

FROM FUR TO FISH: RECONSIDERING THE EVOLUTION OF PRIVATE PROPERTY

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One of the most enduring questions about private property is why it develops. Strongly influenced by a short article by economist Harold Demsetz, property scholars recently have analyzed the evolution of private property in economic and social terms, and described it as a response to factors such as changes in relative prices, measurement costs, and the size and heterogeneity of user groups. In this Article, Professor Katrina Wyman argues that Demsetzian-inspired accounts of the evolution of private property tend to neglect the role of the state in property rights formation. Building on the extensive scholarship about the evolution of property rights, she emphasizes the need to take seriously the implications of the political process by which private property often is formed.

To underscore her theoretical argument about the evolution of private property, Wyman also offers a case study of contemporary property rights formation. For over six decades, an international movement has been underway to enclose the oceans, including marine fisheries. Drawing on original research, Wyman examines why individual transferable quotas and similar instruments have been slow to develop in U.S. coastal fisheries in federal waters since national jurisdiction over fisheries was extended to 200 miles from the shore in 1976.

In closing, Wyman underscores the richness of Demsetz's pioneering account of private property and the scholarship that it has spawned. But she also suggests that there remains a large gap between how private property actually evolves and many of the prevailing theoretical understandings of the development of property rights.

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She argues in turn that filling this gap requires the development of a more robust positive theory of the evolution of private property that takes into account the political process through which private property often is formed, and more systematic empirical research into the development of property rights.

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INTRODUCTION

Almost forty years after it first was published, a short article by economist Harold Demsetz remains the touchstone for explaining why private property develops.¹ Demsetz's seminal article hypothesized that private property emerges within society from the bottom up, in response to underlying economic and social forces.² As he suc-

¹ Harold Demsetz, *Toward a Theory of Property Rights*, 57 AM. ECON. REV. 347, 347 (1967) [hereinafter Demsetz, *Toward*] (offering "some guidance for investigating the emergence of property rights"). Much has been written on the significance of Demsetz's 1967 article. See, e.g., ITAI SENED, *THE POLITICAL INSTITUTION OF PRIVATE PROPERTY* 34 (1997) ("One of the most influential neo-classical theor[ies] of the emergence of property rights is due to Harold Demsetz."); Thomas W. Merrill, *Introduction: The Demsetz Thesis and the Evolution of Property Rights*, 31 J. LEGAL STUD. S331, S331 (2002) ("The point of departure for virtually all efforts to explain changes in property rights is Harold Demsetz's path-breaking article, 'Toward a Theory of Property Rights.' The article is still widely cited and reproduced, especially in first-year property courses in law schools.") (citation omitted).

Demsetz recently offered "a more general theory of property rights" in Harold Demsetz, *Toward a Theory of Property Rights II: The Competition Between Private and Collective Ownership*, 31 J. LEGAL STUD. S653, S653 (2002) [hereinafter Demsetz, *Toward II*]. This more recent piece is fundamentally similar to Demsetz's 1967 article in that both characterize property rights as a response to underlying economic and social factors. See *id.* at S658-59.

² In labeling Demsetz's account a bottom-up account, I am drawing on similar distinctions between top-down and bottom-up stories in a range of sources. See ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* 137-40 (1991) (drawing on work of Oliver Williamson to discuss legal centralism and non-legal sources of control); KATHRYN FIRMIN-SELLERS, *THE TRANSFORMATION OF PROPERTY RIGHTS IN THE GOLD COAST: AN EMPIRICAL ANALYSIS APPLYING RATIONAL CHOICE THEORY* 7 (1996) (comparing state's supply and societal demand); Lee J. Alston & Pablo T. Spiller, *A Congressional Theory of Indian Property Rights: The Cherokee Outlet*, in *PROPERTY RIGHTS AND INDIAN ECONOMIES: THE POLITICAL ECONOMY FORUM* 85, 86 (Terry L. Anderson ed., 1992) (drawing distinctions between demand and supply); Lee J. Alston et al., *Toward an Understanding of Property Rights*, in *EMPIRICAL STUDIES IN INSTITUTIONAL CHANGE* 31, 31-33 (Lee J. Alston et al. eds., 1996) (same); David Feeny, *The Development of Property Rights in Land: A Comparative Study*, in *TOWARD A POLITICAL ECONOMY OF DEVELOPMENT: A RATIONAL CHOICE PERSPECTIVE* 272, 273-75 (Robert H. Bates ed., 1988) (offering demand and supply model); Terry L. Anderson & J. Bishop Grewell, *Property Rights Solutions for the Global Commons: Bottom-Up or Top-Down?*, 10 DUKE ENVTL. L. & POL'Y F. 73, 77-84 (1999) (discussing top-down property rights created by governments and bottom-up property rights formed through custom and common law); Robert Brooks et al., *Sudden Changes in Property Rights: The Case of Australian Native Title*, 52 J. ECON. BEHAV. & ORG. 427, 427-29 (2003) (comparing endogenous and exogenous views of emergence of property rights); Richard A. Epstein, *The Allocation of the Commons: Parking on Public Roads*, 31 J. LEGAL STUD. S515, S518 (2002) (distinguishing bottom-up and top-down systems of property). See generally, e.g., LEE J. ALSTON ET AL., *TITLES, CONFLICT, AND LAND USE: THE DEVELOPMENT OF PROPERTY RIGHTS AND LAND REFORM ON THE BRAZILIAN AMAZON FRONTIER* (1999) (drawing distinctions between demand and supply).

There is another typology that categorizes theories of the evolution of property rights based on whether the theories emphasize efficiency or distributional considerations as the cause of change. See, e.g., FIRMIN-SELLERS, *supra*, at 11-12; Stuart Banner, *Transitions*

cinctly stated, "It is my thesis . . . that the emergence of new property rights takes place in response to the desires of the interacting persons for adjustment to new benefit-cost possibilities."³ Demsetz also provided a now famous example to illustrate his hypothesis that private property develops through private ordering. Drawing on anthropological evidence, he argued that aboriginal peoples in the eighteenth century in what is now Canada developed family hunting territories in response to the growth of the commercial beaver fur trade. Until Europeans began purchasing furs to supply markets back home, beaver had little value, and aboriginal peoples hunted the animal on a limited scale for personal use. Demsetz hypothesized that hunting territories emerged after the value of beaver rose in response to greater demand from the fur trade, because the benefits of dividing up rights to beaver increased.⁴

Between Property Regimes, 31 J. LEGAL STUD. S359, S360 (2002) (contrasting Demsetz's efficiency-based theory with alternative, according to which "societies reallocate property rights when some exogenous political realignment enables a powerful group to grab a larger share of the pie"); Saul Levmore, *Property's Uneasy Path and Expanding Future*, 70 U. CHI. L. REV. 181, 184–86 (2003) [hereinafter Levmore, *Property's Uneasy Path*] (distinguishing efficiency and interest group theories of property rights); Saul Levmore, *Two Stories About the Evolution of Property Rights*, 31 J. LEGAL STUD. S421, S429–33 (2002) [hereinafter Levmore, *Two Stories*] (describing competing economic efficiency and interest group theories of evolution of property rights); Thomas W. Merrill, *Explaining Market Mechanisms*, 2000 U. ILL. L. REV. 275, 275–98 (2000) (distinguishing and then synthesizing wealth maximization and distributional theories for emergence of market mechanisms); Merrill, *supra* note 1, at S336 (discussing approach by other scholars of incorporating distributional considerations into Demsetz's model); Ning Wang, *The Coevolution of Institutions, Organizations, and Ideology: The Longlake Experience of Property Rights Transformation*, 29 POL. & SOC'Y 415, 417–20 (2001) (identifying and analyzing both economic and distributional theories).

³ Demsetz, *Toward*, *supra* note 1, at 350.

⁴ *Id.* at 351–53. Since Demsetz's article was published, there has been new research by anthropologists and others about the origins of the native hunting territories. See, e.g., Paul Nadasdy, "Property" and Aboriginal Land Claims in the Canadian Subarctic: Some Theoretical Considerations, 104 AM. ANTHROPOLOGIST 247, 249 (2002) (discussing debate over Algonquian land tenure); Henry E. Smith, *Semicommon Property Rights and Scattering in Open Fields*, 29 J. LEGAL STUD. 131, 143 (2000) (referring to work of John McManus in arguing that semicommons may have existed in Demsetz's example of family hunting territories). See generally Harvey A. Feit, *The Construction of Algonquian Hunting Territories: Private Property as Moral Lesson, Policy Advocacy, and Ethnographic Error*, in 7 HISTORY OF ANTHROPOLOGY: COLONIAL SITUATIONS 109 (George W. Stocking, Jr. ed., 1991) (providing historical analysis of Frank Speck's anthropological work studying Algonquian hunting territories); Colloquium, *Who Owns the Beaver? Northern Algonquian Land Tenure Reconsidered*, 28 ANTHROPOLOGICA 7 (1986) (discussing history of debate and disagreements in field of Algonquian land tenure in light of recent developments, such as more intensive regional, ethnographic, and historical studies); Ann M. Carlos & Frank D. Lewis, *Property Rights, Competition, and Depletion in the Eighteenth-Century Canadian Fur Trade: The Role of the European Market*, 32 CAN. J. ECON. 705 (1999) (examining causes of depletion of beaver in certain areas after advent of European fur trade); Harvey A. Feit, *Les territoires de chasse algonquiens avant leur*

What Demsetz neglected to specify is the mechanism by which the underlying economic and social forces he identified as the impetus for the development of private property ultimately are translated into individual rights. Instead, his article simply implied that “interacting persons” somehow agree spontaneously to establish private property.⁵ Consistent with his silence on the mechanism for change, Demsetz does not stop to ponder how the aboriginal communities he discusses allocated hunting territories among family units. He merely assumes that communities agreed to do so as the value of beaver increased.⁶ In eliding an explanation of the process which gives rise to new property rights arrangements, Demsetz’s article shares a failing common to functional accounts of institutional change in general: It assumes that demand generates its own supply.⁷

‘découverte’? *Études et histoires sur l’épuisement du gibier, les incendies de forêt et la sociabilité de la chasse*, 34 RECHERCHE AMÉRINDIENNES AU QUÉBEC (forthcoming 2004) [hereinafter Feit, *Les territoires*] (arguing that Algonquian hunting territories could have existed before arrival of Europeans).

In a forthcoming article, anthropologist Harvey Feit reviews the scholarship on the origins of the hunting territories and indicates that their origins remain a matter of debate. According to Feit, he and others suggest that the territories predated contact with Europeans, while other scholars maintain that the territories resulted from this contact. Feit, *Les territoires*, *supra*, at 1.

⁵ Demsetz, *Toward*, *supra* note 1, at 350. Multiple sources emphasize Demsetz’s lack of attention to the mechanism by which property rights evolve. See, e.g., Banner, *supra* note 2, at S360 (speculating on mechanism); Epstein, *supra* note 2, at S519 (noting that Demsetz’s account “offers only before and after snapshots of the system of property relations, which ignores the gory details of transition”); James E. Krier, *The Tragedy of the Commons, Part Two*, 15 HARV. J.L. & PUB. POL’Y 325, 338 (1992) (arguing that Demsetz “implicitly” assumes “that a community plagued by noncooperation can improve its condition by cooperating”); Merrill, *supra* note 1, at S336 (describing Demsetz’s theory as offering “before-and-after snapshots of a society in which changes in relative resource values give rise to changes in property institutions”); Richard A. Posner, *Some Uses and Abuses of Economics in Law*, 46 U. CHI. L. REV. 281, 289 (1979) (noting, in discussion of efficiency hypothesis, that Demsetz discusses evolution of private property without describing mechanism by which it emerges, or why it does so); Carol M. Rose, *Property as Storytelling: Perspectives from Game Theory, Narrative Theory, Feminist Theory*, 2 YALE J.L. & HUMAN. 37, 51 (1990) (arguing that classical property theorists use narratives “to slide smoothly over the cooperative gap”).

Demsetz himself has recognized the limits of his 1967 article. See Krier, *supra*, at 339 n.44 (noting that, when contradiction in his article was mentioned, Professor Demsetz replied, “That’s why I called it ‘Toward a Theory of Property Rights’”).

⁶ Demsetz, *Toward*, *supra* note 1, at 352.

⁷ See Robert O. Keohane, *Governance in a Partially Globalized World: Presidential Address, American Political Science Association, 2000*, 95 AM. POL. SCI. REV. 1, 4 (2001) (offering general warning about “[t]he inadequacy of functional theories”). Above, I paraphrase Keohane’s statement that “[o]ne can imagine a simple functional theory of global institutions by which the demand for governance, generated by globalism, creates its own supply.” *Id.* at 4. Demsetz’s explanation also might be described as an “invisible hand explanation” for the transformation of property rights. See ROBERT NOZICK, *ANARCHY, STATE AND UTOPIA* 18–22 (1974) (discussing invisible hand explanations).

In the decades since the publication of Demsetz's article, scholars have attempted to fill the void left by its silence on the mechanism for establishing private property. Some theorists have continued to assume that private property largely is created from the bottom up, in response to underlying economic and social conditions. In defense of this notion, game-theoretic accounts have been offered to establish that private property may emerge spontaneously within society.⁸ But these accounts ultimately do not offer a generalizable, positive explanation for the emergence of private property because they typically are premised on strong assumptions, often assuming away, for example, the fact that private parties typically interact in the presence of a state.⁹

Other scholars have departed from Demsetz's implicit premise that private property is created endogenously within society and suggested instead that it is the product of a political process.¹⁰ But even

⁸ See, e.g., Robert C. Ellickson, *Property in Land*, 102 YALE L.J. 1315, 1320–21, 1321 n.19, 1365–66 (1993) (offering positive economic theory about evolution of property rights similar to Demsetz's that relies on repeat play, although predicting only "close-knit groups" of repeat players will develop "cost-minimizing" property arrangements).

⁹ In addition to assuming away the state, game-theoretic explanations that point to repeat play within society to account for private property also may make assumptions about the ease of interpersonal communication that do not apply in modern societies characterized by high levels of market exchange. Moreover, it is unclear that many societies in the past provided opportunities for repeat play sufficient to enforce a private property regime, given historical limitations on communications and transportation infrastructure.

For overviews of the potential and the limits of game-theoretic explanations for the origins of private property, see THRAINN EGGERTSSON, *ECONOMIC BEHAVIOR AND INSTITUTIONS* 299–301 (1990), who describes the suitability of game theory in modeling different factual situations, and SENED, *supra* note 1, at 67–73, who discusses game-theoretic approaches. See also AVINASH K. DIXIT, *LAWLESSNESS AND ECONOMICS: ALTERNATIVE MODES OF GOVERNANCE* 20, 150–52, 154 (2004) (referring to difficulties of modeling institutional change in game-theoretic terms).

¹⁰ See JEAN ENSMINGER, *MAKING A MARKET: THE INSTITUTIONAL TRANSFORMATION OF AN AFRICAN SOCIETY* 123–42 (1992) (emphasizing role of politics in discussing evolution of Orma property rights); SHAWN EVERETT KANTOR, *POLITICS AND PROPERTY RIGHTS: THE CLOSING OF THE OPEN RANGE IN THE POSTBELLUM SOUTH* 128–43 (1998) (tracing political process by which livestock enclosure was accomplished in postbellum Georgia); SENED, *supra* note 1, at 1 (arguing that property rights are created through political process); Gary D. Libecap, *Distributional Issues in Contracting for Property Rights*, 145 J. INST. & THEORETICAL ECON. 6, 7 (1989) ("Property rights are political institutions."); Robert P. Merges, *Intellectual Property Rights and the New Institutional Economics*, 53 VAND. L. REV. 1857, 1868 (2000) ("What Demsetz omitted, of course, was politics. Only governments can grant property rights."). See generally ALSTON ET AL., *supra* note 2 (emphasizing political character of rights in examining evolution of property rights in Brazilian Amazon frontier); EGGERTSSON, *supra* note 9 (emphasizing limits of attempting to explain property rights without addressing political considerations); GARY D. LIBECAP, *CONTRACTING FOR PROPERTY RIGHTS* (1989) (characterizing property as determined through political process); Alston & Spiller, *supra* note 2 (using demand and supply-side framework to examine evolution of Indian property rights); Alston et al., *supra* note 2

these scholars often have remained heavily influenced by Demsetz and have tended to portray that political process as functioning much like market ordering, in which rights are rearranged through voluntary contracting between affected parties.¹¹ Analyzing the political arena as if it were a market overlooks the fact that the political context involves fundamentally different decisionmaking rules and attendant differences in the conditions auspicious for institutional change.¹²

In particular, the market and political contexts differ about whether decisions are made unanimously. While directly affected parties must agree to rearrange rights through market transactions, many directly affected parties may not be consulted personally when rights are rearranged through political processes, let alone given a veto over the decision to change.¹³ Since the political process does not require unanimity to proceed, it is important, in determining the probability of change, to analyze the expected distribution of the benefits and costs of private property among the influential interest groups who

(noting that property rights typically are created by governments); Epstein, *supra* note 2 (distinguishing bottom-up and top-down systems of property rights).

Just as game theory has been used to explain the emergence of private property within society, so it also has been used in political process accounts of the evolution of property rights. When political accounts are modeled, however, the players are, or include, political actors, rather than simply private parties. See generally SENED, *supra* note 1 (deploying game theory in offering political process account of formation of property rights). Moreover, political process accounts not framed in game-theoretic terms might be modeled in this way. See DIXIT, *supra* note 9, at 127 (arguing that Libecap's political process account of property rights formation "support[s] the results of the theory of repeated games"); ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* 23 (1990) ("In the most general sense, all institutional arrangements can be thought of as games in extensive form.").

¹¹ See, e.g., LIBECAP, *supra* note 10, at 4, 10, 16, 28 (arguing that property is determined through political process); *id.* at 4, 11 (using "contracting" to describe efforts to modify property rights by private individuals and through political negotiations); *id.* at 9–28 (offering single analytical framework for examining private and political contracting over property rights); *id.* at 11–12 (implying that proposed changes in property rights must be Pareto superior in suggesting that "[t]he bargaining parties must see their welfare improved or at least made no worse off"); Libecap, *supra* note 10, at 7, 10 (similarly defining contracting as "private, intragroup negotiations" and lobbying of "government officials"). But see Libecap, *supra* note 10, at 10–12 (implying that unanimity, or less than unanimity, may be required to rearrange property rights).

¹² For a similar warning about the dangers of analogizing government and private actors in a different context, see generally Daryl J. Levinson, *Making Government Pay: Markets, Politics, and the Allocation of Constitutional Costs*, 67 U. CHI. L. REV. 345 (2000), who argues that governments differ from private firms in that governments respond to votes rather than dollars and emphasizes the significance of this insight for constitutional remedies.

¹³ In describing the decisionmaking rule in the market, I do not intend to deny the existence of externalities.

are likely to be consulted.¹⁴ The different decisionmaking rules at work in the political process also cast into doubt the conventional wisdom about the variables most conducive to rearranging property rights, such as low measurement costs,¹⁵ excessive levels of resource utilization,¹⁶ and small numbers of homogeneous resource users.¹⁷ Moreover, recognizing the significance of political decisionmaking rules underscores the need to examine these rules closely in any particular context as variations in them may affect the success of rearranging rights. In particular, the more the collective-choice rules tend toward mandating the unanimity of the affected parties to alter rights in the market, the more difficult it may be to rearrange rights politically.¹⁸

Building on existing scholarship about the evolution of property rights, this Article underscores the political character of the process through which private property typically is established and considers the implications of that political decisionmaking process for positive theories about the emergence of private property. The state's role in supplying property through the political process is apparent historically.¹⁹ It is even more readily observable in the modern administra-

¹⁴ See *infra* Parts I.B.1 & II.C.2.a.

¹⁵ See *infra* Parts I.B.2 & II.C.2.b.

¹⁶ See *infra* Parts I.B.3 & II.C.2.c. For simplicity, this Article uses the term "resource" to refer to goods and resources generally.

¹⁷ See *infra* Parts I.C.1 & II.C.3.a (discussing heterogeneity); *infra* Parts I.C.2 & II.C.3.b (discussing group size).

¹⁸ See *infra* Parts I.A & II.C.1.

¹⁹ See generally FIRMIN-SELLERS, *supra* note 2 (describing evolution of property rights in Ghana under British rule); KANTOR, *supra* note 10 (tracing history of livestock enclosure in postbellum Georgia); Fred S. McChesney, *Government As Definer of Property Rights*, in PROPERTY RIGHTS AND INDIAN ECONOMIES: THE POLITICAL ECONOMY FORUM 109 (Terry L. Anderson ed., 1992) [hereinafter McChesney, *Government As Definer*] (examining history of U.S. policy of allotment in force between 1887 and 1934); Fred S. McChesney, *Government As Definer of Property Rights: Tragedy Exiting the Commons?*, in PROPERTY RIGHTS: COOPERATION, CONFLICT, AND LAW 227 (Terry L. Anderson & Fred S. McChesney eds., 2003) [hereinafter McChesney, *Tragedy Exiting*] (using various examples in discussing government's role in creating property rights); Alston & Spiller, *supra* note 2 (discussing evolution of property rights in Cherokee Outlet in Oklahoma during nineteenth century); Zeynep K. Hansen & Gary D. Libecap, *Small Farms, Externalities, and the Dust Bowl of the 1930s*, 112 J. POL. ECON. 665 (2004) (analyzing causes of Dust Bowl in 1930s); Sumner J. La Croix, *Property Rights and Institutional Change During Australia's Gold Rush*, 29 EXPLORATIONS ECON. HIST. 204 (1992) (describing gold rush in nineteenth-century Australia); Sumner J. La Croix & James Roumasset, *The Evolution of Private Property in Nineteenth-Century Hawaii*, 50 J. ECON. HIST. 829 (1990) (describing property rights in Hawaiian land); Frank A. Sharman, *An Introduction to the Enclosure Acts*, 10 J. LEGAL HIST. 45 (1989) (describing enclosure in England).

tive state.²⁰ Indeed, many of the liveliest contemporary debates concerning property rights are about whether to create private rights in resources traditionally owned by the public through the state, such as air, water, fisheries and public lands.²¹

In this Article, I offer theoretical and empirical arguments for reorienting prevailing positive theories of the evolution of property rights to reflect the significance of the decisionmaking rules in the political process by which private property typically is formed. I begin by identifying a framework for analyzing the effect of decisionmaking rules on the probability of change. Then I isolate five standard hypotheses about why private property develops, drawing on a wide range of scholarship, especially the work of economist Gary Libecap, Demsetz's most sophisticated successor. Although much evolution of property scholarship is about the allocation of property in organized societies rather than the state of nature,²² it nonetheless undervalues the political dimension of property rights formation. I recast the five standard hypotheses to reflect the effects of decisionmaking rules in the political process.

