¹⁷ See James Salzman & J.B. Ruhl, *Currencies and the Commodification of Environmental Law*, 53 *STAN. L. REV.* 607, 693-94 (2000); Thomas C. Schelling, *Prices as Regulatory Instruments*, in *INCENTIVES FOR ENVIRONMENTAL PROTECTION* 1, 39 (Thomas C. Schelling ed., 1983).

Build mechanisms to internalize externalities. An externality is a cost of a decision shouldered by someone other than the decision makers.³¹⁸ Externalities can describe many of the problems related to emerging commons. Particularly where policies are not integrated, this helps to create incentives among commons incumbents to take into account rival values.³¹⁹

Provide incentives for users to conserve the commons. Conserving the commons, obviously, leaves more to go around for all potential users. Conservation is often expensive. Not surprisingly, when commons institutions fail to promote conservation, change comes slowly. Policy carrots can send signals to incumbents that encourage them to value conservation or at least desire to avoid wasteful practices.³²⁰

Create limited rights for those with interests in the commons. Providing all users—privileged and otherwise—tools to oversee and perhaps even challenge decisions of those governing the commons creates avenues for change and limits the degree to which institutions become encrusted. The tools to accomplish this include what might be characterized as administrative process protections: the right to provide input, analyze, and even challenge decisions regarding the commons. This might also include providing those with an interest the ability to bring legal causes of action (e.g., specific remedies or the right to bring citizen suits). Of course, for such protections to have meaning, the person or entity providing redress must be somewhat impartial.

If necessary, buy out interests of entrenched users. Sometimes accommodating incumbent users and emerging values is not possible.³²¹ When the interests of entrenched users and emerging values and emerging commons are irreconcilable, buying out conflicting users often makes sense: it is a pathway out of political turmoil or gridlock.

B. Finding the Right Mix Between Institutional Stability and Responsiveness

While the design principles laid out above attempt to avoid direct conflicts with Ostrom's principles that promote stability, to some extent this is irresolvable: the former resists change and the later facilitates it. So, those with influence over institutional design will need to determine how much weight to put into stability as compared to adaptability.

In finding the right mix, practical concerns will often constrain available options. For the most part, incumbents will favor stability over responsiveness because it favors their interests. Given the difficulties in solving the tragedy of the commons, institutional survival may require leaving fledgling institutions alone until they have acquired sufficient stability. Yet, this is a difficult balance because waiting too long to begin building in responsiveness may significantly increase the costs of reform. While these timing issues are difficult, we might find some comfort in that,

³¹⁸ See Coase, *The Problem of Social Cost*, *supra* note 34, at 1-2.

³¹⁹ See Demsetz, *supra* note 2, at 348.

³²⁰ See YOUNG, *supra* note 30, at 81 (discussing the role of regulatory oversight).

³²¹ See NORTH, INSTITUTIONS, *supra* note 34, at 90.

generally speaking, by the time a particular use begins to crowd out others, change will not risk introducing a tragedy of the commons. Yet, acting before interests collide can often reduce the political costs of moving ahead.

Second, when we think that our institutions have got it right, we might resist adding more responsiveness to institutional design.³²² This contention has the greatest weight when the trajectory of a commons institution bucks the typical evolutionary trend. The typical trajectory first sees institutions (i.e., crowding) for those uses of the commons that serve relatively small numbers of tight-knit people, who utilize a localized dimension of a commons in pursuit of economic gain. Institutions that generally come later protect values that benefit larger numbers of people, focus on broader dimensions of the commons, and maximize non-market values. Surface water is a well recognized commons that illustrates this trajectory: water institutions first emerged to allocate the commons to agriculture or to some other highly consumptive use like mining; over time demands grew from municipal water users; still later, we saw institutions for demand to preserve instream flows for scenic, recreation, and wildlife values. However, when we do not see the typical trajectory of institutional evolution, we might resist change because it may risk a shift from accommodating more people to fewer people, from less consumptive uses to more consumptive uses, from regional dimensions to local dimensions, and non-market values to market-driven values. While we can explain part of this by individual preferences, such reservations may also stem from concerns relating to collective action problems: those values we tend to protect first in the commons are those values with the smallest collective action problems.³²³ When institutions emerge in spite of greater collective action costs, it may raise concerns that increasing the responsiveness of institutions may give those values facing less substantial collective action costs a second opportunity to prevail over incumbent uses that are, for some reason, preferred.