To underscore my theoretical arguments about why property rights evolve, I offer a case study of contemporary property rights formation. Reflecting Demsetz's use of property rights formation in beaver to illustrate his hypothesis, there is a strong emphasis in the evolution of property rights scholarship on the development of private property in natural resources. My case study examines why individual tradable rights have been slow to evolve in U.S. coastal fisheries in

²⁰ See SENED, *supra* note 1, at 155–77 (discussing private property rights in airport landing slots); Merges, *supra* note 10, at 1867 (noting that property rights are created by state in discussing theoretical approaches relevant to intellectual property rights). See generally ALSTON ET AL., *supra* note 2 (discussing role of federal and state agencies in evolution of property rights in Brazilian Amazon frontier during recent decades); James Boyle, *The Second Enclosure Movement and the Construction of the Public Domain*, 66 LAW & CONTEMP. PROBS. 33 (2003) (discussing intellectual property rights); Epstein, *supra* note 2 (discussing parking permits); Thomas W. Hazlett, *Assigning Property Rights to Radio Spectrum Users: Why Did FCC License Auctions Take 67 Years?*, 41 J.L. & ECON. 529 (1998) (discussing spectrum access rights); Michael A. Heller, *The Tragedy of the Anticommons: Property in the Transition from Marx to Markets*, 111 HARV. L. REV. 621 (1998) (discussing post-Communist property transitions and other contexts).

²¹ See, e.g., James L. Huffman, *The Inevitability of Private Rights in Public Lands*, 65 U. COLO. L. REV. 241 (1994) (suggesting that debates about allocating access to public lands inevitability are about distributing benefits to private interests); see also *infra* note 95 (citing sources advocating tradable environmental allowances in various natural resources).

²² This includes Demsetz's pioneering article, which explicitly notes that its hypothesis is relevant to the emergence of property in "Western societies." Demsetz, *Toward*, *supra* note 1, at 350.

federal coastal waters since national jurisdiction over fisheries was extended to 200 miles from the shore in 1976.²³

For over six decades, an international movement has been underway to enclose the oceans. This enclosure movement has progressed in a series of waves, reminiscent of the famous enclosures of English common lands.²⁴ In the first wave, countries began claiming national property rights over ever-larger expanses of the oceans, including marine fisheries, after the end of the Second World War.²⁵ Then countries began subdividing national property rights in fisheries domestically into smaller-scale communal regimes in a second wave of enclosures.²⁶ For over thirty years, economists and others have been advocating a third wave of enclosure through the creation of individual tradable rights.²⁷ To date, however, the advo-

²³ This Article uses various terms to refer to individual transferable quotas and analogous instruments, including individual quotas, individual rights, individual tradable rights and tradable rights. I define individual transferable quotas and analogous instruments *infra* note 127. Except where warranted by the context, I do not use the term individual fishing quota. A defined term in U.S. fisheries regulation, individual fishing quota may refer to permits which are not tradable. See 16 U.S.C. § 1802(21) (2000) (defining individual fishing quota). For clarity, I do not consider limited entry licenses to be equivalent to individual transferable quotas and they are not among the rights whose evolution in fisheries is examined empirically in this Article. See *infra* text accompanying notes 91–92 (discussing concept of limited entry).

²⁴ See *infra* note 84 and accompanying text for further discussion of the parallel between the enclosure of land and of the oceans.

²⁵ See *infra* notes 86–89 and accompanying text for further discussion of the extension of national jurisdiction.

²⁶ See *infra* notes 90–92 and accompanying text for further discussion of the federal creation of communal regimes within the United States.

²⁷ See *infra* note 94 for sources addressing the intellectual history of individual transferable quotas, *infra* notes 95–97 and accompanying text for descriptions of the concept of individual transferable quotas and *infra* notes 99–105 and accompanying text for an overview of the normative arguments in support of individual transferable quotas.

Notably, fisheries played a prominent role in the intellectual development of the normative economic thesis that private property is often the most efficient method of allocating resources. In particular, observations about fisheries were employed in the initial efforts to formalize the economic diagnosis of the problems with common-pool resources. These are resources from which it is difficult to exclude others, and which are subtractable, meaning that use by one person diminishes the amount available for others. See, e.g., LIBECAP, *supra* note 10, at 12 (noting that “classic articles outlining common pool problems . . . are built around open access fisheries”); William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1, 8 (2003) (referring to “the classic common pool resources of fisheries”); Thomas Dietz et al., *The Drama of the Commons*, in *THE DRAMA OF THE COMMONS* 3, 9 (Elinor Ostrom et al. eds., 2002) (“The influential work of Gordon (1954) and Schaefer (1957) drew attention to the economic factors in the management of one type of common-pool resource—fisheries.”); Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J. 1, 32 n.124 (2000) (citing sources discussing fisheries in tracing history of scholarly inquiry into problems of common-pool resources); Carol M. Rose, *Environmental Controls: Management Strategies for Common Resources*,

cates of individual transferable quotas have met with only limited success.

This Article is the first attempt to analyze comprehensively the pattern of individual tradable rights formation in U.S. coastal fisheries in federal waters since national jurisdiction was extended to 200 miles in 1976. It is also the first attempt to explain that pattern in terms of the various theories accounting for the evolution of private property.²⁸ Thus, this Article aims to contribute to the positive scholarship about property rights on both empirical and theoretical levels.

The remainder of this Article is divided into two Parts. Part I discusses in theoretical terms why private property rights evolve. Part II offers the case study of individual tradable rights formation in U.S. federal coastal fisheries as a vehicle for testing the theoretical claims advanced in Part I. The Article concludes by discussing the need to develop and to test systematically more robust theories that reflect the political character of property rights formation.

I

THEORETICAL ANALYSIS OF WHY PRIVATE PROPERTY RIGHTS DEVELOP

Harold Demsetz squarely located the impetus for establishing individual property rights in private ordering.²⁹ “[T]he emergence of

1991 DUKE L.J. 1, 3 n.5 (1991) (“The idea of the tragedy of the commons may have had its beginnings with the study of fishing.”). Even Coase addressed the problems with common-pool resources in the context of fisheries. See R.H. Coase, *Discussion*, in *ECONOMICS OF FISHERIES MANAGEMENT: A SYMPOSIUM* 60–61 (A.D. Scott ed., 1970) (briefly commenting on paper about fisheries).

²⁸ The closest project I have found is a political science Ph.D. dissertation that Professor Robert Keohane recently brought to my attention: Frank Alcock, *Bargaining, Uncertainty and Property Rights in North Atlantic Fisheries* (2003) (unpublished Ph.D. dissertation, Duke University) (on file with the *New York University Law Review*). The scope of Alcock’s project is different. He attempts to explain the development of property rights in fisheries in Iceland, Norway, Atlantic Canada and New England since the creation of Exclusive Economic Zones (EEZs).

In addition, Alcock implicitly approaches the subject largely from a bottom-up perspective, focusing primarily on the implications of uncertainty among fishers about the distributional consequences of rearranging property rights and industry heterogeneity, especially the degree of vertical integration of harvesting and processing operations. See *id.* at 5–7.

²⁹ See, e.g., *SENED*, *supra* note 1, at 35 (“Demsetz’s argument does not assign any role for governments in the evolution and maintenance of property rights.”); James E. Krier & W. David Montgomery, *Resource Allocation, Information Cost and the Form of Government Intervention*, 13 NAT. RESOURCES J. 89, 102 (1973) (“Demsetz suggests that within the realm of the private market, institutions will naturally develop such that private bargains will work to allocate resources as efficiently as possible, since all bargains in which gains from trade exceed the costs of realizing them will take place.”). But see Harold Demsetz, *Some Aspects of Property Rights*, 9 J.L. & ECON. 61, 62 (1966) (referring to

new property rights,” he argued, “takes place in response to the desires of interacting persons for adjustment to new benefit-cost possibilities.”³⁰ Since the publication of Demsetz’s hypothesis, many scholars have offered similar largely endogenous accounts of the origins of private property, pointing to underlying economic and social conditions as the primary drivers of change.³¹

possibility that government might play role in deciding “which individuals possess what property rights” and protecting property rights, although also suggesting these functions could be performed by courts or private individuals themselves, respectively).

³⁰ Demsetz, *Toward*, *supra* note 1, at 350.

³¹ Many examples of bottom-up accounts of private property echo Demsetz’s account to varying degrees. See generally LIBECAP, *supra* note 10 (offering framework for analyzing why property rights evolve and four case studies about evolution of property rights in natural resources); C. Leigh Anderson & Eugene Swimmer, *Some Empirical Evidence on Property Rights of First Peoples*, 33 J. ECON. BEHAV. & ORG. 1 (1997) (considering access rights among indigenous peoples); Terry L. Anderson & P.J. Hill, *The Evolution of Property Rights: A Study of the American West*, 18 J.L. & ECON. 163 (1975) (elaborating and testing theory in context of property rights development in American Great Plains); David E. Ault & Gilbert L. Rutman, *Land Scarcity, Economic Efficiency, and African Common Law*, 12 RES. L. & ECON. 33 (1989) (arguing that, while common law evolved efficient rules as land became more scarce in British-ruled areas of Africa, governments did not consistently adopt wealth-maximizing rules); Robert D. Cooter, *Inventing Market Property: The Land Courts of Papua New Guinea*, 25 L. & SOC’Y REV. 759 (1991) (implicitly endorsing largely economic account of why property evolves); Ellickson, *supra* note 8 (offering modified version of Demsetzian hypothesis, arguing that close-knit groups evolve cost-minimizing land regimes); Gershon Feder & David Feeny, *Land Tenure and Property Rights: Theory and Implications for Development Policy*, 5 WORLD BANK ECON. REV. 135, 138–39 (1991) (using Thailand as example for argument that property rights in land evolve as scarcity increases); Hannes H. Gissurarson, *Non-Exclusive Resources and Rights of Exclusion: Private Property Rights in Practice*, 13 JOURNAL DES ECONOMISTES ET DES ETUDES HUMAINES 119 (2003) (explaining emergence of private property as function of demand and political support); D. Bruce Johnsen, *The Formation and Protection of Property Rights Among the Southern Kwakiutl Indians*, 15 J. LEGAL STUD. 41 (1986) (arguing that Kwakiutl potlaching was designed to protect exclusive fishing rights); Ronald N. Johnson & Gary D. Libecap, *Contracting Problems and Regulation: The Case of the Fishery*, 72 AM. ECON. REV. 1005 (1982) (examining persistence of common property in Texas shrimp fishery); La Croix, *supra* note 19 (examining formation of property rights in gold in Australia during gold rush of 1850s); Clarisa Long, *Information Costs in Patent and Copyright*, 90 VA. L. REV. 465 (2004) (examining copyright and patent law through lens of information costs); Merrill & Smith, *supra* note 27 (arguing that there are limited number of forms of property rights because standardization reduces measurement costs); Svetozar Pejovich, *Towards an Economic Theory of the Creation and Specification of Property Rights*, 30 REV. SOC. ECON. 309 (1972) (offering theory similar to Demsetz’s, although referring more explicitly to behavior of state); Leonid Polishchuk & Andrei Savvateev, *Spontaneous (Non)emergence of Property Rights*, 12 ECON. TRANSITION 103 (2004) (arguing that secure property rights have not developed in Russia because of inadequate support from below, particularly lack of support from wealthy owners); Andrzej Rapaczynski, *The Roles of the State and the Market in Establishing Property Rights*, 10 J. ECON. PERSP. 87 (1996) (arguing that property rights emerge in response to market demand); Kal Raustiala & David G. Victor, *The Regime Complex for Plant Genetic Resources*, 58 INT’L ORG. 277 (2004) (offering Demsetzian account of property rights formation); Rose, *supra* note 27 (offering evolutionary account of environmental law); Henry

This Article takes the opposite starting point, arguing that understanding why private property does or does not develop requires focusing first on the collective-choice rules for establishing private property and then turning to underlying economic and social forces. I begin this Part by identifying a framework for thinking about the influence of political institutions on the timing of the introduction of private property. Then I examine two categories of hypotheses about the evolution of property rights: hypotheses that focus on the economic and physical attributes of resources, and hypotheses concerned with the characteristics of resource users.³² In discussing the various hypotheses, I reframe them to reflect the impact of the distinctive collective-choice rules in the political arena on property rights formation.

A. Political Institutions

Political institutions influence the timing of the development of property rights because they affect the costs of decisionmaking. Although not immune to economic and social forces, political institutions nonetheless tend to become stable over time, especially if there

E. Smith, *The Language of Property: Form, Context, and Audience*, 55 STAN. L. REV. 1105 (2003) (analogizing property law to language and arguing that both reflect concern with reducing information processing costs); Robert Sugden, *Spontaneous Order*, 3 J. ECON. PERSP. 85 (1989) (suggesting that property may arise spontaneously); Symposium, *The Evolution of Property Rights*, 31 J. LEGAL STUD. S331 (2002) (collecting papers from conference at Northwestern University School of Law reconsidering Demsetz's hypothesis about evolution of property rights); John Umbeck, *Might Makes Rights: A Theory of the Foundation and Initial Distribution of Property Rights*, 19 ECON. INQUIRY 38 (1981) (offering economic theory of formation of property rights constrained by violence); Janet T. Landa, *A Bioeconomics-Public Choice Theory of Property Rights: Sago Palms as Private Property Among the Melanau of Sarawak* (Sept. 13, 2004) (unpublished manuscript, on file with the *New York University Law Review*) (offering theory of property rights in sago palms based on bioeconomics and public choice theory).

Several sources provide overviews of the scholarship on the emergence of property rights. See EGGERTSSON, *supra* note 9, at 247–80 (describing emergence of property rights in both “naive” and interest group models); EIRIK G. FURUBOTN & RUDOLF RICHTER, *INSTITUTIONS AND ECONOMIC THEORY: THE CONTRIBUTION OF THE NEW INSTITUTIONAL ECONOMICS* 104–20 (1997) (analyzing evolution of property rights scholarship); SENED, *supra* note 1, at 33–50 (discussing failure of neo-classical theories of origin of property rights to incorporate political aspects of market interactions, to recognize distinction between performance and structure of economy, and to consider strategic aspects of interaction among agents); Dean Lueck & Thomas J. Miceli, *Property Rights and Property Law*, in *HANDBOOK OF LAW AND ECONOMICS* (A. Mitchell Polinsky & Steven Shavell eds.) (forthcoming) (manuscript at 21–25) (examining scholarship about determinants of evolution of property rights), at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=578323 (last visited Jan. 1, 2005); Merges, *supra* note 10, at 1867–72 (discussing scholarship about evolution of property rights since Demsetz).

³² The separation of hypotheses about the attributes of resources from hypotheses about the characteristics of resource users reflects William Buzbee's criticism of the tragedy of the commons literature for focusing solely “on the underlying relationship between the resource and those who utilize the resource.” Buzbee, *supra* note 27, at 29.

are significant constitutional or other impediments to changing them.³³

In analyzing the importance of the political institutions through which private property typically is established, it is useful to keep in mind three archetypal decisionmaking rules. The first, analogous to

³³ See OSTROM, *supra* note 10, at 50–54 (distinguishing and ranking three categories of decisionmaking rules based on difficulty of changing them).

Although the impact of political institutions on the formation of private property is not well developed, there are many references to institutions in the evolution of property rights scholarship. See ALSTON ET AL., *supra* note 2, at 19 (discussing impact of “multiple, competing government agencies” on supply of property rights); WILLIAM A. FISCHER, *REGULATORY TAKINGS: LAW, ECONOMICS, AND POLITICS* 218–52 (1995) (discussing paralysis in land use development in California in 1970s); KANTOR, *supra* note 10, at 14–16, 38–112, 128–43 (underscoring significance of voting rules for probability of property rights formation in discussing referenda requiring majority approval to adopt livestock enclosure in postbellum Georgia); LIBECAP, *supra* note 10, at 108–14 (considering implications of voting rules established by governments for extent of oil field unitization by private firms); Alston & Spiller, *supra* note 2, at 86–89, 99–102 (emphasizing importance of composition of congressional committees for changes in property rights of Cherokees in nineteenth century); Alston et al., *supra* note 2, at 33 (briefly referring to “institutional features of representative governments” that may delay changes in property rights and discussing example of U.S. congressional committees); Barry C. Field, *The Evolution of Property Rights*, 42 KYKLOS 319, 335–40 (1989) (discussing significance of political institutions for property rights arrangements without addressing significance of voting rules); Michael A. Heller, *The Boundaries of Private Property*, 108 YALE L.J. 1163, 1186–87 (1999) (arguing that “empowering too many jurisdictional bodies . . . can create a tragedy of the anticommons” that blocks change); Heller, *supra* note 20, at 679 n.259 (noting that, in land use, “permitting processes with multiple layers of state and local agency approvals could create a ‘planning anticommons’” (citing WILLIAM A. FISCHER, *THE ECONOMICS OF ZONING LAWS: A PROPERTY RIGHTS APPROACH TO AMERICAN LAND USE CONTROLS* 224–26 (1985))); Merges, *supra* note 10, at 1868 (“The translation of changed conditions into property rights thus takes place only through the mediation of political institutions.”).

The importance of collective-choice rules is better recognized in environmental law scholarship than in the origins of property rights scholarship. For example, building on Buchanan and Tullock’s work, Jonathan Wiener argues that the voluntary assent, or unanimity, voting rule required to adopt international environmental regulation influences both what instruments should be used internationally and the actual content of global regulation. See generally Jonathan Baert Wiener, *Global Environmental Regulation: Instrument Choice in Legal Context*, 108 YALE L.J. 677 (1999); Jonathan Baert Wiener, *On the Political Economy of Global Environmental Regulation*, 87 GEO. L.J. 749 (1999).

Without expressly invoking the concept of decisionmaking rules, other scholars have suggested that the fragmented process through which U.S. environmental policy is established affects what instruments should be used to address concerns such as air pollution. See Richard B. Stewart, *Madison’s Nightmare*, 57 U. CHI. L. REV. 335, 353–54 (1990). For a discussion of the role that fragmented institutions may play in delaying domestic environmental policy reform, see generally Buzbee, *supra* note 27, who notes that fragmented legislative and regulatory institutions contribute to the neglect of environmental harms, as fragmentation reduces the incentive for regulators to address them and creates uncertainty about where to turn among interest groups demanding regulation, and Daniel C. Esty, *Next Generation Environmental Law: A Response to Richard Stewart*, 29 CAP. U. L. REV. 183, 192 (2001), who briefly notes that environmental regulatory reform has been delayed in the United States because the “political system” has a “structural bias . . . in favor of the status quo.”

the prevailing marketplace rule, requires the unanimous agreement of the parties affected before a shift in property rights regimes may proceed. This rule typically will generate very high decisionmaking costs when there are many potentially affected parties because a requirement of unanimity maximizes the number of actors who can bargain strategically to obtain a larger share of the gains associated with shifting to private property.³⁴ The second is a majoritarian decisionmaking rule. It could require either a simple or a qualified majority. Decisionmaking costs likely will decline the more the rule approximates simple majoritarianism because fewer actors have opportunities to bargain strategically for a bigger share of the benefits of private property. The third decisionmaking rule is a unitary rule under which a single actor decides. While decisionmaking costs likely will be lowest under this rule, concentrating authority in a single actor may lead to less efficient decisions unless that actor is exceptionally benevolent and well informed.³⁵

³⁴ See Heller, *supra* note 20, at 639 (noting one party's ability to block change when unanimity is required); *id.* at 627, 635 (describing "paradigm of an anticommons" in which multiple owners whose unanimous agreement is required to use Moscow storefront "are a wide variety of state and quasi-state organizations"). Heller refers to other examples in which the multiple owners whose consent is required to rearrange property rights under the market rule of unanimity seem to be private actors. See *id.* at 679 n.259 (discussing intellectual property); *id.* at 684–85 (discussing urban redevelopment in Kobe, Japan).

³⁵ JAMES M. BUCHANAN & GORDON TULLOCK, *THE CALCULUS OF CONSENT: LOGICAL FOUNDATIONS OF CONSTITUTIONAL DEMOCRACY* 63–69 (1962); see also HENRY HANSMANN, *THE OWNERSHIP OF ENTERPRISE* 39–44 (1996) (discussing costs of collective decisionmaking); ELINOR OSTROM, *SELF-GOVERNANCE AND FOREST RESOURCES* 4 (Ctr. for Int'l Forestry Research, Occasional Paper No. 20, 1999) (identifying four collective-choice rules and arguing that applicable rule affects "whether an institutional change . . . will occur"); Michael J. Trebilcock, *Communal Property Rights: The Papua New Guinean Experience*, 34 U. TORONTO L.J. 377, 406–10 (1984) (discussing advantages and disadvantages of various decisionmaking rules).

In their simplest form, decisionmaking costs include the costs of gathering information about possible changes in property rights and deliberating about these changes. A more diffuse decisionmaking process should impose greater informational and deliberation costs because of the greater number of actors whose information needs must be satisfied and the time that multiple actors may spend considering an issue. More insidiously, decisionmaking costs also include the costs arising from the strategic behavior to which different collective-choice processes give rise. Decisionmaking processes involving multiple decisionmaking bodies likely provide greater opportunities for individual parties to delay changes in property rights by providing institutional structures for revisiting decisions. In addition, because more diffuse processes offer greater opportunities for blocking change, they may enhance the ability of opponents of change to extract side payments. The strategic costs engendered by revisiting decisions or extracting side payments also could be considered the consequence of the costs of gathering information, as these costs might be characterized as a byproduct of asymmetric information. For discussions of decisionmaking costs, see, for example, BUCHANAN & TULLOCK, *supra*, at 68–69 (discussing decisionmaking costs under varying circumstances); HANSMANN, *supra*, at 41–42 (describing costly inefficiencies that arise from collective-choice process); see also PETER S. MENELL &

Demsetzian accounts of the emergence of private property implicitly assume that the rearrangement of property rights occurs under the first decisionmaking rule, which requires the unanimous agreement of the private parties that would be affected by the change. This presumption reflects the decentralized, bottom-up orientation of these accounts, in which property rights are created through private interactions, without the intervention of a third party with a monopoly on the use of force. In bottom-up accounts, creating private property is a voluntary exercise analogous to a market transaction and therefore similarly susceptible to individual holdouts.

In practice, however, the collective-choice rules for altering property rights rarely require unanimity among the affected parties. There are notable examples of tribal societies in which leaders were influenced in their allocation of resources more by prominent members of the community than by the community as a whole.³⁶ The rarity of a unanimity requirement is even more apparent in the contemporary administrative state, in which government often becomes involved in a policy area precisely because private parties were unable to reach an acceptable agreement on their own. When an administrative agency or legislature makes a determination about whether to establish pri-

RICHARD B. STEWART, ENVIRONMENTAL LAW AND POLICY 61-62 (1994) (discussing opportunism as form of transaction cost).

The costs of reaching a decision should be distinguished from the costs resulting from an inefficient decision. To distinguish the two forms of costs, consider the example of a decision on the total allowable amount of fish that can be caught in a particular geographic area. The process of reaching the decision may be costly if every fisher is required to agree on the allowable level of the catch. Separately, however, the decision may give rise to what Buchanan and Tullock label external costs if, for example, the allowable catch is set too high and fishers are permitted to overfish and thereby to threaten the long-term health of the resource. These costs would be external to the fishers making the decision if the costs would be assumed by future generations of fishers. BUCHANAN & TULLOCK, *supra*, at 63-68; see also HANSMANN, *supra*, at 40 (drawing similar distinction between "the costs resulting from inefficient decisions" and "the costs of the decisionmaking process itself").

³⁶ See, e.g., CLARK C. GIBSON, POLITICIANS AND POACHERS: THE POLITICAL ECONOMY OF WILDLIFE POLICY IN AFRICA 150-51 (1999) (explaining that before colonization, Zambian chiefs, who were enmeshed in "a complex web of patron-client relationships . . . allocated land for settlement and farming, declared open and closed seasons for fishing and hunting, and determined which species could be killed and by whom"); see also T.W. BENNETT, HUMAN RIGHTS AND AFRICAN CUSTOMARY LAW UNDER THE SOUTH AFRICAN CONSTITUTION 133-34 (1995) (describing power under customary law of leaders and wardheads to allot land and regulate access to natural resources). But see Christopher Boehm, *Egalitarian Behavior and Reverse Dominance Hierarchy*, 34 CURRENT ANTHROPOLOGY 227, 236 (1993) (arguing that "as of 40,000 years ago . . . it is very likely that all human societies practiced egalitarian behavior"); Trebilcock, *supra* note 35, at 406 (indicating that custom requires unanimity for land dealings in Papua New Guinea).

vate property, affected parties may not be canvassed personally, let alone allowed to vote on the final decision.³⁷

Contemporary collective-choice processes for establishing private property vary widely. A process might be concentrated, with decisionmaking delegated to a single government actor or a hierarchically organized government agency. Alternatively, private property might be established through a collective decisionmaking body—such as a committee, a legislature, or a regulatory agency—that operates by a majority or qualified-majority voting rule. A third possibility is a

³⁷ There are exceptions, however. Referenda have been held in Canadian fisheries and at least one U.S. fishery (Gulf of Mexico red snapper) about whether to introduce tradable rights. See S.E. REG'L OFFICE, NAT'L MARINE FISHERIES SERV., INITIAL REFERENDUM FOR THE GULF OF MEXICO RED SNAPPER INDIVIDUAL FISHING QUOTA PROGRAM (IFQ) APPROVED 1 (Southeast Fishery Bulletin No. NR04-012, 2004) (announcing results of first of two referenda required to establish individual fishing quotas for Gulf of Mexico red snapper), available at <http://sero.NMFS.noaa.gov/pubann/pa04/pdfs/nr04-012.pdf>; *infra* note 202 (describing origins of unique statutory requirement for referenda to introduce individual quotas in Gulf of Mexico red snapper fishery). Moreover, referenda prior to the implementation of individual transferable quotas may become a more general statutory requirement in the United States if the primary federal fisheries statute, the Magnuson-Stevens Act, is amended along the lines suggested recently by the Bush Administration, several House members and Senators, the Pew Commission, and the U.S. Commission on Ocean Policy. See Fishery Conservation and Management Amendments Act of 2004, S. 2066, 108th Cong. § 11(d)(6) (2004); Fishing Quota Standards Act of 2003, H.R. 2621, 108th Cong. § 2(d)(4) (2003); Fishing Quota Act of 2003, S. 1106, 108th Cong. § 2(d)(6) (2003); Press Release, U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Bush Administration Recommends Strengthening of Magnuson-Stevens Act (June 27, 2003), available at <http://www.publicaffairs.noaa.gov/releases2003/jun03/noaa03081.html> (including proposed reauthorization bill); U.S. COMM'N ON OCEAN POL'Y, PRELIMINARY REPORT OF THE U.S. COMMISSION ON OCEAN POLICY: GOVERNOR'S DRAFT 235 (2004), available at <http://www.oceancommission.gov>; PEW OCEANS COMM'N, AMERICA'S LIVING OCEANS: CHARTING A COURSE FOR SEA CHANGE 113–14 (2003), available at http://www.pewoceans.org/oceans/oceans_report.asp. For examples of the use of referenda or other mechanisms of public consultation to shift property rights in resources other than fisheries, see KANTOR, *supra* note 10, at 14–16, 38–112, 128–43, who notes that referenda were required to close the open range in postbellum Georgia, except where livestock enclosure was imposed directly by the legislature, and Epstein, *supra* note 2, at S538, who notes that, for a Chicago neighborhood to shift to residential parking permits, “at least 65 percent of the residents” must sign the petition, among other requirements.

It should be noted that the full name of the Magnuson-Stevens Act is the Magnuson-Stevens Fishery Conservation and Management Act. See JOSH EAGLE ET AL., TAKING STOCK OF THE REGIONAL FISHERY MANAGEMENT COUNCILS IV (2003) (discussing history of name of Magnuson-Stevens Act), available at http://fisheries.stanford.edu/Stanford_Council_Report.pdf. Moreover, the statute has not always had this name. When it first was enacted in 1976, the statute was called the Fishery Conservation and Management Act. *Id.* Subsequently it was renamed the Magnuson Fishery Conservation and Management Act, in honor of Senator Warren Magnuson. The statute assumed its current name in 1996, in a tribute to then Senator Ted Stevens. *Id.* For the sake of clarity, I refer to the statute as the Magnuson-Stevens Act throughout this Article, even when discussing the statute before 1996.

combination of institutions and their attendant decisionmaking rules. When multiple institutions are involved, it will be especially difficult to characterize the decisionmaking rule collectively generated by them.

For analytical clarity, the collective-choice processes for establishing private property might be envisioned as falling along a spectrum according to the extent to which they either concentrate ultimate decisionmaking in a single individual or a hierarchically organized agency, or distribute decisionmaking among multiple decisionmaking bodies, individuals, or agencies. The processes that fall closer to the concentrated end of the spectrum presumably would generate lower decisionmaking costs than the processes closer to the dispersed end. In turn, processes generating lower decisionmaking costs should be expected to introduce private property rights faster, assuming the level and distribution of demand for privatization are constant. Conversely, processes giving rise to higher decisionmaking costs should be expected to switch more slowly to private property, assuming once again that the level and distribution of demand are constant.³⁸

The primary reason why diffuse processes involving multiple decisionmaking bodies give rise to higher decisionmaking costs is that the multiple bodies tend to have different preferences on an issue. If, however, the various bodies share the same preferences, then the additional decisionmaking costs generated by multiple bodies will be minimal, although not nonexistent. Simply requiring the approval of the multiple bodies to proceed, even if they agree with each other, nonetheless adds to the costs of implementing private property, for example, by increasing deliberation costs.³⁹

³⁸ See GEORGE TSEBELIS, *VETO PLAYERS: HOW POLITICAL INSTITUTIONS WORK* 19 (2002) (arguing that greater "the number of veto players" and "the distance among" them, "the more difficult it is to change the status quo"); Heller, *supra* note 20, at 655 (recognizing that heterogeneity of interests, as well as large numbers of owners, delays change in market settings where unanimity is required). See generally JOHN D. HUBER & CHARLES R. SHIPAN, *DELIBERATE DISCRETION? THE INSTITUTIONAL FOUNDATIONS OF BUREAUCRATIC AUTONOMY* (2002) (discussing impact of structure of decisionmaking institutions); KENNETH A. SHEPSLE & MARK S. BONCHEK, *ANALYZING POLITICS: RATIONALITY, BEHAVIOR AND INSTITUTIONS* 345-79 (1997) (same); Mathew D. McCubbins et al., *Administrative Procedures as Instruments of Political Control*, 3 J.L. ECON. & ORG. 243 (1987) (same); Terry M. Moe & Michael Caldwell, *The Institutional Foundations of Democratic Government: A Comparison of Presidential and Parliamentary Systems*, 150 J. INST. THEORETICAL ECON. 171 (1994) (comparing impact of structure of decisionmaking institutions in presidential and parliamentary systems).

³⁹ See TSEBELIS, *supra* note 38, at 29 (suggesting that, even if veto players overlapped in their preferences, addition of another veto player might delay change if "transaction costs in the interaction of different veto players" are considered). Decisionmaking bodies likely will exhibit different preferences if the institutions are assigned different mandates, selected by and accountable to different constituencies, or comprised of members who are

Below I suggest that one of the reasons that tradable rights have been slow to develop in U.S. coastal fisheries in federal waters is that the political institutions through which these rights typically must be created are highly inclusive, resulting in multiple veto points that increase the cost of decisionmaking.⁴⁰ To illustrate the role that these veto points have played in delaying the pace of change, I discuss an instance in which Congress, principally at the instigation of a small number of senators from coastal states, blocked the regional fishery management councils and the federal fisheries management agency from introducing new individual tradable fishing rights for several years.⁴¹ This congressional action illustrates the potential for institutions with different mandates, constituencies, and decisionmaking processes to block the introduction of property rights by taking different positions on the same issue.⁴²

B. Attributes of Resources

Instead of focusing at the outset on the political institutions through which private property must be created, Demsetzian accounts of the evolution of individual rights start with underlying economic and social factors. In particular, standard Demsetzian accounts suggest that the probability that private property will be introduced is influenced heavily by several factors loosely related to the characteristics of the resource itself. Among the attributes commonly empha-

ected or appointed in different ways, or for different lengths of time. See, e.g., ALSTON ET AL., *supra* note 2, at 77 (suggesting that state land agency in state of Pará is more responsive to local political pressures than federal agency); Todd J. Zywicki, *Senators and Special Interests: A Public Choice Analysis of the Seventeenth Amendment*, 73 OR. L. REV. 1007, 1009–12 (1994) (arguing that shift from state legislatures selecting senators to direct election opened door to increased special interest legislation).

⁴⁰ See *infra* Part II.C.1.

⁴¹ See *infra* notes 180–93, 202–07 and accompanying text for a discussion of the moratorium preventing councils from recommending, and NMFS from approving, individual transferable quotas and the repeal in the same legislative context of a plan to introduce individual transferable quotas in Gulf of Mexico red snapper fishery.

⁴² See *supra* note 39 for sources discussing when decisionmaking bodies might be expected to exhibit diverse preferences.

The case study in Part II *infra* underscores the role of political institutions in property rights formation and emphasizes how a highly fragmented political decisionmaking process such as the one regulating U.S. federal fisheries may delay change. However, formal testing of the significance of variance in political institutions for the timing of the introduction of private property must await a future study with more institutional variance, where it is also possible to hold constant other variables, such as changes in prices, measurement and monitoring costs, the degree of utilization and group size, and heterogeneity. See generally Thomas H. Hammond & Christopher K. Butler, *Some Complex Answers to the Simple Question "Do Institutions Matter?": Policy Choice and Policy Change in Presidential and Parliamentary Systems*, 15 J. THEORETICAL POL. 145 (2003) (discussing difficulty of conclusively establishing that institutions matter).

sized are the market value of the resource, the difficulty of measuring and monitoring it, and the degree of utilization of the resource. Recognizing the significance of the political institutions through which private property typically is created requires reframing the standard treatments of these variables to reflect the impact of the decision-making rules in the political process.

1. *Changes in Prices*

One of the most consistent themes in accounts of the origins of private property is that property rights evolve in response to changes in the price of a resource.⁴³ In particular, it is often suggested that an increase in the price of a resource due to greater demand from expanding markets or population growth promotes the introduction of private property in that resource.⁴⁴ According to this standard hypothesis, when the resource is worth more, individuals stand to gain more if the resource is securely in their hands.

The conventional story that price increases prompt the introduction of private property rights reflects the idea that property rights respond to shifts in the rents, or profits, expected from private property. Rents are "any price over cost."⁴⁵ Costs include the cost of har-

⁴³ E.g., EGGERTSSON, *supra* note 9, at 259 ("Generally, it has been assumed in the property rights literature that an increase in the value of a resource will foster exclusive rights."); LIBECAP, *supra* note 10, at 17 ("An increase in asset values due to changes in relative prices typically will lead to greater competition for control and political pressure on politicians from various claimants for a more favorable definition of property rights."); Anderson & Hill, *supra* note 31, at 167 ("Any change in the price of a well defined and enforced bundle of rights changes the return on resources devoted to property rights questions. 'The higher market value attaching to goods with strong ownership rights spurs individuals to seek laws that would strengthen private property rights.'" (citing ARMEN ALCHIAN & WILLIAM ALLEN, *UNIVERSITY ECONOMICS* 141 (3d ed. 1972))); Demsetz, *Toward*, *supra* note 1, at 350 ("Increased internalization, in the main, results from changes in economic values."); *id.* ("[G]iven a community's tastes . . . the emergence of new private or state-owned property rights will be in response to changes in technology and relative prices."); Feeny, *supra* note 2, at 273 ("[A]n appreciation in the relative price of a factor will induce an increase in the demand for an institution to define property rights in that factor. It will also increase the benefits to be derived from the utilization of that system of property rights.").

⁴⁴ For examples of references to expanding markets as the trigger, see ALSTON ET AL., *supra* note 2, at 35, who discusses increasing coffee exports, Feeny, *supra* note 2, at 283, who discusses growing "commercialization of the Thai economy" and expanded ties with "regional and world markets," and La Croix & Roumasset, *supra* note 19, at 851, who discuss how "new market opportunities" for sugar partly induced the evolution of property rights in Hawaiian land. See also Feeny, *supra* note 2, at 296 (referencing population growth as trigger).

⁴⁵ Fred S. McChesney, *Rent from Regulation*, in 3 *THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW* 310, 311 (Peter Newman ed., 1998) ("In textbook-perfect competition, price equals marginal cost, so any price over cost by definition constitutes a rent.").

vesting the resource as well as the cost of securing the resource under the applicable property rights regime. Under the standard story, the cost side of the equation is held constant, so a price increase raises expected rents. This rise in rents in turn is expected to stimulate demand for more individual rights.⁴⁶

However, the standard story about prices seems naive⁴⁷ once it is recognized that private property typically is formed through political—rather than market—ordering. The traditional theory's focus on the overall level of anticipated rents as a driver of change neglects the significance of the distribution of the expected rents among the politically influential parties that are likely to participate in the decision-making process. Yet the political process is surely as sensitive to the distribution of expected rents among influential groups as it is to aggregate levels of expected rents. Imagine a new property rights arrangement that promises sizeable aggregate gains compared with the status quo. The new arrangement nonetheless might not be introduced if those gains would be spread thinly among numerous persons who individually would need to incur large costs to obtain the rearrangement. Conversely, an institutional change that promises minimal aggregate gains or perhaps even an overall loss to a society still might take place if the change would benefit a small group of politically influential persons. If each member of the small group stands to make large gains, the group members might lobby for the change even though it would not generate sizeable gains for society as a whole. Despite its importance as a determinant of change, however, the effect of the distribution of expected rents among influential groups has been recognized only slowly in the scholarship about the origins of property rights formation.⁴⁸

⁴⁶ For a clear exposition of the idea that it is the greater magnitude of expected rents under private property than other regimes that promote changes in property rights, see ALSTON ET AL., *supra* note 2, at 84–86, 118, who explain when titles will be warranted. See also Alston et al., *supra* note 2, at 32 (espousing idea that it is “potential rent . . . that drives the demand for property rights”).

⁴⁷ In using the term “naive,” I am invoking Thráinn Eggertsson's well-known description of the Demsetzian approach. See EGGERTSSON, *supra* note 9, at 250 (“Demsetz's 1967 paper . . . is the classic reference for the naive theory of property rights, [which seeks] to explain the development of exclusive property rights without explicitly modeling social and political institutions.”).

⁴⁸ Still, of the gaps in the standard Demsetzian account discussed in this Article, the most widely recognized is probably the lack of attention to the distributional consequences of property rights formation. Economist Gary Libecap, in particular, emphasizes the significance of the distribution of rents in property rights formation for the likelihood that change will take place. See, e.g., LIBECAP, *supra* note 10, at 4–5, 11, 19 (arguing that positions of bargaining parties are molded by private expected gains); Libecap, *supra* note 10, at 7 (“[T]he heart of the contracting problem is devising politically-acceptable allocation mechanisms to assign the gains from institutional change.”); see also ALSTON ET AL., *supra*

Consistent with the conventional story, tradable rights have been introduced in a number of fisheries following a pattern of price increases that suggested that a switch to tradable rights would generate higher aggregate levels of rents.⁴⁹ However, the distribution of expected rents among politically influential parties has mattered at least as much as the aggregate level of expected rents for the timing of

note 2, at 4 (arguing that "allocation and enforcement" of property rights "involve distributional concerns"); ENSMINGER, *supra* note 10, at 126 (noting distributional consequences of changes in property rights); FIRMIN-SELLERS, *supra* note 2, at 4, 33 (emphasizing significance of distributional conflict for creation of property rights in examining transformation of property rights in Ghana); DOUGLASS C. NORTH, INSTITUTIONS, INSTITUTIONAL CHANGE AND ECONOMIC PERFORMANCE 51-52 (1990) (referring to role of "powerful constituents" in influencing form of property rights); Alston & Spiller, *supra* note 2, at 99-101 (discussing interest groups implicated in evolution of property rights in Cherokee Outlet); Alston et al., *supra* note 2, at 32 (noting significance of distribution of gains and losses for whether property rights change); Banner, *supra* note 2, at S368-69 (discussing role of oligarchies in property transitions); Epstein, *supra* note 2, at S516-17 (emphasizing role of interest groups in political systems for controlling parking); Feeny, *supra* note 2, at 274 (offering model for evolution of property rights that emphasizes that whether they change depends in part on benefits that "elite decisionmakers of government" may reap); Gissurarson, *supra* note 31, at 119-20 (referring to change in traditional distribution of rights in discussing evolution of property rights in Danish eel); Krier, *supra* note 5, at 332-46 (discussing distributional issues); La Croix, *supra* note 19, at 225 (referring to impact of interest groups on mining rules); La Croix & Roumasset, *supra* note 19, at 851 (relying on "rent-seeking as the engine of change"); Levmore, *Property's Uneasy Path*, *supra* note 2, at 184-86 (arguing that there are two possible stories for shifts toward or away from privatization of intellectual property rights: optimistic transaction cost story, and interest group story); Levmore, *Two Stories*, *supra* note 2, at S423-33 (applying same argument to more types of property); McChesney, *Government as Definer*, *supra* note 19, at 122 (explaining allotment as political policy that increased budgets of Bureau of Indian Affairs and served interests of well-organized non-Indian interest groups); McChesney, *Tragedy Exiting*, *supra* note 19, at 243 (explaining that political pressure can dictate inefficient allocation of property rights); Merges, *supra* note 10, at 1870-71 (referring to role of interest groups); Merrill, *supra* note 2, at 280-81 (discussing distributional considerations in explaining evolution of market mechanisms for regulating environmental resources); Wang, *supra* note 2, at 417 (arguing that there are two schools of thought about why property rights evolve, "the economic school and the distribution school"). See generally KANTOR, *supra* note 10 (discussing distributional issues associated with fence law reform in postbellum Georgia); Robert Higgs, *Legally Induced Technical Regress in the Washington Salmon Fishery*, in EMPIRICAL STUDIES IN INSTITUTIONAL CHANGE 247 (Lee J. Alston et al. eds., 1996) (discussing implications of different forms of fisheries regulation for different groups of fishers).