Third, stability might be favored over responsiveness when a commons is nonrenewable or at least slow to renew because responsiveness might lead to more consumptive uses of the commons, which might be difficult or impossible to reverse. It is somewhat troubling—a paradox of preservation—that the more a commons is preserved for less consumptive uses, the more attractive it might seem to those who would use the commons for more consumptive uses: the more a commons is preserved, the more it becomes a target. In contrast, the more a commons user destroys the value of a commons for other users, the less competition we are likely to find over the commons.

The combination of collective action problems and perceived non-renewability of resources causes many to hesitate at the suggestion of increased institutional adaptability. This, for example, explains why

³²² See YOUNG, *supra* note 30, at 80–81.

³²³ The costs of collective action increase as the number of users increase, the distance between users increases, and the per capita benefit decreases. See *supra* Part IV.A. Likewise, the more a use is market-driven, the more likely it is that commons users will be willing to invest in institutions to protect the commons and to lock-in privileged access to its benefits. *Id.*

suggestions to auction off national parks³²⁴ cause many to pause. Such a proposal incites concern that benefactors of this responsive mechanism might end up excluding large segments of those who currently use the national parks or that the use (e.g., developments of bed and breakfasts, condos, and high-end cabins) might damage what is left of the sense of wilderness found in national parks.

VIII. CONCLUSION

For four decades, the academic literature surrounding the commons has primarily focused on identifying and attempting to solve tragedies of the commons. An entire body of literature focuses on the role of stable institutions. Yet, this important scholarship neglects the fact that seemingly successful institutions create new problems because stability becomes rigidity when the way we value commons changes.

When values change and interest percolates in shaping institutions to protect an emerging dimension of the commons, the institutions of the past often stand in the way. Thus the heart of many of today's challenges in governing the commons arise from attempts to solve yesterday's looming tragedies. In taking a closer look at this problem, we find that the resistance of institutions to account for change is not a matter of chance but rather of design. In order to muster the support to overcome tragedies of the commons, we tend to create institutions that myopically define the value of the commons and that lock in protections of the commons by providing users credible commitments so that they—and nobody else—will benefit from the sacrifices necessary to overcome tragedies of the commons. Further, once users gain privileged access to the commons, it generally follows that those users invest in maintaining and expanding these gains. To the extent incumbent institutions increase the cost of change, an institution is a tragic institution.

Whether or not an institution will increase the cost of change hinges on the extent to which an emerging value conflicts with the interests of the incumbent users and the institutional mechanism that governs them. Whether an emerging commons or an incumbent institution prevails hinges on several factors: the willingness of those supporting the emerging value and the incumbent institutions to invest in maintaining or changing an institution; the degree of power of each of these groups; and the degree to which either party can harness institutions in pursuit of their gains. Tragic institutions can take different forms, sometimes completely dominating rival uses, sometimes limiting changes to incremental changes, and sometimes creeping into the picture even when it appears that an emerging commons is so well rooted that it appears to have extinguished the incumbent use all together.

³²⁴ For example, some claim the National Park System Reform Act (H.R. 260), sometimes referred to as the Parks Closing Commission Bill, was a scheme to put hundreds of national parks on the auction block. See Congressional Press Release, Tom Daschle, U.S. Senator, Democrats Fight Republican Assaults on the Environment (Apr. 22, 1997) (on file with author).

Tragic institutions challenge our prior conceptions of how to define institutional success in the commons. Rather than defining institutional success with institutional stability, tragic institutions highlight the need for institutional responsiveness as well. While institutions need some degree of stability to stave off the tragedy of the commons, the prevalence of tragic institutions in the commons suggest that we have over invested in stability and sold short responsiveness. Still, responsiveness is not much of an option where there is institutional fragility. Additionally, even when it is an option, we may have qualms, particularly when the current institutional mix has overcome collective action challenges and found ways to protect values that focus on broader dimensions of the commons, less consumptive uses, incorporating broader numbers of users, and non-market driven values. We also may have concerns when extraction of a commons is nonrenewable or at least slow to renew. In such cases, stability may serve heroic rather than tragic purposes. Yet, most often, a close examination suggests that less reliance on stability and more reliance on responsiveness would work to the greatest good.