On the general significance of distributional issues in public policymaking, see, for example, SENED, *supra* note 1, at 47, who states that "[t]he political game is played between unequal players, who worry more about distributional consequences and conflicting interests than they worry about social or any other kind of efficiency," and CHARLES WOLF, JR., MARKETS OR GOVERNMENTS: CHOOSING BETWEEN IMPERFECT ALTERNATIVES 29 (1988), who states that "most public policy decisions are usually even more concerned with distributional issues (namely, *who* gets the benefits and *who* pays the costs) than with efficiency issues (namely, how *large* are the benefits and costs)."

⁴⁹ See *infra* Part II.C.2.a (noting some evidence consistent with hypothesis that price increases induce changes in property rights).

the introduction of property rights. In particular, debates about introducing individual fishing rights have been plagued by conflicts among groups of fishers and processors about how to allocate tradable rights when first implementing them.⁵⁰ In fisheries, tradable rights represent an interest in the rents that private property promises. Accordingly, conflicts about how to allocate tradable rights are instances of concerns among influential groups about the distribution of rents getting in the way of changes in property rights that promise higher aggregate levels of rents.

2. *Measurement and Monitoring Costs*

Another recurring theme in accounts of the origins of private property is the influence of measurement and monitoring costs on whether and when privatization takes place. There are two items that must be measured and monitored for property rights to have force: the contours of the resource that is the subject of private property, and the limits of the legal rights enjoyed by the various owners of the resource.⁵¹ The costs of measuring and monitoring both of these items have been characterized as impediments to the creation of private property. Demsetz noted the cost of monitoring the underlying resource. In particular, he speculated that one of the reasons that private property rights did not develop in the animals of the American Southwest was that these animals were difficult to monitor because they ranged widely.⁵² More recently, others have suggested that the costs of measuring and monitoring idiosyncratic forms of legal rights have limited the number of categories of rights recognized in property law. According to the proponents of this view, larger numbers of categories would generate higher measurement costs for third parties since they would need to investigate rights more carefully if considerable individual tailoring were permitted.⁵³

⁵⁰ See *infra* notes 202–09 and accompanying text.

⁵¹ See Long, *supra* note 31, at 474–82 (identifying two main categories of information that observers need to process under “[t]he proprietarian relationship”).

⁵² Demsetz, *Toward*, *supra* note 1, at 353; see also ENSMINGER, *supra* note 10, at 127 (noting that improved infrastructure may reduce cost of monitoring private property); Anderson & Hill, *supra* note 31, at 172, 175 (explaining how introduction of barbed wire in 1870s reduced cost of enclosing land and livestock and increased rights definition in these resources in American West); Gissurarson, *supra* note 31, at 122–23 (arguing that mountain pastures in Iceland were not divided into private property because of high “exclusion costs for individual plots”); Dean Lueck, *The Extermination and Conservation of the American Bison*, 31 J. LEGAL STUD. S609, S641–44, S646–50 (2002) (attributing near extinction of bison in nineteenth century partly to high cost of enclosing bison, which are nomadic).

⁵³ See Merrill & Smith, *supra* note 27, at 8 (arguing that property rights “are restricted to a limited number of standardized forms” because “[s]tandardization of property rights

The argument that measurement and monitoring costs influence property rights is a variation on the notion that higher expected rents drive the creation of private property. Measurement and monitoring costs are simply one category of cost that affects the magnitude of expected rents. Holding constant the price of a resource, the standard measurement and monitoring cost story argues that private property has developed either because measurement and monitoring costs are sufficiently low given the price, or has not developed because the cost of delimiting individual rights is too high. Under this story, private property still might emerge in the future if a price increase makes further delimitation plausible even at current measurement costs, or if measurement costs fall, for example, due to technological change.⁵⁴

Isolating measurement and monitoring costs from other costs relevant to determining expected rents emphasizes that the cost of acquiring information affects the shape of property rights. In effect, measurement and monitoring costs are a proxy for the difficulty of obtaining information about a resource and the legal rights surrounding it. As an example of the kind of information that private property may require, consider some of the information that is necessary to implement tradable rights in fish. Every year, information must be obtained about the affected population of fish to calculate the overall amount that can be harvested. Once that allowable catch has been allocated among fishers, information must be compiled regularly about the amount of fish they are harvesting individually and whether they hold sufficient individual quotas either from the initial allocation or subsequent purchases to cover their catch.⁵⁵

reduces . . . measurement costs"); Smith, *supra* note 31, at 1108, 1114–15 (extending Merrill and Smith's argument about measurement costs and suggesting that property and related law reflect concern with reducing cost of measurement, or information processing). See generally Henry Hansmann & Reinier Kraakman, *Property, Contract and Verification: The Numerus Clausus Problem and the Divisibility of Rights*, 31 J. LEGAL STUD. 373 (2002) (arguing that limited number of forms of property rights facilitates verifying ownership of rights); Long, *supra* note 31 (arguing that patent and copyright reflect information costs).

⁵⁴ See Merrill & Smith, *supra* note 27, at 40–42 (arguing that technological changes that lower information costs will reduce standardization); Smith, *supra* note 31, at 1155 (noting that "as assets increase in value we would expect an increase in complexity" of rights); *id.* at 1188 ("[R]ecently, certain formalism requirements (e.g., for negotiability) have been relaxed as communication has become cheaper.").

⁵⁵ See Yoram Barzel, *Measurement Cost and the Organization of Markets*, 25 J.L. & ECON. 27, 28 n.3 (1982) ("Measurement is the quantification of information."); Smith, *supra* note 31, at 1140 ("[T]he owner's claim to Blackacre involves production costs (the costs of erecting a fence and filing title documents) and processing costs (the costs of viewing and respecting the fence and searching and reading the title documents)."); see also Daniel C. Esty, *Environmental Protection in the Information Age*, 79 N.Y.U. L. REV. 115, 121 n.12 (2004) (citing leading scholarship on economic relevance of information).

However, the existing stories about measurement and monitoring costs arguably are as politically naive⁵⁶ as the standard story that price increases promote privatization by increasing expected rents. Just as the standard story about prices ignores the distribution of the higher expected rents generated by the higher prices, so the measurement and monitoring cost stories neglect the distribution of the higher costs that might arise under private property. Instead, these stories suggest that the aggregate level of measurement and monitoring costs will determine the arrangement of property rights and neglect the significance of the distribution of those costs among the parties most likely to be influential in the political process. Imagine, as the standard stories predict, that private property necessitates higher measurement and monitoring costs. Private property still might be introduced if the interest groups that stand to benefit are sufficiently powerful to externalize all or a portion of these costs onto society at large and thereby avoid incurring the higher measurement and monitoring costs.⁵⁷

In analyzing why tradable rights have been slow to evolve in U.S. coastal fisheries, I note empirical evidence that tradable rights do, in fact, increase measurement and monitoring costs. I also suggest, however, that these costs may not have been an important obstacle to introducing tradable rights in recent decades because fishers have not been required consistently to shoulder the burden of these higher costs.⁵⁸ This experience in the fisheries context reinforces the need to revisit the hypothesis about the significance of aggregate levels of measurement and monitoring costs, given that the distribution of those costs may undercut their political salience, and accordingly their predictive strength, for the development of private property rights.

3. *Degree of Utilization*

Embedded within Demsetz's discussion of why the fur trade caused hunting territories to emerge is the notion that private property is most likely to develop in a resource that is being used actively

⁵⁶ See *supra* note 47 (explaining reference to "naive").

⁵⁷ See ENSMINGER, *supra* note 10, at 141-42 (noting that ability to externalize enforcement costs onto central state enabled Orma to adopt "more exclusive control of pastoral lands"); Banner, *supra* note 2, at S363 (speculating that fishermen might be able to externalize cost of "establishing and enforcing" property rights onto taxpayers).

Notably, Merrill and Smith recognize the possibility that measurement costs might be externalized onto third parties. Merrill & Smith, *supra* note 27, at 8. But they optimistically argue that courts and legislatures "reduce the costs to third parties of measuring the legal dimensions of property rights." *Id.* at 9.

⁵⁸ See *infra* Part II.C.2.b.

for economic gain.⁵⁹ The idea that the degree of utilization of a resource influences the timing of the introduction of private property forms the basis of a sequential hypothesis about the implementation of private property that is most fully developed by economist Gary Libecap. He envisions roughly three stages in the utilization of a resource based on economic and biological factors: an early stage, an interim or "middling" stage, and a late stage. According to Libecap, resources are most likely to shift to private property late in the history of exploitation, second most likely to shift early in the history of exploitation, and least likely to shift in the interim or middling stage.⁶⁰

The sequential hypothesis is another variation on the idea that expected rents drive the creation of private property. Under this hypothesis, the price of the resource implicitly is held constant, but the cost side of the equation varies depending on the level of the utilization of the resource. In particular, Libecap emphasizes that harvesting costs and the costs of organizing users to make the transition to private property will differ depending on the level of utilization.

Libecap suggests that private property might emerge early in the history of exploitation because the costs of shifting to tradable rights will be comparatively lower at the beginning. It may be easier to negotiate an initial distribution of rights early in the history of a fishery, for example, because there will be "no preexisting claims or

⁵⁹ See Demsetz, *Toward*, *supra* note 1, at 351–52 (discussing situation before and after advent of fur trade).

⁶⁰ See LIBECAP, *supra* note 10, at 74, 81–82, 86, 98, 100, 107, 116 (explaining relationship between probability of property rights shifting and sequence of stages of resource use); Gary D. Libecap, *The Conditions for Successful Collective Action*, in LOCAL COMMONS AND GLOBAL INTERDEPENDENCE: HETEROGENEITY AND COOPERATION IN TWO DOMAINS 168–69, 188 (Robert O. Keohane & Elinor Ostrom eds., 1995) (same). *But cf.* LIBECAP, *supra* note 10, at 100, 107 (implying that private property is more likely to develop when resource development has matured, rather than when it is excessive); Gary D. Libecap & James L. Smith, *The Economic Evolution of Petroleum Property Rights in the United States*, 31 J. LEGAL STUD. S589, S595 (2002) (same). It is important to emphasize that, for Libecap, exploitation (or utilization) is not a purely biological concept. Rather, a resource's utilization level is a function of economic as well as biological factors. See, e.g., Libecap, *supra*, at 161, 168 (suggesting that resource is "late" in history of exploitation "after conditions have become so severe regarding the state of the resource and the ability of the parties to obtain income from its use").

Other scholars also have offered sequential explanations of the evolution toward private property that relate the choice of management tool to different stages in the history of resource exploitation. E.g., ALSTON ET AL., *supra* note 2, at 81–114 (elaborating framework "for sequential development and the demand for titles"); Epstein, *supra* note 2, at S518–19 (sketching evolutionary account in which property rights change as intensity of use increases); Esty, *supra* note 55, at 193 ("The level of resource pressure determines when intervention is justified. But the level of resource pressure at which intervention is justified also depends on intervention costs, which are in part a function of information costs."); Rose, *supra* note 27, at 14–29 (offering evolutionary account of choice of instrument for regulating environmental resources).

historical catch differences that must be reconciled.”⁶¹ Moreover, introducing private property earlier would save on harvesting costs later. The magnitude of the expected savings under private property as compared with an alternative property rights arrangement would be uncertain, however, given the undeveloped state of the market for the resource.

Even though private property may emerge in the early stage, it is more likely to emerge in the late stage under Libecap’s hypothesis. In suggesting that resources are most likely to shift to tradable rights in the late stage, the hypothesis assumes that when resources are overutilized, harvesting costs will be considerably lower under private property as compared with communal or open-access arrangements. As Libecap explains, the aggregate gains from revisiting property rights might be “very large . . . if the fishery was so severely overfished that incomes or returns per unit of effort were very low.”⁶² Moreover, the costs of bargaining a new rights arrangement are assumed to be lower after a resource is overexploited, on the basis that negotiations will involve a smaller number of more homogeneous resource users than when resource utilization was at its peak.⁶³

The sequential hypothesis is notable because it takes into account the political process by which private property develops by first emphasizing the relevance of the costs of collective action for the probability of change, and then suggesting that these costs vary depending on the level of resource use. But like the hypotheses about prices and about measurement and monitoring costs discussed above, Libecap’s sequential hypothesis does not appreciate fully the implications of understanding property rights formation as a political process in which the key to success is overcoming the obstacles created by the prevailing decisionmaking rules.

Taking political factors into account, Libecap’s hypothesis that resources will be more amenable to private property early in the history of exploitation than in the middling stage becomes questionable. As mentioned above, Libecap suggests that resources will be amenable to rights early on because there will be no preexisting claims to the resources at this stage of exploitation. But if there are no claims to a resource, it is unlikely that anyone will be sufficiently motivated to incur the costs of lobbying regulators or legislators for private prop-

⁶¹ LIBECAP, *supra* note 10, at 86.

⁶² *Id.*; see also *id.* at 116 (“[C]hanges in property rights generally will come late, when common pool losses and, hence, the gains from agreement are large enough to facilitate side payments and other political exchanges to build a consensus for the new institutions.”).

⁶³ *Id.* at 74, 81–82.

erty. Moreover, the costs of implementing private property in these circumstances could be high, since the absence of a cadre of existing users might make it more difficult to allocate ownership rights at the outset.

The prediction that private property is most likely to be introduced late in the history of exploitation is also suspect. To its credit, this prediction is consistent with the common intuition that institutions change in the face of crisis. But the costs of bargaining a new arrangement of rights might be very high late in the history of utilization, as there may be many entrenched interests with claims to a comparatively depleted resource. Moreover, introducing private property late in the history of exploitation may not generate significant savings in harvesting costs given the level of effort already applied to the resource.⁶⁴

This suggests that, contrary to Libecap's hypothesis, the middling stage of utilization might be the optimal stage for introducing private property. The potential for economizing on harvesting costs likely will be tangible given the fact that there is a developed market for the resource. In addition, the costs of collective action might be lower than when the resource is overutilized because users will be competing for shares in a resource that remains reasonably healthy. The costs of collective action also might be cheaper than when a resource is underutilized, due to the existence of a defined set of users to whom rights could be assigned. Indeed, I discuss evidence below that most of the federal coastal fisheries that shifted to tradable rights between 1977 and 2002 were fully utilized, rather than overutilized or underutilized as Libecap's sequential hypothesis would predict.⁶⁵ This evidence further reinforces the need to consider the political dynamics of property rights formation in theorizing about when it is likely to take place.

C. Characteristics of Resource Users

The standard theories about the evolution of property rights have taken two approaches to interest groups of resource users. Some

⁶⁴ Contrary to Libecap, Alcock suggests that "IFQ [individual fishing quota] programs are more likely to benefit a broader group of stakeholders if they are implemented before stock conditions enter dire straights [sic]" but nonetheless argues (without systematic empirical evidence) that "[i]n the vast majority of cases, IFQs are adopted only after stocks have suffered serious declines and/or other regulatory options have failed." Alcock, *supra* note 28, at 206; *see also* OSTROM, *supra* note 35, at 3 (suggesting that self-governing associations are most likely to emerge where "[t]he resource is not at a point of deterioration such that it is useless to organise or so underutilised that little advantage results from organising").

⁶⁵ *See infra* Part II.C.2.c.

scholars neglect the role of interest groups in changes in property rights, implicitly assuming, as Demsetz did, that private property is formed through private ordering among individuals.⁶⁶ Others emphasize the contributions of interest groups, and thereby recognize a political dimension to the evolution of property rights.⁶⁷ But even these more political accounts of the evolution of property rights often rely on simplified conceptions of the political process that largely equate it with private ordering requiring the agreement of the affected groups in order to proceed.

Indeed, reflecting their underlying similarity, both the scholarship that takes interest groups into account and the scholarship that neglects them often focus on two characteristics of user groups: the size of the groups, and their degree of homogeneity. In turn, large group size and heterogeneity routinely are identified as obstacles to the establishment of private property, on the ground that they complicate the key step of allocating private rights when they are first introduced.⁶⁸

⁶⁶ See Anderson & Hill, *supra* note 31, at 164 (offering economic theory of origins of property rights emphasizing “variables such as demand, factor endowments, and technology”); Smith, *supra* note 31, at 1108, 1114–15 (analogizing property law to language and arguing that property law is structured to reduce information processing costs). See generally Rose, *supra* note 27 (offering evolutionary account of choice of instrument for regulating environmental resources that focuses substantially on cost-minimization and pressure on resource).

In arguing that changes in property rights are prompted by forces within society, Demsetz noted the role of individuals in bringing new property rights arrangements into being. Demsetz, *Toward*, *supra* note 1, at 350 (“[T]he emergence of new property rights takes place in response to the desires of the interacting persons for adjustment to new benefit-cost possibilities.”); *id.* at 354–57 (noting that small numbers facilitate internalizing externalities). However, Demsetz did not explicitly incorporate interest groups—or the distributional conflicts to which they give rise—into his hypothesis about why property rights evolve toward private property.

⁶⁷ Indeed, there is now a comparatively extensive scholarship discussing the role of interest groups in property rights formation. See, e.g., ENSMINGER, *supra* note 10, at 134–41 (discussing different forms of property rights preferred by various Orma groups); Levmore, *Two Stories*, *supra* note 2, at S425–33 (arguing there is interest group explanation, as well as efficiency explanation, for changes in property rights); see also *supra* note 48 (citing additional sources addressing distributional issues). See generally KANTOR, *supra* note 10 (discussing groups implicated in livestock enclosure in postbellum Georgia); LIBECAP, *supra* note 10 (addressing distributional implications in analyzing property rights formation in natural resources).

⁶⁸ See *infra* note 69 (citing sources discussing heterogeneity); *infra* note 76 (citing sources discussing group size).

For discussions of the significance of the initial allocation of rights, see LEIGH RAYMOND, *PRIVATE RIGHTS IN PUBLIC RESOURCES: EQUITY AND PROPERTY ALLOCATION IN MARKET-BASED ENVIRONMENTAL POLICY* 5 (2003), who states that “the initial allocation . . . generally makes or breaks the political adoption of any licensed property policy,” and Tom Tietenberg, *The Tradable Permits Approach to Protecting the Commons: What Have We Learned?*, in *THE DRAMA OF THE COMMONS* 197, 207–09

1. *Heterogeneity*

Heterogeneity among the groups and individuals laying claim to a resource often is identified as an obstacle to creating private property.⁶⁹ The intuition seems to be that the most obvious formula for allocating shares at the outset would distribute them equally to existing participants, but that differences in wealth, political experience, or skills diminish the likelihood that all claimants will agree on an initial equal allocation of rights, and hence delay institutional change.⁷⁰

However, there are at least two grounds for doubting that heterogeneity is an obstacle to establishing private property. First, the hypothesis that heterogeneity is typically unhelpful is questionable even if one assumes that property rights usually are created in the private sphere. At its core, the hypothesis that heterogeneity is detrimental assumes that the obstacle to private agreement is a desire by the most successful parties under the status quo to preserve their existing entitlements in the face of redistributive pressures from less successful parties.⁷¹ But the obstacle to private agreements allocating

(Elinor Ostrom et al. eds., 2002), who states that “[t]he initial allocation of entitlements is perhaps the most controversial aspect of a tradable permits system.” See also Paul L. Joskow & Richard Schmalensee, *The Political Economy of Market-Based Environmental Policy: The U.S. Acid Rain Program*, 41 J.L. & ECON. 37 (1998) (analyzing initial allocation of sulfur dioxide allowances in U.S. acid rain program).

⁶⁹ See, e.g., LIBECAP, *supra* note 10, at 22–23, 31, 50, 68–69, 117, 119–20 (discussing disadvantages of heterogeneity and advantages of homogeneity); Lee J. Alston et al., *Regulating Natural Resources: The Evolution of Perverse Property Rights*, in EMPIRICAL STUDIES IN INSTITUTIONAL CHANGE 244, 245 (Lee J. Alston et al. eds., 1996) (discussing disadvantages of heterogeneity); Steven F. Edwards, *Rent-Seeking and Property Rights Formation in the U.S. Atlantic Sea Scallop Fishery*, 16 MARINE RESOURCE ECON. 263, 273 (2002) [hereinafter Edwards, *Rent-Seeking*] (characterizing heterogeneity as obstacle); Elinor Ostrom, *How Types of Goods and Property Rights Jointly Affect Collective Action*, 15 J. THEORETICAL POL. 239, 261 (2003) (noting that, while attributes conducive to success of individual property rights are not “as well established as the attributes” conducive to communal property regimes, “heterogeneity of participants also affect[s] the costs of maintaining withdrawal-rights systems” such as individual transferable quotas (citing Steven F. Edwards, *Ownership of Renewable Ocean Resources*, 9 MARINE RESOURCE ECON. 253 (1994) [hereinafter Edwards, *Ownership*]]); Polishchuk & Savvateev, *supra* note 31, at 107 (characterizing heterogeneity as detrimental); Rose, *supra* note 27, at 4 (arguing that heterogeneity reduces likelihood of collective action).

⁷⁰ One idea underlying the intuition may be that an equal distribution at the outset is a focal point. See, e.g., Smith, *supra* note 31, at 1128–30, 1163 (discussing role of psychological prominence, salience, and focal points in establishing property rights).

⁷¹ For instance, Libecap emphasizes that harvesters with different fishing skills vary in their ability to catch fish. In turn, he maintains that more productive fishers will resist a new regime premised on equal sharing because it will not recognize their greater success under the preexisting regime. LIBECAP, *supra* note 10, at 22–23, 73–74, 82–84; see also Johnson & Libecap, *supra* note 31, at 1010–12 (offering Libecap’s most complete explanation of difficulties caused by heterogeneity among fishers).

rights could be analyzed through another lens. In particular, where two parties with different degrees of historical success are having difficulty agreeing on how to allocate rights between them, the obstacle might be framed as the parties' identical interests in maximizing their entitlements under the new regime, not their differential success under the status quo. For example, even if two fishers have the same skills and are equally productive under the existing regime, they still might have difficulty agreeing on a new regime premised on equal shares if they are rational maximizers with the same objective of accumulating wealth.⁷² The key point is that, even within the private sphere, it is unclear whether heterogeneity is disadvantageous. While the standard hypothesis characterizes the parties' differential success under the status quo as an obstacle, this heterogeneity actually may be beneficial if it is the parties' identical interest in wealth maximization that is impeding agreement because differences may create opportunities for gains through trade.⁷³

A second reason to question the theory that heterogeneity impedes the creation of private property is that it is even more difficult to characterize heterogeneity as presumptively detrimental once it is recognized that private property typically emerges through political rather than market ordering. In legislative and regulatory settings, heterogeneity may be helpful or harmful, depending on the distribution of costs and benefits. On the positive side, differences in wealth and political influence may be conducive to institutional

⁷² My example is inspired by one provided by Lisa Martin. See Lisa L. Martin, *Heterogeneity, Linkage and Commons Problems*, in *LOCAL COMMONS AND GLOBAL INTERDEPENDENCE: HETEROGENEITY AND COOPERATION IN TWO DOMAINS* 71 (Robert O. Keohane & Elinor Ostrom eds., 1995). Imagine, Martin suggests, "two individuals . . . attempting to divide a dollar between themselves. Assume each has an identical utility function, wishing to capture as much of the dollar for himself as possible. This situation maximizes conflict of interest and illustrates that such conflicts may arise even when individuals are homogeneous." *Id.* at 73.

⁷³ Markets in individual quotas depend on fishers having different preferences for fishing and different unit costs of fishing. If every harvester spent the same amount to catch a unit of fish and had the same desire to fish, there would be no gains from trading and no purpose in creating individual transferable rights. See Duncan Snidal, *The Politics of Scope: Endogenous Actors, Heterogeneity and Institutions*, in *LOCAL COMMONS AND GLOBAL INTERDEPENDENCE: HETEROGENEITY AND COOPERATION IN TWO DOMAINS* 47, 64 (Robert O. Keohane & Elinor Ostrom eds., 1995) (arguing that "heterogeneous interests provide an essential basis for cooperative exchange" in markets); ROBERT N. STAVINS, *MARKET-BASED ENVIRONMENTAL POLICIES: WHAT CAN WE LEARN FROM U.S. EXPERIENCE (AND RELATED RESEARCH)?* 10 (KSG Working Paper No. RWP03-031, 2003) (arguing that market-based pollution systems will generate greater gains where there is significant cost heterogeneity among covered sources, and that "where abatement costs are more uniform across sources, the political costs of enacting an allowance trading approach are less likely to be justifiable"), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=421720.

change, if there is a wealthy subgroup within a larger group of resource users that is willing to act as a political entrepreneur. For example, a subgroup might undertake this role if the subgroup's members calculate that the benefits each member would derive in rearranging rights outweigh the costs that individual members would incur in initiating the rearrangement. On the other hand, heterogeneity may be detrimental if there is no subgroup motivated to initiate collective action and the relevant interests are unable to reach agreement privately to lobby regulators or legislators for change.⁷⁴

Below, I offer evidence consistent with the hypothesis that heterogeneity may be helpful when private property is created through a political process. Specifically, I discuss an important fishery in which a distinct subgroup of industry participants appears to have determined that the benefits of establishing private property outweighed the costs of initiating the rearrangement, and provided an impetus for shifting to tradable rights.⁷⁵

2. Group Size

Many scholars analyzing the development of property rights argue that large numbers of parties complicate the introduction of new rights arrangements.⁷⁶ The idea is that larger numbers of inter-

⁷⁴ For a recent overview of the commons scholarship on the impact of heterogeneity on collective action that discusses Mancur Olson's hypothesis that inequality facilitates collective action, see Pranab Bardhan & Jeff Dayton-Johnson, *Unequal Irrigators: Heterogeneity and Commons Management in Large-Scale Multivariate Research*, in *THE DRAMA OF THE COMMONS* 87, 90 (Elinor Ostrom et al. eds., 2002), who argue that "theoretical and case-study research has tended to diverge into two camps: those studies that find a positive role for heterogeneity, and those that point out a negative role." See also Snidal, *supra* note 73, at 63 (arguing that "variety of forms and consequences of heterogeneity leads to a less than satisfying conclusion: the impact of heterogeneity is heterogeneous").

For arguments in the scholarship on the origins of private property that heterogeneity may be beneficial, see SENE, *supra* note 1, at 133–54, who discusses the role of political entrepreneurs in property rights formation, Terry L. Anderson & Peter J. Hill, *Cowboys and Contracts*, 31 J. LEGAL STUD. S489, S493 (2002), who state that "[p]roperty rights entrepreneurs contract to form coalitions to define and enforce property rights, and those coalitions develop rules that may rely on the coercive power of the state for enforcement," and Banner, *supra* note 2, at S369, who argues that transitions between property regimes may be "more likely in less egalitarian societies." A similar argument is made outside the origins of private property scholarship. See NEIL K. KOMESAR, *IMPERFECT ALTERNATIVES: CHOOSING INSTITUTIONS IN LAW, ECONOMICS, AND PUBLIC POLICY* 70 (1994) ("[T]he greater the heterogeneity of the distribution, the greater the likelihood of collective action on behalf of the larger group because of the existence of small, high per capita stakes subgroups.").

⁷⁵ See *infra* Part II.C.3.a.

⁷⁶ See, e.g., LIBECAP, *supra* note 10, at 21, 31, 38, 50, 70, 86, 117, 119 (characterizing large group size as detrimental); Edwards, *Rent-Seeking*, *supra* note 69, at 273 (same); Libecap, *supra* note 60, at 166 (same); Ostrom, *supra* note 69, at 261 (noting that, while attributes conducive to individual property rights are not "as well established as the attrib-

ests complicate the task of developing an agreement to rearrange rights by increasing the number of parties whose concerns must be considered.

However, as with heterogeneity, there are grounds for doubting that large group size is a clear-cut obstacle to introducing private property. Large numbers of interests might be an obstacle to introducing private property if the typical mechanism for making the transition is private ordering. Then large numbers would complicate the task of shifting to private property for the very reason identified by the standard story—larger numbers would increase the number of parties whose agreement would be required under the rule of unanimity that prevails in the marketplace.⁷⁷ But it is not clear that large numbers are an obstacle to implementing private property in the more commonly used political process. In the political realm, unanimous agreement of affected parties is not required to proceed, and instead success typically depends on convincing a certain number of individuals in regulatory and legislative institutions that the move to private property is desirable.

The conventional picture of the political process suggests that small groups are more likely to prevail in the political realm than large groups.⁷⁸ This is assumed to be the case because the individual members of a small group may be more likely to have larger stakes in the outcome of a policy dispute than individual members of a large group. In turn, these larger stakes may motivate the small group members to organize. In addition, the costs of organizing small groups may be lower than the costs of organizing large groups, given that there are fewer individuals to contact.

However, extensions of standard theories of collective action suggest that there is no reason to presume that small groups routinely will prevail in the political process while large groups will lose. Contrary

utes" conducive to communal property regimes, "[t]he size of the group involved . . . also affect[s] the costs of maintaining withdrawal-rights systems" such as ITQs (citing Edwards, *Ownership*, *supra* note 69)); Robert Repetto, *A Natural Experiment in Fisheries Management*, 25 *MARINE POL'Y* 251, 254–55 (2001) (implying small group size facilitates change); Rose, *supra* note 27, at 4 (suggesting collective action is inhibited if number of parties is "too large"). *But cf.*, e.g., Ostrom, *supra* note 69, at 257 (arguing that while group size has been described "as conducive to the initial organization of communal resources . . . more theoretical and empirical work is needed").

⁷⁷ KOMESAR, *supra* note 74, at 100 ("Many impediments to transacting can be traced to the numbers of participants necessary to reach a solution and, in turn, the dilution of per capita stakes.").

⁷⁸ See, e.g., *id.*, at 54 (criticizing interest group theory of politics for overemphasizing "overrepresentation of concentrated interests"); Einer R. Elhauge, *Does Interest Group Theory Justify More Intrusive Judicial Review?*, 101 *YALE L.J.* 31, 35–44 (1991) (identifying key themes of interest group theory of lawmaking).

to the conventional wisdom that politics is the preserve of small groups, these extensions imply that groups of either size can prevail in the political arena.⁷⁹ For example, if the expected rents of collective action are distributed unequally among the members of a large group, there may be a small subgroup or a political entrepreneur sufficiently motivated to organize on behalf of the large group. Even if the expected rents of collective action are distributed equally among the members of the large group, a large group may act if its members enjoy sufficiently large individual stakes. The costs of large-group action also might be manageable notwithstanding the size of the group, for example, if the members of the large group are readily identifiable, or if media attention provides a low-cost avenue for spreading information.⁸⁰

The key point to underscore is that recognizing that private property is formed primarily through political rather than private ordering throws into doubt the standard story that small group size is presumptively more conducive to establishing private property than large group size. While it may be easier for small groups to negotiate new rights arrangements privately, there is no reason to assume a priori that large groups will be disadvantaged in the political process. Instead, whether small or large groups will prevail depends on a range of factors, including the distribution of the expected rents from collective action, "the complexity of the issue," or the characteristics of user groups.⁸¹ Consistent with the prediction that both large and small groups can prevail in the political arena, I provide evidence below that

⁷⁹ Notably, there are many policy areas where large groups prevail over small groups. Clean air legislation, for example, might be interpreted as protecting the interests of the large and diffuse group of breathers, while imposing costs on smaller, concentrated groups of polluters. See Richard L. Revesz, *Federalism and Environmental Regulation: A Public Choice Analysis*, 115 HARV. L. REV. 553, 571 (2001) ("[T]he logic of collective action makes it difficult to explain why there is any environmental regulation at all.").

⁸⁰ This discussion of why large and small groups may prevail in the political process is drawn from KOMESAR, *supra* note 74, at 53–122. Komesar emphasizes the potential for majorities, as well as minorities, to dominate political processes, notwithstanding the conventional focus on minoritarian influence. See *id.*; see also DANIEL SHAVIRO, WHEN RULES CHANGE: AN ECONOMIC AND POLITICAL ANALYSIS OF TRANSITION RELIEF AND RETROACTIVITY 70 (2000) ("[S]mall groups with concentrated interests can disproportionately either win or lose in the political process."); WOLF, *supra* note 48, at 42–44, 173–74 (referring to possibilities for minority exploitation of majorities and majority exploitation of minorities); Elhauge, *supra* note 78, at 35–44, 64–65 (surveying interest group theory predicting small groups will be more successful than large groups, but also noting that large groups have advantages in political process).

⁸¹ KOMESAR, *supra* note 74, at 73, 88.

the fisheries that have shifted to tradable rights have been composed of groups of fishers of various sizes.⁸²

D. Summary

By analogizing rights formation to a market process, the prevailing stories about the evolution of property rights neglect the significance of the political process through which private property more typically is established. Although the collective-choice rules for establishing private property vary, they rarely require the unanimous agreement of the affected parties. Recognizing the distinctive decisionmaking rules that apply in the political context is important not only because variations in these rules may affect the probability of shifting to private property. It is also important because the expected impact of many of the variables highlighted in the standard accounts of the origins of private property changes once the political character of property rights formation is factored into the equation. The expected distribution of the benefits and costs of private property among the groups most likely to be influential in the political process becomes more significant than the aggregate level of those benefits and costs. In addition, expectations about the level of resource utilization most conducive to introducing private property may shift once the political character of property rights formation is recognized. Finally, small group size and homogeneity become less solid predictors of whether private property will emerge under a more avowedly political understanding of private property formation, as the agreement of each and every affected party is no longer a precondition for change.

Part II of this Article offers a case study of property rights formation in U.S. federal coastal fisheries that underscores both the political character of the process by which property rights typically are established and the need to take seriously that political process in determining the probability of change. Part II.A introduces the concept of individual transferable quotas. Part II.B analyzes the prevalence of tradable rights in federal coastal fisheries. Part II.C considers the extent to which the hypotheses discussed above explain the pattern of individual property rights formation in coastal fisheries. At the end of

⁸² See *infra* Part II.C.3.b; see also Alston et al., *supra* note 69, at 245 (referring to examples where large groups have triumphed over small groups in disputes about property rights); Higgs, *supra* note 48 (describing scenario in which large group of downstream fishermen prevailed over small group of upstream fishermen in Washington salmon fishery); Ostrom, *supra* note 69, at 258 (referring to studies suggesting different optimal numbers in different situations).

Part II.C, I briefly summarize my findings about why tradable rights have been slow to emerge in these fisheries.

II

CASE STUDY OF INDIVIDUAL RIGHTS FORMATION IN U.S. FEDERAL COASTAL FISHERIES

A. Background

1. Three Waves of Ocean Enclosures

For over six decades, a movement has been underway around the world to enclose the oceans that cover at least seven-tenths of the earth.⁸³ This enclosure movement has progressed in a series of waves, similar to the famous enclosures of common lands in England that began in the fifteenth century.⁸⁴ Three waves of ocean enclosures in particular might be distinguished.⁸⁵

In the first wave, coastal countries began creating national property rights in parts of the oceans that historically had been accessible to all.⁸⁶ In a decision out of sync with its prevailing multilateralist

⁸³ DAVID HUNTER ET AL., *INTERNATIONAL ENVIRONMENTAL LAW AND POLICY* 655 (2d ed. 2002) (noting that "at least seven-tenths" of earth is covered by ocean (citing *GAIA: AN ATLAS OF PLANET MANAGEMENT* (Norman Myers ed., 1993))).

⁸⁴ See Boyle, *supra* note 20, at 33–37, 34 n.2 (canvassing scholarship on enclosure movement in England, noting that it involved series of enclosures); Ellickson, *supra* note 8, at 1391 (noting that land enclosures took place in waves between 1450 and 1849); Harry N. Scheiber & Christopher J. Carr, *From Extended Jurisdiction to Privatization: International Law, Biology, and Economics in the Marine Fisheries Debates, 1937–1976*, 16 *BERKELEY J. INT'L L.* 10, 54 (1998) (referring to "modern movement for 'ocean enclosure' through the extension of coastal jurisdiction beyond the old three-mile limit"). See generally Sharman, *supra* note 19 (providing introduction to enclosure movement in England). The parallel between the land and marine enclosures is not exact, for several reasons. For example, oceans (including ocean fisheries) probably were regulated less than common lands prior to enclosure in England. See Ellickson, *supra* note 8, at 1388–91 (describing institutionalized property rights in medieval open-field system).

⁸⁵ Richer historical treatments of the evolution of the regulation of the oceans may be found in several sources. See generally ANN L. HOLLICK, *U.S. FOREIGN POLICY AND THE LAW OF THE SEA* (1981) (outlining history of twentieth-century U.S. oceans policy); R.P. Anand, *Changing Concepts of Freedom of the Seas: A Historical Perspective*, in *FREEDOM FOR THE SEAS IN THE 21ST CENTURY: OCEAN GOVERNANCE AND ENVIRONMENTAL HARMONY* 72 (John M. Van Dyke et al. eds., 1993) (offering concise history of evolution of freedom-of-seas concept); Harry N. Scheiber & Chris Carr, *Constitutionalism and the Territorial Sea: An Historical Study*, 2 *TERRITORIAL SEA J.* 67 (1992) (examining changes in U.S. oceans policy from perspective of separation-of-powers issues); Scheiber & Carr, *supra* note 84 (examining history of idea of privatizing fisheries).

⁸⁶ See HOLLICK, *supra* note 85, at 9 ("At the beginning of the [twentieth] century, the oceans could be characterized economically as a common property resource and politically and socially as a global commons."); Anand, *supra* note 85, at 72–83 (discussing evolution of freedom of seas concept).

On the concept of the territorial sea, see HOLLICK, *supra* note 85, at 5–6, 9–10, who discusses the historical concept of the territorial sea, Scheiber & Carr, *supra* note 85, at 68,

posture immediately following World War II, the United States initiated the modern ocean enclosure movement in 1945 by unilaterally extending its jurisdiction over the continental shelf and proclaiming the right to establish conservation zones for fisheries.⁸⁷ Other countries then followed suit, proclaiming national jurisdiction over ever-larger expanses of marine fisheries, either as part of, or independent of, broader claims to the oceans.⁸⁸ The 1982 Convention on the Law of the Sea codified these extensions of national jurisdiction, establishing the right of countries to claim 200-mile Exclusive Economic Zones (EEZs) in which they could regulate fishing, as well as other activities.⁸⁹

who refer to the original U.S. announcement of the three-mile territorial sea in the late eighteenth century, and Scheiber & Carr, *supra* note 84, at 13–14, who discuss the concept of the “three-mile offshore limit of sovereignty” and challenges to it.

⁸⁷ Continental Shelf Proclamation, 10 Fed. Reg. 12,303 (Oct. 2, 1945); Fisheries Proclamation, 10 Fed. Reg. 12,304 (Oct. 2, 1945). These are known as the “Truman Proclamations.”

⁸⁸ See HOLLICK, *supra* note 85, at 18–19, 61, 67–95 (discussing historical importance of 1945 Truman Proclamations, under which United States unilaterally claimed jurisdiction over natural resources of continental shelf and right to establish conservation zones to protect high seas fisheries, and unilateral claims subsequently made by Latin American countries); HUNTER ET AL., *supra* note 83, at 669–70 (discussing “phenomenon of ‘creeping jurisdiction’” before and after 1982 Convention on the Law of the Sea); Anand, *supra* note 85, at 79 (referring to Latin American claims of late 1940s and early 1950s); *id.* at 81 (noting that coastal state claims increased after 1960, such that “nearly 35% of the ocean . . . was claimed by coastal states” by 1973); Scheiber & Carr, *supra* note 84, at 15 (“With the Truman Proclamation, the United States set in motion the modern diplomacy of ocean enclosures by the coastal states.”).

In 1947, Chile became the first country to assert a claim for jurisdiction out to 200 miles. HOLLICK, *supra* note 85, at 75.

⁸⁹ See HUNTER ET AL., *supra* note 83, at 660–62 (describing jurisdictional zones established by 1982 Convention on the Law of the Sea, including EEZ); *id.* at 659, 667 (noting that Convention came into force in 1994, but that United States has yet to ratify it, even though United States complies with it); *Rescuing the Law of the Sea*, N.Y. TIMES, Aug. 22, 2004, § 4 (Week in Review), at 8 (urging Senate ratification of 1982 Convention on the Law of the Sea).

The 1982 Convention followed many years of negotiations, and by the time it was agreed upon, many countries had claimed 200-mile zones, many of which dated to the mid-1970s. See HUNTER ET AL., *supra* note 83, at 657–59 (briefly referring to history of 1982 Convention on the Law of the Sea); Anand, *supra* note 85, at 77, 80–83 (same); Christopher J. Carr & Harry N. Scheiber, *Dealing with a Resource Crisis: Regulatory Regimes for Managing the World’s Marine Fisheries*, 21 STAN. ENVTL. L.J. 45, 51–53 (2002) (same); James E. Wilen, *Renewable Resource Economists and Policy: What Differences Have We Made?*, 39 J. ENVTL. ECON. & MGMT. 306, 312 (1999) (describing simultaneous expansion of jurisdiction over fisheries to 200 miles by United States and other coastal nations).

The background to the creation of the U.S. EEZ is as follows: After extending its exclusive jurisdiction over fisheries out to twelve miles in 1966, the United States further extended its control over fisheries out to 200 miles in 1976 by legislating “a fishery conservation zone” that ran from three to 200 miles from the shore. In 1983, the zone was absorbed into the U.S. EEZ. See Pub. L. No. 89-658, 80 Stat. 908 (2000) (codified at 16

In the second wave of enclosure, countries domestically began subdividing their expanded national rights over the oceans into communal regimes. In the United States and elsewhere, communal rights in fisheries have been established on several scales. The 1976 congressional legislation that expanded U.S. jurisdiction over fisheries out to 200 miles also established a domestic regulatory regime that assigned primary responsibility for managing marine fisheries in federal waters to eight regional councils. Each of these councils effectively has become the communal governor of the fisheries within a relatively wide geographically defined jurisdiction.⁹⁰

In many fisheries, the establishment of a collective regime at the regional level was followed by the creation of even smaller scale, species-specific communal regimes. For example, the regional fishery management councils have established numerous limited entry licensing regimes.⁹¹ A limited entry regime carves out a smaller community of fishers from a council's jurisdiction by excluding fishers from taking a particular species unless the fisher holds a valid license for the species. What keeps a limited entry license from being a full-fledged individual property right is that the license does not grant a

U.S.C. §§ 1091–94) (repealed 2000) (describing 1966 jurisdiction extension); Magnuson-Stevens Fishery Conservation and Management Act of 1976, Pub. L. No. 94-265, 90 Stat. 331 (codified as amended at 16 U.S.C. § 1801–02 (2000) (establishing 1976 fishery conservation zone); Proclamation 5030, 48 Fed. Reg. 10,605 (Mar. 14, 1983) (establishing U.S. EEZ); U.S. COMM'N ON OCEAN POLICY, *supra* note 37, at 227 (referring to relationship between fishery conservation zone and U.S. EEZ).

For a brief discussion of the background to the creation of the U.S. 200-mile fishery conservation zone in 1976, which emphasizes that fishermen from New England, the Pacific coast, and Alaska urged the extension of national jurisdiction in the face of growing competition from foreign vessels on U.S. shores, see MICHAEL L. WEBER, *FROM ABUNDANCE TO SCARCITY: A HISTORY OF U.S. MARINE FISHERIES POLICY* 65–67, 69, 83–84 (2002). For richer histories of twentieth-century U.S. oceans policy, see sources cited *supra* note 85.

Notably, countries still continue to claim parts of the oceans. See Andrew C. Revkin, *Jockeying for Pole Position*, N.Y. TIMES, Oct. 10, 2004, § 4 (Week in Review), at 4 (describing various countries' claims to Arctic).

⁹⁰ The jurisdiction of the eight regional fishery management councils originally was set out at Fishery Conservation and Management Act of 1976, Pub. L. No. 94-265, 90 Stat. 347 § 302(a) (1976). The geographic boundaries of the councils' authority is now codified at 16 U.S.C. § 1852(a)(1) (2000).

⁹¹ G.H. Darcy & G.C. Matlock, *Development and Implementation of Access Limitation Programmes in Marine Fisheries of the United States*, in *USE OF PROPERTY RIGHTS IN FISHERIES MANAGEMENT* 96, 98 (Food & Agric. Org. of the U.N., Fisheries Technical Paper No. 404/2, Ross Shotton ed., 2000) (Proceedings of the FishRights99 Conference) (“As of October 1999 there were 15 moratoria [on new entrants] and 11 license/vessel limitation programmes in place in federally managed U.S. marine fisheries [although] extent of use of these programmes varies considerably among regions of the country.”), available at <http://www.fao.org/docrep/003/x8985E/x8985e05.htm>; *id.* app. 2, at 105 (depicting graphically “Limited Access Management Measures in U.S. Fisheries”).

fisher the right to a specific amount of fish. Instead, limited entry licensing delimits the group of fishers who can compete for a species without giving any of these fishers a right to a specific quantity of fish.⁹² In addition to—or instead of—limiting entry, councils have found other ways to protect fisheries, none of which create individual rights in specific quantities of fish. These other tools include a total allowable limit on the amount of fish that may be harvested or limits that resemble conventional command-and-control regulation used in other environmental policy areas, such as regulating the kind of gear, the size of boats, and the length of fishing seasons.⁹³

For over three decades, economists and others have been promoting, with limited success, a third wave of enclosure that would create individual property rights out of communal or national regimes: the establishment of individual transferable quotas.⁹⁴ Individual

⁹² Peter H. Pearse, *From Open Access to Private Property: Recent Innovations in Fishing Rights as Instruments of Fisheries Policy*, 23 OCEAN DEV'T & INT'L L. 71, 75 (1992) ("With license limitation, fisheries remained common property in the sense that all the fishermen holding licenses shared the right to fish the stocks, but others were now excluded."). On the history of the idea of limited entry, see generally *id.*, which discusses innovations in fisheries, including the license limitation, Scheiber & Carr, *supra* note 84, who discuss the history of the idea of privatizing fisheries, James E. Wilen, *Limited Entry Licensing: A Retrospective Assessment*, 5 MARINE RESOURCE ECON. 313 (1988), who offers a retrospective assessment of limited entry as of the late 1980s, and Wilen, *supra* note 89, who surveys developments in fisheries economics and policy, including limited entry.

Two other characteristics of limited entry licenses are worth noting. Sometimes the community of fishers created by a limited entry regime is defined very narrowly, with particular schemes established for fishers taking a particular species, using a specific type of gear in an identified geographic area. Second, while typically allocated for free to existing fishers as of a particular date, limited entry licenses in some fisheries are transferable. See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, NAT'L RES. COUNCIL, *SHARING THE FISH: TOWARD A NATIONAL POLICY ON INDIVIDUAL FISHING QUOTAS* 117–18 (1999) (describing limited licenses).

⁹³ See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 115–38 (surveying fisheries management techniques, although not following categorization used in this Article).

⁹⁴ The fisheries-specific formulation of tradable environmental property rights often is credited to a 1973 paper by economist Francis Christy. See FRANCIS T. CHRISTY, JR., *FISHERMAN QUOTAS: A TENTATIVE SUGGESTION FOR DOMESTIC MANAGEMENT* (Law of the Sea Inst., Univ. of R.I., Occasional Paper No. 19, 1973) (suggesting system of "fisherman quotas," under which boat owners (and possibly non-owning boat captains) would be assigned percentage of catch, which they could lease to other individuals, but not sell, except to agency regulating fishery); Anthony D. Scott, *Conceptual Origins of Rights Based Fishing*, in *RIGHTS BASED FISHING* 11, 26 (Philip A. Neher et al. eds., 1989) (crediting idea of individual transferable quotas to Christy's 1973 paper); Wilen, *supra* note 89, at 316–17, 321–22 (crediting Christy with idea of individual transferable quotas, arguing that they remained "a theoretical curiosity" even among fisheries economists in late 1970s, and implying that individual transferable quotas became more widely accepted after experiments with them in early 1980s outside U.S.). But see Scheiber & Carr, *supra* note 84 (dating discussion of the idea to the early 1970s and suggesting that Christy may not have

transferable quotas are analogous to other property-based ideas for managing environmental resources, such as marketable pollution permits, transferable grazing rights, and tradable rights in habitat for endangered species, that come out of the growing interest in property rights theory in economics in the 1960s.⁹⁵ Individual transferable quotas begin with a cap on the total amount of a particular fish species that can be harvested in a defined area: the total allowable catch. Under individual transferable quotas, rights adding up to this cap are distributed among harvesters, who may trade the rights. These rights typically are denominated as rights to a percentage of the harvest, which are translated annually into a specific volume of fish depending on the total amount of fish allowed to be caught that year.⁹⁶ The

first proposed concept); Wilen, *supra* note 89, at 321 n.32, 322 & nn.33–35 (discussing role of number of economists in implementing individual transferable quotas in United States and in other countries, including University of Delaware economics professor Lee Anderson, who was “instrumental in promoting and designing” individual transferable quotas for Atlantic surfclam and ocean quahog fisheries).

⁹⁵ See Wilen, *supra* note 89, at 316 (analogizing individual transferable quotas to marketable pollution permits). See generally Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 STAN. L. REV. 1333 (1985) (discussing ideas for managing pollution); Robert H. Nelson, *How to Reform Grazing Policy: Creating Forage Rights on Federal Rangelands*, 8 FORDHAM ENVTL. L.J. 645 (1997) (discussing ideas for managing grazing rights); David Sohn & Madeline Cohen, Note, *From Smokestacks to Species: Extending the Tradable Permit Approach from Air Pollution to Habitat Conservation*, 15 STAN. ENVTL. L.J. 405 (1996) (discussing ideas for managing habitat for endangered species).

On the origins of the concept of tradable rights in environmental resources, see Scheiber & Carr, *supra* note 84, at 43, who refer to the “rising interest . . . in property rights theory . . . in the discipline of economics.” However, in the 1970s, environmental and natural-resource economists focused on taxes rather than property rights instruments. See EGGERTSSON, *supra* note 9, at 267–68 (noting that, until 1970s, most fisheries economists advocated taxes or subsidies, but many economists now favor individual transferable quotas); Wallace E. Oates, *From Research to Policy: The Case of Environmental Economics*, 2000 U. ILL. L. REV. 135, 141–47 (2000) (discussing initial preference among economists for taxes to regulate pollution, and policymakers’ turn toward tradable pollution permits); Wilen, *supra* note 89, at 311–12 (pointing out that “fisheries economists through the early 1970s, like their counterparts examining pollution problems over the same period,” focused mainly on taxes rather than property rights approaches). Although there is now less focus on using taxes or fees to regulate resources, these instruments still retain adherents and there remains a literature about whether taxes or tradable rights are optimal.

A number of scholars questioning the standard diagnosis and prescription have underscored the potential for successful communal management of common pool resources. See Dietz et al., *supra* note 27, at 6–26 (providing overview of history of commons scholarship and key concepts).

⁹⁶ New Zealand initially denominated individual transferable quotas “as a fixed tonnage.” John H. Annala, *New Zealand’s ITQ System: Have the First Eight Years Been a Success or a Failure?*, 6 REV. IN FISH BIOLOGY & FISHERIES 43, 55 (1996). Faced with the need to buy back individual quotas to protect fish stocks, however, the government then switched to rights denominated as a proportion of the total allowable catch. See *id.* at 55–56.

transferability of the individual quota rights often is restricted to address distributional concerns in fishing communities, although the scale and content of restrictions on alienability differ considerably among programs.⁹⁷

The introduction of individual transferable quotas is a dramatic development in a fishery. As mentioned above, individual transferable quotas are distinct from any other management regime because they grant fishers entitlements to specific quantities of the catch. Granting these rights significantly changes the incentives of fishers in ways predicted by the normative arguments economists offer for individual transferable quotas and private property more generally.⁹⁸ The next Section examines the arguments for and against tradable rights in fisheries by way of background to the analysis of why U.S. coastal fisheries have made only slow progress in implementing these rights.

2. Normative Arguments for Individual Transferable Quotas

There are three standard normative economic arguments for individual transferable quotas. The first argument relates to the need to promote optimal levels of investment in fishing. Private property often is advocated as a means of stimulating new socially beneficial investment, such as research and development (in the case of patents) or artistic creation (in the case of copyright). In contrast, economists advocate individual transferable quotas to address inefficiently high levels of investment in fishing.⁹⁹ Many fisheries are plagued now by excessive numbers of fishers and vessels who compete for shares of the allowable catch, and thereby depress net earnings from fishing.¹⁰⁰

⁹⁷ U.S. GEN. ACCOUNTING OFFICE, GAO-04-277, *INDIVIDUAL FISHING QUOTAS: METHODS FOR COMMUNITY PROTECTION AND NEW ENTRY REQUIRE PERIODIC EVALUATION* 9–11 (2004) (listing various limitations on transferability used in foreign and U.S. fisheries to protect fishing communities); *id.* at 18–19 (discussing difficulties created by limitations on transferability).

⁹⁸ On the significance of individual transferable quotas, see Scheiber & Carr, *supra* note 84, at 19 n.33, who state that individual transferable quotas “reach[] to the reform of the basic structure of the fishing industry by excluding those who are not awarded a property right in the resource (or a franchise or license, as a form of vested property, for access to the resource).” However, it should be emphasized that the introduction of individual transferable quotas does not put an end to government regulation, and many forms of regulation may persist. See Carr & Scheiber, *supra* note 89, at 48.

⁹⁹ See Keith E. Casey et al., *The Effects of Individual Vessel Quotas in the British Columbia Halibut Fishery*, 10 MARINE RESOURCE ECON. 211, 222 (1995) (arguing that “[e]conomists and other analysts of quota programs have cited the potential benefits to be gained by rationalization of fishing” and that “[v]irtually all [the] literature has focused on” expected “input savings”).

¹⁰⁰ See Jon G. Sutinen, *Fisheries Management & Governance: An Academic’s Perspective*, Presentation at the Managing Our Nation’s Fisheries Conference 5 (Nov. 13, 2003) (slides on file with the *New York University Law Review*) (noting that forty out of

By providing fishers with guaranteed shares of the harvest, individual transferable quotas reduce the incentive to overinvest in new capital and labor to beat other fishers to the catch. In addition to deterring new overinvestment, individual transferable quotas also lower current overinvestment. In particular, the ability to transfer individual quotas allows some of the excessive numbers of fishers and vessels to exit the industry by enabling less efficient harvesters to sell out. After individual transferable quotas are introduced, the number of fishers in the affected fishery often falls dramatically and the incomes of the remaining fishers rise, especially if fishers are allowed to trade their rights with few restrictions.¹⁰¹

According to the second argument, economists maintain that individual quotas should increase the value of the output from the fishery. In the absence of individual quotas, fishing often degenerates into a race in which fishers compete to harvest as much of the catch as they can before regulators end the fishing season to protect the stocks. The incentives are very different in a fishery with individual quotas. Secure in the knowledge that they are entitled to a specific share of the catch, fishers with individual quotas may take more time to harvest a better-quality, higher-value product over a longer period of time. For example, the implementation of individual transferable quotas in the British Columbia halibut fishery extended the fishing season and allowed harvesters to sell more higher-priced fresh fish over more of the year.¹⁰²

sixty-one U.S. fisheries assessed have overcapacity, and estimating fleet overcapacity in New England groundfish fishery at sixty-three percent, Gulf of Mexico shrimp fishery at forty-one percent, and West Coast groundfish fishery at seventy-five percent).

¹⁰¹ See, e.g., U.S. GEN. ACCOUNTING OFFICE, GAO-03-159, *INDIVIDUAL FISHING QUOTAS: BETTER INFORMATION COULD IMPROVE PROGRAM MANAGEMENT* 35 tbls.7-8, 36 tbl.9 (2002) (reporting significant reductions in number of quota holders after introduction of individual transferable quotas, including 26.8% drop in number of quota holders in Alaskan halibut fishery between 1995 and 2001, even though there are limits on transferability).

In addition, the number of crew working on fishing vessels may decline precipitously, although the remaining crew members may earn more because they work longer. See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 391.

¹⁰² See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 123 (noting that, after individual vessel quotas were introduced for halibut in British Columbia, “[h]alibut were marketed as fresh fish rather than as frozen product, and there was a corresponding increase in landed price”); Wilen, *supra* note 89, at 319 & n.26 (noting that individual transferable quotas have given “fishermen the incentive to produce raw products that would sell into higher valued markets,” citing, as examples, consequences of tradable rights in British Columbia halibut and some New Zealand and Australia bluefin tuna fisheries). The consequences were similar in the Alaskan halibut fishery after individual transferable quotas were implemented. See U.S. GEN. ACCOUNTING OFFICE, *supra* note 101, at 20-21 (stating that individual fishing quotas in Alaska extended “the halibut and sablefish fishing seasons in some areas from several days to 8 months” and “the fresh halibut

Third, individual transferable quotas sometimes are advocated as a means of promoting a greater sense of stewardship among fishers.¹⁰³ According to this line of argument, allocating individual harvesting rights to shares of the catch should encourage fishers to reduce their harvest in the short term in exchange for future benefits. This argument evokes Demsetz's suggestion that private property converts an owner into "a broker whose wealth depends on how well he takes into account the competing claims of the present and the future."¹⁰⁴ The evidence of greater stewardship is anecdotal. But there are indications that fishers who own individual transferable quotas may be more committed "to the long-term sustainability of their stocks," less likely to seek increases in the overall catch that is allowed, and more willing to invest in "local cooperation and voluntary controls."¹⁰⁵

In spite of these arguments supporting individual transferable quotas, they remain controversial. The criticism focuses primarily on

market . . . increased from 15 percent of the total halibut market in 1994 to 46 percent in 2001"); *id.* at 26 fig. 9 (illustrating changes in halibut ex-vessel prices between 1984 and 2001, which suggests increases in prices after 1995, but also declines, depending on baseline for making comparisons).

¹⁰³ See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 35–36 (noting that some argue that quota holders have an incentive to "encourage behavior to conserve the resource, conduct needed research, and assist the enforcement and monitoring," but suggesting that "[t]he net effect . . . on conservation" would "depend" on a number of factors).

¹⁰⁴ Demsetz, *Toward*, *supra* note 1, at 355. For an example of the argument applied to fisheries, see Avi Brisman, Comment, *A Less Tragic Commons?: Using Harvester and Processor Quotas to Address Crab Overfishing*, 26 SEATTLE U. L. REV. 929, 974–75 (2003), who argues that rationalizing the Alaska crab fishery "should result in . . . improved crab stock management," more careful fishing practices that reduce ghost fishing, and a reduced risk of overharvesting.

In addition to the three standard arguments discussed above, other arguments also are offered on behalf of individual transferable quotas. For example, it often is suggested that individual quotas improve the safety of fishing. The idea is that, by eliminating the need to race for fish, individual transferable quotas allow fishers to catch more safely. See, e.g., 142 CONG. REC. 23,704 (1996) (statement of Sen. Murray) (arguing during Senate debate on 1996 amendments to Magnuson-Stevens Act that individual transferable quotas could improve safety in Alaska crab fishery, as they have in halibut fishery). The crab fishery is one of the most dangerous fisheries in the world. See Mike Lewis, *Crabbing Industry Faces a Sea Change*, SEATTLE POST-INTELLIGENCER, Oct. 15, 2003, at A1 ("At least 70 people died in Alaska's crab fisheries in the 1990s.").

¹⁰⁵ SUZI KERR ET AL., EVALUATING THE NEW ZEALAND INDIVIDUAL TRANSFERABLE QUOTA MARKET FOR FISHERIES MANAGEMENT 15–17 (Motu Econ. & Pub. Pol'y Res. Trust, Working Paper No. 2003-02) (2003) (providing anecdotal evidence about New Zealand experience), available at http://www.motu.org.nz/nz_fish.htm; see also LAURA JONES & MIRIAM BIXBY, MANAGING FISH: TEN CASE STUDIES FROM CANADA'S PACIFIC COAST 106 (2003) (providing anecdotal evidence about Canadian experience); Repetto, *supra* note 76, at 255–57, 261–62 (providing anecdotal evidence about American and Canadian experiences in scallop fisheries).

equity and environmental concerns.¹⁰⁶ First, like the famous enclosures of the English commons, individual transferable quotas are accused of privileging aggregate efficiency over equity.¹⁰⁷ As mentioned above, one argument for individual transferable quotas is that implementing them will improve efficiency by reducing the excessive numbers of fishers and capital investment that commonly plague many fisheries. Especially if they have little experience with individual transferable quotas,¹⁰⁸ particular interests in fisheries, such as small-scale fishers, often argue that individual transferable quotas will take away their access to the rents generated by commercial fishing and will consolidate harvesting in a few large firms. These fishers are concerned that they will not receive enough quota shares in the initial allocation to continue to fish profitably and that they may not be able to buy additional shares in the secondary market because they lack access to capital.¹⁰⁹ A second criticism of individual transferable quotas rejects the argument that they promote greater stewardship. While some environmentalists support individual transferable quotas, others argue that implementing them will damage the marine environment if, for example, lax enforcement permits fishers to take more than the volume of fish for which they have quota shares.¹¹⁰

¹⁰⁶ See MARINE FISH CONSERVATION NETWORK, *INDIVIDUAL FISHING QUOTAS: ENVIRONMENTAL, PUBLIC TRUST, AND SOCIOECONOMIC IMPACTS 1* (2004) (outlining concerns about individual fishing quota programs), available at http://www.conservefish.org/site/pubs/network_reports/ifqwhitepaper_highres.pdf. In the 1990s at least, the Marine Fish Conservation Network (MFCN) was comprised mainly of conservation organizations, although it also included fisher organizations. See WEBER, *supra* note 89, at 186.

¹⁰⁷ See MARINE FISH CONSERVATION NETWORK, *supra* note 106, at 10–12 (expressing concerns about social costs of individual fishing quota programs); Boyle, *supra* note 20, at 33–36 (discussing perspectives on enclosure).

¹⁰⁸ See Alcock, *supra* note 28, at 249–95 (arguing that small-scale fishers may come to support individual transferable quotas after they acquire experience with them, drawing on case study of fishers in Nova Scotia).

¹⁰⁹ See *infra* note 277. Processors also may oppose individual transferable quotas, or attempt to secure rights in the initial allocation instead. See *infra* note 280.

¹¹⁰ See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 36 (noting concerns that individual transferable quotas may induce fishers to highgrade (i.e., selectively harvest higher-value fish), or quota bust (“misreport catches”)).

A second biologically-oriented criticism is that individual transferable quotas are inconsistent with ecosystem-based management, on the ground that they are premised on single species management. But individual transferable quotas potentially could be consistent with ecosystem-based management if, for example, total allowable catches were established taking into account the needs of the ecosystem as a whole and individuals quotas were introduced in the various fisheries in an ecosystem. See generally E.K. Pikitch et al., *Ecosystem-Based Fishery Management*, 305 Sci. 346 (2004) (explaining and advocating ecosystem-based fishery management); Andrew Freedman, *Snowe Says Support for Magnuson Reauthorization Fizzling*, ENV’T & ENERGY DAILY, Sept. 15, 2004 (“Many in the environmental community believe [individual transferable] quotas are incompatible

The criticisms of individual transferable quotas on distributional and environmental grounds can be—and indeed, have been—addressed at least partially through program design where quota shares are introduced.¹¹¹ The concerns of interest groups such as small-scale fishers who fear they will lose out under individual transferable quotas may be addressed through side payments that take the form of additional quota shares in the initial allocation or limits on the subsequent transferability of quota shares to temper the tendency toward consolidation. Devoting sufficient resources to enforcement can avoid the deleterious consequences some environmentalists fear. However, as I discuss below, distributional conflicts about which segments of the fishing industry will benefit from individual transferable quotas have been an especially significant obstacle to their widespread

with ecosystem-based conservation because they focus on individual species rather than taking a broader approach.”), at <http://www.eenews.net/EEDaily.php>.

Some environmentalists also object to individual transferable quotas because of concerns that they will give rise to expectations among fishers that they hold property rights in fisheries and consequently make it harder to take measures to protect fish stocks. *See infra* note 119 (discussing concerns about property rights character of individual transferable quotas).

For a discussion of the split among environmentalists over individual transferable quotas, see WEBER, *supra* note 89, at 190 (discussing how MFCN, which was comprised primarily of conservationists in 1990s, “was so split over” individual transferable quotas in mid-1990s that organization “remained silent” in debate before 1996 reauthorization of Magnuson-Stevens Act “although some of its members did not”). Compare, for example, the testimony of two Network-member organizations on individual transferable quotas: *Transferable Quotas Under the Magnuson Act: Hearings Before the Subcomm. on Fisheries Mgmt. of House Comm. on Merchant Marine and Fisheries*, 103rd Cong. 119–21 (1994) (statement of Greenpeace), which opposed individual transferable quotas on environmental and other grounds, with *id.* at 431–36 (statements of Rodney M. Fujita, Ph.D. and D. Douglas Hopkins, J.D., Environmental Defense Fund), which supported individual transferable quotas. For more recent Environmental Defense testimony supportive of individual transferable quotas, see *Individual Fishing Quotas (IFQs): Hearings Before the Subcomm. on Fisheries Conservation, Wildlife and Oceans of House Comm. on Resources*, 107th Cong. 69–75 (2002) (statement of Peter M. Emerson, Senior Economist, Environmental Defense). For the current views of the MFCN on individual transferable quotas, see Press Release, Marine Fish Conservation Network, Coalition Launches New Initiative to Promote Standards for Individual Fishing Quotas to Protect Family Fishermen and Marine Ecosystems (May 4, 2004), available at http://www.conservefish.org/site/mediacenter/pressreleases/ifqcampaignnewsrelease_national.pdf (noting that “coalition of . . . commercial and recreational fishing groups, environmental organizations, aquariums, and marine scientists” is urging Congress to adopt “national standards” for individual fishing quotas to “protect family fishermen and the environment”).

¹¹¹ See Wilen, *supra* note 89, at 317 (noting that “many of the anticipated problems” with individual transferable quotas “either have not materialized or have been dealt with in program design”); Jim O’Malley & Dick Allen, *ITQ Debate: Discards, High-Grading Dilemma*, FisheryConservation.com (identifying and addressing concerns about discarding and high-grading), at <http://www.lobsterconservation.com/highgrading> (last visited Jan. 28, 2005).

use in U.S. coastal fisheries.¹¹² The concerns that environmentalists have voiced about individual transferable quotas have been less of an impediment, probably for several reasons. Major environmental groups only became actively involved in fisheries politics in the 1990s, and many environmentalists have focused more on restoring depleted fish populations than on the allocation of access to fisheries.¹¹³ Moreover, as mentioned above, there are environmentalists who support individual transferable quotas.¹¹⁴

The remainder of Part II analyzes the pattern of the introduction of individual transferable quotas in U.S. federal waters as a case study of the adequacy of Demsetzian accounts of the origins of private property. The introduction of individual transferable quotas is a particularly useful test of those accounts for two primary reasons.¹¹⁵

First, the setting for the emergence of tradable rights in fisheries is similar to those in the standard accounts of the evolution of property rights. Since Demsetz's seminal article, much of the scholarship about the evolution of private property has focused on the emergence

¹¹² See *infra* Part II.C.2.a.

¹¹³ On the relatively recent role of environmental groups in fisheries politics, see WEBER, *supra* note 89, at xxv, 173–95, who discusses the growing role of environmentalists in fisheries after the collapse of the New England groundfish fishery, Beth Daley & Gareth Cook, *Sea Change: The New England Fishing Crisis*, BOSTON GLOBE, Oct. 28, 2003, at A1, who chronicle the role of environmentalists in fisheries, and Dexter Van Zile, *Green Machine*, NAT'L FISHERMAN, Mar. 2004, at 18, who describes the role of Pew Charitable Trusts in fisheries policy.

¹¹⁴ See *supra* note 110 and accompanying text. Notably, Environmental Defense is working to introduce individual transferable quotas in several U.S. fisheries. See *a Better Future for America's Fisheries*, SOLUTIONS, Mar.–Apr. 2004, at 4–5, available at http://www.environmentaldefense.org/documents/3568_Solutions_0304.pdf (describing Environmental Defense's work with regional councils and fishermen to promote conservation).

¹¹⁵ For an explicit suggestion in the scholarship on individual transferable quotas that Demsetz's theory of the evolution of property rights explains their emergence, see Pearse, *supra* note 92, at 82, who suggests that "[r]ecent developments in fishing rights are consistent with" Demsetz's theory, although "property [in fisheries] is being built on governmental regulatory mechanisms rather than emerging on its own."

Indeed, there is literature on the evolution (or non-evolution) of property rights in specific fisheries or groups of fisheries. See LIBECAP, *supra* note 10, at 73–92 (evaluating evolution of property rights in Gulf of Mexico fisheries). See generally Rognvaldur Hannesson, *The Political Economy of ITQs*, in SYMPOSIUM ON GLOBAL TRENDS; FISHERIES MANAGEMENT 237 (1994) (discussing political and economic circumstances that affect implementation of individual transferable quotas); Edwards, *Rent-Seeking*, *supra* note 69 (evaluating evolution of property rights in Atlantic sea scallops in U.S.); Johnson & Libecap, *supra* note 31 (evaluating evolution of property rights, focusing primarily on Texas shrimp); Repetto, *supra* note 76 (discussing evolution of property rights in Atlantic sea scallops in United States and Canada); Alcock, *supra* note 28 (explaining evolution of property rights in fisheries in North Atlantic, in particular Iceland, Norway, Atlantic Canada and New England).

of private rights in organized societies, not in the state of nature.¹¹⁶ Individual transferable quotas fit this paradigm because they involve creating private rights in publicly owned resources.

Second, individual transferable quotas are a property rights-based approach for managing resources in two respects. First, individual transferable quotas share the same purpose as other more familiar forms of private property. Just as Demsetz and other economists champion private property as a mechanism for improving efficiency,¹¹⁷ so the thrust of the arguments for individual transferable quotas is that they will improve economic returns from fisheries by reducing overcapacity and improving product quality and stewardship. Second, individual transferable quotas also share many of the formal characteristics commonly assumed to inhere in private property,¹¹⁸ even though there is considerable reluctance to characterize them as such for fear of attracting takings liability should it become necessary to reduce the value of the rights.¹¹⁹ Notably, quota shares are indi-

¹¹⁶ See *supra* note 22 (noting that Demsetz suggests that his hypothesis extends to explaining evolution of property rights in Western societies); *supra* note 31 (citing evolution of property scholarship).

¹¹⁷ See Demsetz, *Toward*, *supra* note 1; see also JEREMY WALDRON, *THE RIGHT TO PRIVATE PROPERTY* 5–12 (1988) (suggesting that Demsetz's argument for property takes up utilitarian argument for private property that was originally advanced by Aristotle).

¹¹⁸ See, e.g., MARINE FISH CONSERVATION NETWORK, *supra* note 106, at 4 (“In fisheries management, IFQs are commonly referred to as ‘rights-based management’ regimes because they assign exclusive access to a portion of the overall catch to an individual fisherman or business.”); Heller, *supra* note 33, at 1196 (noting that regulations such as those creating individual fishing quotas that avoid tragedy of commons “are seen as creating rather than destroying private property”); RAYMOND, *supra* note 68, at 21 (describing individual transferable quotas as instance of licensed property, and indicating that “[m]ost ITQ programs create a right that is fully exclusive and extremely secure—granted in perpetuity to current users, albeit only as a percentage of a floating total allowable catch figure”); *id.* at 14–18 (explaining concept of licensed property as property that includes “many of the traditional rights of ownership” but that is “subject to future cancellation or modification by the government”); Scheiber & Carr, *supra* note 84, at 16 (“The ITQ idea involves the creation of property rights in the form of issuing licenses to fish for a specified quantity of the species in question.”); Scott, *supra* note 94, at 26–27 (analyzing property rights characteristics of individual transferable quotas); see also *Foss v. Nat’l Marine Fisheries Serv.*, 161 F.3d 584, 588 (9th Cir. 1998) (claiming that “[t]here can be no doubt that the IFQ permit is property” on basis that “it is subject to sale, transfer, lease, inheritance, and division as marital property in a dissolution,” in holding that individual fishing quota permit created due process property interest). But see Seth Macinko & Daniel W. Bromley, *Property and Fisheries for the Twenty-First Century: Seeking Coherence from Legal and Economic Doctrine*, 28 VT. L. REV. 623, 638–43 (2004) (rejecting holding in *Foss*, and referring to contrary precedents on grazing permits).

¹¹⁹ See 16 U.S.C. § 1853(d)(2)(A) (2000) (providing that individual fishing quotas may be terminated or limited without compensation); § 1853(d)(3) (2000) (specifying that individual fishing quotas are permits, may be revoked or limited, and do not confer right of compensation if revoked or limited); *Sea Watch Int’l v. Mosbacher*, 762 F. Supp. 370, 375–76 (D.D.C. 1991) (holding that individual transferable quotas do not create property

vidual allotments that are exclusive, durable, and alienable.¹²⁰ Indeed, there is even a registry of individual transferable quotas for recording security interests against them, reminiscent of the registries of traditional property rights in land.¹²¹

As a prelude to analyzing the pattern of tradable rights formation in U.S. coastal fisheries, it is necessary to examine the elements of that pattern. The next Section briefly outlines when and where tradable rights have been adopted in U.S. coastal fisheries under federal jurisdiction.

B. Prevalence of Tradable Rights in U.S. Federal Coastal Fisheries

The scope for establishing tradable rights in fisheries broadened considerably when the United States extended national jurisdiction out to 200 miles in 1976 and the competing claims of fishers from other nations were phased out of American waters.¹²² Before 1976, the United States controlled too few fisheries to allocate and enforce a limited number of rights to harvest many fish.¹²³ The extension

interests); U.S. COMM'N ON OCEAN POLICY, *supra* note 37, at 234 (arguing that individual transferable quotas should be called "dedicated access privileges," partly because this term "highlights the fact that fishing is a privilege, not a right").

Some environmentalists are particularly reluctant to accept the characterization of individual transferable quotas as property because they oppose the notion of privatizing public resources. See, e.g., MARINE FISH CONSERVATION NETWORK, *supra* note 106, at 4–5, 13 (arguing that existing legislative provisions should be strengthened to further clarify that individual fishing quotas are not property rights); SETH MACINKO & DANIEL W. BROMLEY, *WHO OWNS AMERICA'S FISHERIES?* iv (2002) (arguing that individual fishing quotas do not constitute property rights but rather "a tradable opportunity to capture a share of the income stream arising from a valuable asset that is owned by all U.S. citizens").

This Article's description of individual transferable quotas as property rights is not intended to suggest that tradable rights are property rights for takings purposes.

¹²⁰ See Scott, *supra* note 94, at 26–27 (analyzing property rights characteristics of individual transferable quotas); see also sources cited *supra* note 118. But see U.S. GEN. ACCOUNTING OFFICE, *supra* note 97, at 9–11 (referring to variety of restraints on alienability).

¹²¹ See U.S. GEN. ACCOUNTING OFFICE, *supra* note 97, at 14 (noting that NMFS's Alaska Region "maintains a voluntary registry where creditors, such as private banks, the state of Alaska, and private lenders can record liens against quota shares").

¹²² David D. Caron, *International Sanctions, Ocean Management, and the Law of the Sea: A Study of Denial of Access to Fisheries*, 16 *ECOLOGY L.Q.* 311, 314 (1989) (estimating that seventy-five to eighty percent of world commercial fisheries are within "200-mile zones"). After jurisdiction was extended from twelve to 200 miles in 1976, harvesting by other nations' fishers was limited initially and then completely eliminated from the U.S. EEZ by the late 1980s. Scheiber & Carr, *supra* note 84, at 49.

¹²³ See Ross D. Eckert, *THE ENCLOSURE OF OCEAN RESOURCES* 124–25 (1979) (discussing obstacles to protecting fish populations before extension of national jurisdiction in 1976). In the 1970s, economists advocated extending national jurisdiction over fisheries partly to facilitate the introduction of private property rights. *Id.* at 16, 120, 147 (suggesting that private rights may be more likely to emerge if authority over fisheries were

brought fisheries between three and 200 miles from U.S. shores under federal jurisdiction, while fisheries within three miles from the shore remained under state jurisdiction.¹²⁴

Currently, there is no comprehensive published source of information about the extent to which individual transferable quotas and analogous instruments have been established in U.S. coastal fisheries in federal (or state) waters.¹²⁵ To remedy this gap, in 2002 and 2003, I reviewed academic literature and government documents, and contacted fisheries regulators in the National Marine Fisheries Service (NMFS),¹²⁶ the eight federal regional fishery management councils, and coastal state and territorial marine fisheries agencies. My objective was to determine the prevalence of individual transferable quotas

assigned to coastal states, but noting political pressures in these states opposing stringent regulation); Donald McRae & Gordon Munro, *Coastal State "Rights" Within the 200-Mile Exclusive Economic Zone*, in *RIGHTS BASED FISHING* 97, 98 (Philip A. Neher et al. eds., 1989) (noting that economists advocated extending national jurisdiction "to mitigate . . . the common property problem associated with international fisheries").

¹²⁴ Texas and Florida regulate Gulf Coast coastal fisheries out to nine miles, rather than three. 43 U.S.C.A. §§ 1301(a)(3)(b), 1312 n.12 (West Supp. 2000); Sarah Bittleman, *Toward More Cooperative Fisheries Management: Updating State and Federal Jurisdictional Issues*, 9 *TULANE ENVTL. L.J.* 349, 357 & n.30 (1996) (citing §§ 1301–1315 (1988)).

In 2002, fish caught between three and 200 miles from the shore represented an estimated fifty-one percent of the value of commercial U.S. fish landings, and sixty-one percent of the volume. Fish caught in state waters (from zero to three miles from the shore) accounted for the remainder of the value and the volume of the U.S. commercial catch. See NAT'L MARINE FISHERIES SERV., *FISHERIES OF THE UNITED STATES* 2002, at 13 (2003) (estimating volume and value of fish in various geographical areas).

Under the Magnuson-Stevens Act, the federal government, in theory, could regulate any fisheries between three and 200 miles from the shore (except for Texas and the Gulf Coast of Florida). See 16 U.S.C. § 1852(a)(1) (2000) (identifying grants of authority to regional fishery management councils as including area seaward of constituent states of councils); see also § 1856 (providing for state jurisdiction). In practice, however, not every fish caught in federal waters is managed solely by federal regulators. Fish may not be regulated at all, and if they are, they could be taken under exclusively federal regulation, a combination of federal and state regulation, or only under state regulation. E-mail from an employee of the Fisheries Statistics Division, National Marine Fisheries Service, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Jan. 13, 2004, 17:42 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) (referring to various permutations of regulation of fish caught between three and 200 miles from shore).

¹²⁵ The closest source I have found is COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92. It includes case studies of the use of individual transferable quotas and analogous instruments in the United States and elsewhere, but does not attempt to offer a comprehensive list of the fisheries in which they have been implemented in the United States.

¹²⁶ While this Article refers to the federal fisheries agency as NMFS, the agency recently has begun referring to itself as NOAA Fisheries, as a way of identifying itself as a part of the National Oceanic and Atmospheric Administration (NOAA). E-mail from an employee of the Public Affairs Office, NOAA Fisheries, to Katrina M. Wyman, Assistant Professor of Law, New York University School of Law (Dec. 14, 2004, 11:56 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*).

and analogous instruments¹²⁷ in coastal fisheries under federal jurisdiction.¹²⁸ I gathered information about both individual transferable

¹²⁷ For the purposes of this Article, a regulatory instrument qualifies as an individual transferable quota or similar program if the instrument (1) is premised on the existence of a total allowable catch for the species covered; (2) assigns a share of the total allowable catch to a sector defined by the species harvested, by harvesting gear and/or by geography; (3) divides up the rights to the total allowable catch for the defined sector among individual fishers or firms; and (4) permits at least a degree of trading among fishers in the sector in the rights. The ability to trade exists in the rights when (1) rights may be sold permanently independent of the license to which they are attached; (2) rights may be sold temporarily (or leased) for the season, independent of the license to which they are attached; or (3) licenses may be stacked for at least the fishing season in a way that permits the fleet to consolidate harvesting of individual quotas on a smaller number of vessels.

Harvesting cooperatives are analogous to individual transferable quotas if (1) the cooperatives cover a species regulated by a total allowable catch, (2) the cooperatives are assigned by regulators a share of the total allowable catch for the species, (3) the cooperatives allocate rights among members to the catch of the species, (4) the cooperatives are structured to permit review of the allocation of the catch (in a way that resembles trading rights in an individual transferable quota program), and (5) the cooperatives were established for purposes similar to the purposes that motivate the establishment of individual transferable quotas, such as reducing overcapitalization.

¹²⁸ For the purposes of this Article, a tradable rights scheme applies to a fishery under federal jurisdiction if (1) the scheme covers fish that are taken entirely or partially within federal waters (between three and 200 miles from the shore); and (2) the fishery is regulated by a federal fishery management council, by the Secretary of Commerce directly, or by a federal council in combination with state regulatory agencies or interstate fisheries commissions. Tradable rights schemes in fisheries exclusively under state jurisdiction are not counted. See *supra* note 124 (discussing various permutations of regulation in U.S. fisheries).

This Article focuses on federal fisheries for three reasons. First, while the extension of national jurisdiction primarily was intended to Americanize important fisheries along U.S. shores, another theme was the extension of federal regulation of coastal fisheries to introduce rational management. Before the extension of national jurisdiction, federal officials were critical of state regulation of coastal fisheries, and these officials perceived the extension of national jurisdiction as an opportunity to improve upon state management. Against this historical backdrop, the federal government might have been expected to be more aggressive in introducing experimental approaches such as tradable rights.

Second, federal fisheries regulators have had ample authority to introduce individual transferable quotas and analogous instruments even though the states have retained jurisdiction over coastal fisheries within the first three miles of shore. As noted earlier, a considerable share of fish are taken in federal waters. See *supra* note 124.

Third, the states have been even less inclined to experiment with individual transferable quotas than have federal regulators, but there may be distinct factors accounting for the states' record concerning tradable rights. In contacting federal, state, and territorial fisheries regulators, I also asked for information about the use of individual transferable quotas or analogous instruments in state-managed fisheries. I learned of only four individual transferable or equivalent programs established by coastal states or under their jurisdiction in marine waters: a cooperative for herring roe in Yaquina Bay, Oregon; an individual transferable quota program for Atlantic surfclams off New Jersey; and individual transferable quotas for striped bass implemented by Delaware and Virginia. Of these four fisheries, only the Delaware and Virginia striped bass fisheries extend to any degree into federal waters, and in 2002, only a very small amount of the striped bass landed in these states was estimated to have been taken in federal waters. E-mail from an employee of the Fisheries Statistics Division, National Marine Fisheries Service, to Katrina

quotas and analogous instruments established by government regulation, and analogous instruments in which segments of the fishing industry allocate a total allowable catch set by regulators among their members. I included analogous instruments devised by industry because of the role of government in contemporary fisheries: Even when the catch is nominally allocated by private industry agreements, these agreements only arise against the backdrop of government regulations limiting the overall catch and the number of participants in a fishery.¹²⁹

As of 2002, individual transferable quotas were used in few federal coastal fisheries. Only six federally regulated coastal fisheries were harvested under individual transferable quotas. Broadening the net, five other federally regulated coastal fisheries were caught under analogous instruments that share the same purpose and key features of individual transferable quotas. Table 1 lists the eleven fisheries under individual transferable quotas and analogous instruments as of 2002, and indicates the years in which these fisheries shifted to tradable rights.¹³⁰

M. Wyman, Assistant Professor, New York University School of Law (Jan. 21, 2004, 14:04 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*). State regulators may be less inclined to experiment with tradable rights than federal regulators because the states may have less institutional capacity, control different types of species, respond to different interest groups, and operate under different decision-making structures. Given these possibilities, a comparison of the federal and state records in implementing individual transferable quotas is best left to another article.

¹²⁹ See *supra* note 127 (defining individual transferable quotas and analogous instruments as used in this Article). Moreover, fishing industry participants that allocate catches in private versions of individual transferable quotas obtain antitrust approval of their agreements. See Joseph M. Sullivan, *Harvesting Cooperatives and U.S. Antitrust Law: Recent Developments and Implications*, Presentation at the International Institute of Fisheries Economics and Trade Conference 2–3, 5, 7 (July 10–14, 2000) (describing contacts with antitrust authorities on behalf of fishing industry clients negotiating cooperatives), available at <http://oregonstate.edu/dept/IIFET/2000/papers/sullivan.pdf>. In addition, fisheries regulators are aware of these agreements when they arise, and the silence of these regulators arguably may be interpreted as approval.

¹³⁰ I have no reason to believe that the number of federally managed coastal fisheries with tradable rights increased in 2003 or in the first ten months of 2004. However, additional individual transferable quota programs were under consideration in the fall of 2004. The North Pacific Fishery Management Council has recommended a series of changes to Alaska crab fisheries that would grant harvesters and processors individual quotas. The plan is controversial because it is the first time U.S. processors would be awarded shares explicitly for processing activity. In addition, the North Pacific Council is working on a rationalization plan for the Gulf of Alaska groundfish fishery. Ted Stevens, Republican senator from Alaska, included a provision in a 2004 omnibus appropriations bill that requires the Secretary of Commerce to “approve and hereafter implement by regulation” the North Pacific Council’s crab rationalization program by January 1, 2005. H.R. 2673, 108th Cong. § 801 (2004). The provision also requires the Secretary of Commerce “in consultation with the North Pacific Fisheries Management Council,” to establish a pilot program of individual and processor quotas for several fisheries in the Gulf of Alaska. § 802.

The 2004 appropriations provision generated a great deal of controversy. *See generally Seafood Processor Quotas: Hearings Before the S. Comm. on Commerce, Sci., and Transp.*, 108th Cong. (2004) (testimony of Sen. John McCain, Chairman, S. Comm. on Commerce, Sci., & Transport.) (referring to creation of quotas as controversial legislation enacted without adequate deliberation); Liz Ruskin, *Stevens Defends Fish Rider Amid Widespread Protests*, ANCHORAGE DAILY NEWS, Nov. 14, 2003, at A1 (discussing protests); Letter from Sen. John S. McCain, Chairman, Senate Committee on Commerce, Science, and Transportation, and Sen. Olympia J. Snowe, Chairman, Subcommittee on Oceans, Fisheries, and Coast Guard, to Sen. Ted Stevens, Chairman, Committee on Appropriations (Sept. 5, 2003) (on file with the *New York University Law Review*) (requesting that Appropriations Committee discontinue efforts to introduce quotas in light of opposition by Department of Justice and Senate Commerce Committee); Press Release, Office of Sen. John McCain, Statement of Senator John McCain on the FY '04 Omnibus (Jan. 22, 2004), available at http://mccain.senate.gov/index.cfm?fuseaction=newscenter.ViewPork&Content_id=1220 (noting opposition to quota provisions among newspapers and fishers and arguing that additional scrutiny is necessary).

The Pacific Fishery Management Council is in the initial stages of preparing a plan for individual transferable quotas in the groundfish trawl fishery off Washington, Oregon, and California. Pac. Fishery Mgmt. Council, Individual Fishing Quotas (IFQs), at <http://www.pcouncil.org/groundfish/gifq.html> (last visited Jan. 28, 2005).

In the Southeast, the Gulf of Mexico Council currently is taking steps toward establishing individual transferable quotas in the red snapper fishery. *See* S.E. REG'L OFFICE, *supra* note 37; GULF OF MEX. FISHERY MGMT. COUNCIL, IFQ PROFILE: AN OPTIONS PAPER FOR THE PROBLEMS IDENTIFIED IN THE GULF OF MEXICO RED SNAPPER FISHERY (2004), available at <http://www.gulfcouncil.org/downloads/itqoptionspaper4a.pdf>; Cain Burdeau, *Gulf Fishermen Criticize Red Snapper Plan—Fear Quotas Would End Up Favoring Large Vessels, Seafood Corporations*, COM. APPEAL, Aug. 16, 2004, at DS4 (reporting on reactions to proposal for individual transferable quotas for red snapper).

The New England Council is contemplating allowing sector-based allocations in the herring fishery, which could set the stage for the creation of individual transferable quotas. *See* NEW ENGLAND FISHERY MGMT. COUNCIL, AMENDMENT 1 TO THE HERRING FISHERY MANAGEMENT PLAN (FMP): SUMMARY OF MEASURES UNDER CONSIDERATION 52–59 (2004), available at http://www.nefmc.org/herring/a1_final_summary_of_alts1204.pdf; Press Release, Environmental Defense, New England Fishery Management Council Votes for Herring Cooperatives: Environmental Defense Calls Vote a Major Step Forward in Improving Herring Fishery (Mar. 23, 2004), available at <http://www.environmentaldefense.org/pressrelease.cfm?ContentID=3604>; *see also infra* note 151 (discussing changes in management of New England groundfish fishery that ultimately may lead to adoption of individual transferable quotas or analogous instruments, including recent formation of sector in Northeast groundfish fishery).

TABLE 1: INDIVIDUAL TRANSFERABLE QUOTAS AND ANALOGOUS INSTRUMENTS IN FEDERAL FISHERIES

Fishery	Year Tradable Rights Were Implemented
Atlantic bluefin tuna individual transferable quotas (purse seine fleet only)	1983 ¹³¹
Atlantic ocean quahog individual transferable quotas	1990 ¹³²
Atlantic surfclam individual transferable quotas	1990 ¹³³
South Atlantic wreckfish individual transferable quotas	1992 ¹³⁴
Maryland summer flounder informal cooperative	Early 1990s ¹³⁵
Alaska halibut individual transferable quotas	1995 ¹³⁶
Alaska sablefish individual transferable quotas	1995 ¹³⁷
Pacific whiting catcher processor harvesting cooperative	1997 ¹³⁸
Bering Sea/Aleutian Islands pollock harvesting cooperatives	1998 ¹³⁹
Alaska weathervane scallop harvesting cooperative	2000 ¹⁴⁰
Tiered permit-stacking program for Pacific fixed gear sablefish harvesters	2002 ¹⁴¹

¹³¹ Implementation of Recommendations of the International Commission for the Conservation of Atlantic Tunas, 48 Fed. Reg. 27,745, 27,753 (June 17, 1983) (to be codified at 50 C.F.R. pt. 285).

¹³² U.S. GEN. ACCOUNTING OFFICE, *supra* note 101, at 36 tbl.9.

¹³³ *Id.*

¹³⁴ *Id.* at 35 tbl.8.

¹³⁵ I have not been able to identify the exact year the informal cooperative was created. For certain purposes in this Article, I have deemed the cooperative to have been agreed upon and implemented in 1993, based on my understanding of the approval date of a federal moratorium on new entrants to the summer flounder fishery that may have facilitated the establishment of the cooperative. See 1 MID-ATL. FISHERY MGMT. COUNCIL ET AL., AMENDMENT 2 TO THE FISHERY MANAGEMENT PLAN FOR THE SUMMER FLOUNDER FISHERY 3-4 (1991) (outlining moratorium, and indicating on cover page that NMFS approval was received in 1992 and 1993). There is no written contract among the members of the cooperative that could be consulted on its history. E-mail from an employee of the Fisheries Service, Maryland Department of Natural Resources, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Jan. 7, 2004, 16:30 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*).

¹³⁶ U.S. GEN. ACCOUNTING OFFICE, *supra* note 101, at 35 tbl.7.

¹³⁷ *Id.*

¹³⁸ Sullivan, *supra* note 129, at 5.

As Table 2 indicates, the eleven fisheries with tradable rights together accounted for a small portion of fisheries in federal waters in 2002. I estimate that approximately six percent of coastal fish stocks under federal management were under tradable rights. Collectively, the eleven fisheries accounted for approximately twenty-four percent of the ex-vessel value¹⁴² of the fish caught in federal waters, and fifty-three percent of the volume. As Table 2 suggests, the estimate of the volume in particular of the fisheries under tradable rights is inflated by the inclusion of Alaskan pollock.

TABLE 2: ESTIMATES OF FEDERAL FISHERIES UNDER TRADABLE RIGHTS IN 2002¹⁴³

C	Percent of Federal Fisheries Under Tradable Rights	
	All	All Except Alaska Pollock
By Number of Coastal Stocks	6%	5%
By Value	24%	15%
By Volume	53%	9%

¹³⁹ In 1998, Congress passed the American Fisheries Act as part of an omnibus appropriations package. Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1999, Pub. L. No. 105-277, § 201, 112 Stat. 2681, 2681-616 to 2681-637 (1998). It facilitated the creation of harvesting cooperatives in the Bering Sea/Aleutian Islands pollock fishery in Alaska by dividing up the pollock catch among three sectors. Subsequently, the pollock fishery shifted to harvesting cooperatives in two stages. In 1999, two cooperatives were established in the offshore (catcher processor) sector: a cooperative of offshore catcher processors and a cooperative of catcher vessels delivering to the offshore catcher processors. In 2000, cooperatives were organized in the two remaining sectors of the pollock fishery. A single cooperative was organized by the catcher vessels delivering to mothership processors. Inshore catcher vessel owners organized seven cooperatives of catcher vessels delivering to inshore processors. See *infra* note 284 (citing sources discussing history of pollock cooperatives).

¹⁴⁰ Togue Brawn & Kevin Scheirer, *The Alaskan Weathervane Scallop Fishery Management History and Cooperative Agreement 3* (Oct. 17, 2003) (unpublished manuscript, on file with the *New York University Law Review*).

¹⁴¹ PAC. FISHERY MGMT. COUNCIL, PERMIT STACKING, SEASON EXTENSION, AND OTHER MODIFICATIONS TO THE LIMITED ENTRY FIXED GEAR SABLEFISH FISHERY INCLUDING AMENDMENT 14 TO THE GROUND FISH FMP ENVIRONMENTAL ASSESSMENT, REGULATORY IMPACT REVIEW, AND INITIAL REGULATORY FLEXIBILITY ANALYSIS 2 (2001).

¹⁴² The ex-vessel value of a fishery is the sum of the value fishers receive for their harvest. See NAT'L MARINE FISHERIES SERV., *supra* note 124, at 121 (defining ex-vessel price as "[p]rice received by the harvester for fish, shellfish, and other aquatic plants and animals"). The ex-vessel value does not include the value added through processing.

¹⁴³ I calculated the estimates of the prevalence of tradable rights in Table 2. To estimate the percentage of fisheries under tradable rights in terms of the number of stocks under federal management (six percent), I derived a number of stocks under federal management, and then a number of stocks under tradable rights. I derived the number of 267 stocks under federal management using summary tables in NAT'L MARINE FISHERIES

Although individual transferable quotas and analogous instruments have been implemented in few federal fisheries overall, there are striking regional variations in the use of tradable rights. In particular, as Table 3 indicates, federal fisheries off the coast of Alaska account for a disproportionate share of those under tradable rights, representing four of the eleven fisheries that are taken under individual transferable quotas and analogous instruments. This overrepresentation is a noteworthy part of the pattern of property rights formation in U.S. coastal fisheries, and I consider it further below.¹⁴⁴

TABLE 3: OVERREPRESENTATION OF ALASKA FISHERIES AMONG FEDERAL TRADABLE RIGHTS FISHERIES¹⁴⁵

	Federal Alaska Fisheries as a Percentage of Federal Fisheries	Federal Alaska Fisheries Under Tradable Rights as a Percentage of Federal Fisheries Under Tradable Rights
By Number of Coastal Stocks	31% (30% excluding pollock)	40% (25% excluding pollock)
By Value	38% (30% excluding pollock)	87% (77% excluding pollock)
By Volume	73% (40% excluding pollock)	95% (37% excluding pollock)

SERV., SUSTAINING AND REBUILDING: NOAA FISHERIES 2002 REPORT TO CONGRESS: THE STATUS OF U.S. FISHERIES 17–18 (2003), *available at* http://www.NMFS.noaa.gov/sfa/statusoffisheries/cover_sos.pdf. This is a report that NMFS has been required statutorily to issue since 1996 on the overfishing and overfished status of fisheries “within each Council’s geographical area of authority.” 16 U.S.C. § 1854(e)(1) (2000). I estimated that there are fifteen stocks under tradable rights (as of 2002), based on my understanding of the coverage of the existing tradable rights programs.

I estimated the ex-vessel value (twenty-four percent) and the volume (fifty-three percent) of fisheries under tradable rights as a proportion of the total ex-vessel value and volume of fish taken from federal waters based on (1) my understanding of the coverage of the tradable rights programs in federal fisheries; (2) information about the ex-vessel value and volume (in pounds) of fisheries under tradable rights in 2002 provided by the National Marine Fisheries Service, *see* E-mail from an employee of the Fisheries Statistics Division to Katrina M. Wyman, *supra* note 128; and (3) estimates of the total ex-vessel value and volume of fish taken in federal waters, *see* NAT’L MARINE FISHERIES SERV., *supra* note 124, at 13. My estimates of the ex-vessel value and volume under tradable rights do not include the value and volume of wreckfish landings in 2002, because NMFS will not release information about 2002 wreckfish landings due to confidentiality concerns.

Estimates without pollock are included because of the way the inclusion of pollock distorts the volume of fisheries under tradable rights. As Table 2 indicates, fifty-three percent of federal fisheries (by volume) are under tradable rights if pollock is counted, but only nine percent of fisheries are under tradable rights once pollock is excluded. A fish in the cod family, pollock is a large, high-volume fishery; the fish is often sold as surimi and frozen products such as fillets and fish sticks. *See* Alaska Fisheries Science Center, National Marine Fisheries Service, FBE Species of Particular Interest—Walleye Pollock, *at* http://www.afsc.noaa.gov/race/behavioral/pollock_fbe.htm. The estimates excluding pollock were calculated in the same way as the estimates including pollock.

¹⁴⁴ *See infra* Parts II.C.2.c & II.C.3.a.

¹⁴⁵ I calculated the estimates in Table 3 based on my understanding of the coverage of the tradable rights programs in federal fisheries.

The regional variation in the use of individual transferable quotas is not the only important aspect of the pattern of property rights formation. The U.S. record also is notable because, as Table 1 indicates, only a single individual transferable quota program was established in federal coastal fisheries in the first thirteen years after the extension of national jurisdiction to 200 miles. Moreover, that program covered only the small component of the Atlantic bluefin tuna fishery taken by the purse seine fleet. Just over half of the eleven fisheries with individual transferable quotas or analogous instruments implemented them in 1995 or after.

A comparison of the history of the introduction of individual transferable quotas in Canada and the United States further underscores the slow pace of change in the United States in the years immediately following the extension of national jurisdiction. The two countries share many ocean fisheries in common, and Canada also

To estimate the number of federally managed stocks in Alaska as a percentage of the total number of federally managed stocks (thirty-one percent), I began with the estimate of the total number of federally managed stocks I had derived for Table 2 (267). NAT'L MARINE FISHERIES SERV., *supra* note 143, at 18. Then I derived an estimate of the number of federally managed stocks under tradable rights from Alaska (eighty-two), drawing again on summaries provided by NMFS. *Id.* The eighty-two federally managed stocks are made up of stocks managed by the North Pacific alone, and jointly with the Pacific Council.

To estimate the number of stocks under tradable rights from Alaska as a percentage of the number of federal stocks under tradable rights (forty percent), I drew on my estimate for Table 2 of the total number of stocks under tradable rights (fifteen). In addition, I estimated the subset of these stocks from Alaska (six) using the stock definitions in NAT'L MARINE FISHERIES SERV., *supra* note 143.

To estimate the ex-vessel value and the volume of federal fisheries from Alaska as a percentage of the ex-vessel value and volume of federal fisheries (thirty-eight and seventy-three percent, respectively), I relied on NMFS estimates of the total ex-vessel value and volume (in pounds) of all fish caught between three and 200 miles off U.S. shores. NAT'L MARINE FISHERIES SERV., *supra* note 124, at 13. Estimates of the ex-vessel value and volume (in pounds) of fish caught between three and 200 miles off Alaska also came from NMFS. See Fisheries Statistics and Econ. Div., Nat'l Marine Fisheries Serv., Landings by Distance from U.S. Shores, 2002, State of Alaska (on file with the *New York University Law Review*). For the 2003 version of these Alaska estimates, see Fisheries Statistics Division, NOAA Fisheries, 2003 U.S. Landings by Distance from Shore, at http://www.st.nmfs.gov/st1/commercial/landings/ds_8850_bystate.html.

To estimate the ex-vessel value and volume of Alaska fisheries under tradable rights as a percentage of the ex-vessel value and volume of all fisheries under tradable rights (eighty-seven and ninety-five percent, respectively), I obtained and then adjusted information about the ex-vessel value and volume of selected fisheries under tradable rights in 2002 directly from NMFS. See E-mail from an employee of the Fisheries Statistics Division to Katrina M. Wyman, *supra* note 128.

All estimates without pollock were calculated in the same way, except that pollock was excluded for the stocks, ex-vessel value and volume counted, as appropriate.

extended national jurisdiction over fisheries to 200 miles in 1976.¹⁴⁶ While it is difficult to compare systematically the prevalence of individual transferable quotas in the two countries today, there nonetheless is considerable evidence that Canada initially was faster in introducing individual transferable quotas than the United States.¹⁴⁷ On the Pacific coast, valuable commercial fisheries in halibut, sablefish, pollock, and other groundfish currently are taken under tradable rights in both the United States and Canada. But in each of these Pacific groundfish fisheries, individual transferable quotas were introduced first on the Canadian side.¹⁴⁸ Indeed, the earlier Canadian introduction of individual vessel quotas for British Columbia halibut

¹⁴⁶ L.S. PARSONS, *MANAGEMENT OF MARINE FISHERIES IN CANADA* 242 (1993) (noting that Canada announced its decision to extend national jurisdiction in 1976; extension took effect in Canada, as in U.S., in 1977).

¹⁴⁷ A comparison of the extent to which the two countries currently use individual transferable quotas or equivalent rights-based programs is complicated by three factors. First, the two countries do not publish comparable data about the best measures of the prevalence of individual transferable quotas: the percentage of stocks and the ex-vessel value and volume of fisheries under individual transferable quotas. Second, any comparison would be complicated by the fact that all coastal fisheries are regulated by the federal government in Canada, while jurisdiction over U.S. coastal fisheries is divided between the federal government and the states. Third, the interpretation of any comparative data would need to take into account differences in factors such as the species harvested and the structure of the fishing industry in the U.S. and Canada.

In addition to Canada, other countries that moved more quickly than the United States to introduce individual transferable quotas after extending national jurisdiction include New Zealand, Iceland, and Norway. Indeed, New Zealand and Iceland have been considerably more aggressive than either Canada or the United States in introducing individual transferable quotas, and virtually the entire commercial harvest in the EEZs of these two countries is taken under individual transferable quotas. See KERR ET AL., *supra* note 105, at 4 (“As of 1996, the species managed under the ITQ system accounted for more than 85% of the total commercial catch taken from New Zealand’s EEZ.”); Alcock, *supra* note 28, at 118–24, 168 (outlining property rights in Iceland’s fisheries). Other countries that rely on individual transferable quotas or similar instruments include Australia, the Netherlands, and Great Britain.

Reliable international data on the prevalence of individual transferable quotas is lacking, but overall individual transferable quotas have been implemented in few countries, although the number would seem to be growing. See ORG. FOR ECON. CO-OPERATION AND DEV., *TOWARDS SUSTAINABLE FISHERIES: ECONOMIC ASPECTS OF THE MANAGEMENT OF LIVING MARINE RESOURCES* 81 tbl.4.3 (1997) (listing fisheries in OECD countries managed using individual quotas); Ragnar Arnason, *Review of Experiences with ITQs: A Report for CEMARE*, 6 (Apr. 6, 2001) (unpublished manuscript, on file with the *New York University Law Review*) (estimating that “over 10% of the global ocean fish harvest is currently taken under ITQs”). See generally ORG. FOR ECON. CO-OPERATION AND DEV., *REVIEW OF FISHERIES IN OECD COUNTRIES: POLICIES AND SUMMARY STATISTICS* (3d ed. 2002) (summarizing major developments in fisheries for OECD countries).

¹⁴⁸ Canada first introduced individual quotas in the British Columbia halibut fishery in 1991. Transferability first was introduced on a limited basis in 1993 and then extended. Casey et al., *supra* note 99, at 216. Individual transferable quotas were implemented in Alaskan halibut in 1995. U.S. GEN. ACCOUNTING OFFICE, *supra* note 101, at 35 tbl.7.

provided an impetus for the United States to implement the first two individual transferable quota programs in Alaska fisheries, for halibut and sablefish.¹⁴⁹ An even more striking difference concerns the use of

Individual vessel quotas were introduced in the British Columbia sablefish fishery in 1990. Again, transferability has been extended over time. POLICY & ECON. BRANCH, DEP'T OF FISHERIES & OCEANS, EXPERIENCE WITH INDIVIDUAL QUOTA AND ENTERPRISE ALLOCATION (IQ/EA) MANAGEMENT IN CANADIAN FISHERIES, 1972-1994, at 63, 70 (1994) (on file with the *New York University Law Review*). Individual transferable quotas were implemented in the Alaska sablefish fishery in 1995. U.S. GEN. ACCOUNTING OFFICE, *supra* note 101, at 35 tbl.7.

An individual vessel quota program covering groundfish taken by the British Columbia trawl sector (including pollock and whiting) was implemented in April 1997. GROUNDFISH TRAWL SPECIAL INDUS. COMM., REVIEW OF THE GROUNDFISH TRAWL INDIVIDUAL VESSEL QUOTA/GROUNDFISH DEVELOPMENT AUTHORITY PLAN 1 (1999) (on file with the *New York University Law Review*) ("The Individual Vessel Quota/Groundfish Development Authority (IVQ/GDA) plan, introduced in April 1997, brought wholesale change to the groundfish trawl industry."). The whiting catcher processor cooperative off the U.S. Pacific coast (below British Columbia) began operating in May 1997. Sullivan, *supra* note 129, at 5 ("On May 27, 1997, the Division issued a favorable 'no enforcement intention' letter and press release, and the fleet converted to share-based fishing."). The cooperatives in the Bering Sea/Aleutian Islands pollock fishery (above British Columbia) were implemented in two phases in 1999 and 2000, after the passage of the American Fisheries Act in 1998. *See supra* note 139.

¹⁴⁹ On the history of individual transferable quotas for halibut in British Columbia, see PARSONS, *supra* note 146, at 214-17. A number of sources discuss the relevance of the British Columbia program for the introduction of individual transferable quotas in Alaska. *See, e.g.*, U.S. GEN. ACCOUNTING OFFICE, *supra* note 97, at 42 (noting that NOAA comments on draft GAO report described "British Columbia (Canada) individual vessel quota program for Pacific halibut . . . as a model for the Alaskan halibut and sablefish IFQ program"); COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 123 (explaining that higher landed price for British Columbia halibut caught under individual vessel quotas "was one factor influencing the implementation of the Alaskan halibut IFQ program"); Matthew Berman & Linda Leask, *On the Eve of IFQs: Fishing for Alaska's Halibut and Sablefish*, 24 ALASKA REV. SOC. & ECON. CONDITIONS 1, 3 (1994) (referring to impact of individual quotas in British Columbia), available at <http://www.iser.uaa.alaska.edu/publications/formal/arsecs/arsec292p1.pdf>; James R. Wilson & Rebecca Lent, *Economic Perspective and the Evolution of Fisheries Management: Towards Subjectivist Methodology*, 9 MARINE RESOURCE ECON. 353, 370 n.16 (1994) (speculating that introduction of individual quotas in British Columbia halibut "stimulated interest" in them within United States because of "virtual monopoly" Canadian fishers enjoyed in supplying "fresh halibut year-round"). Records from the North Pacific Fishery Management Council meetings held in December 1991 and April 1992 indicate that Alaskans were aware of the changes brought about by the introduction of individual vessel quotas in British Columbia. Jack Crowley, Testimony at the Public Hearing on Sablefish and Halibut IFQs, in Minutes of the Ninety-ninth Plenary Session of the North Pacific Fishery Management Council app. I, at 13 (Dec. 2, 1991) (transcript on file with the *New York University Law Review*) (commenting favorably on Canadian experience); Vic Horgan, Testimony at the Public Hearing on Sablefish and Halibut IFQs, in Minutes of the Ninety-ninth Plenary Session of the North Pacific Fishery Management Council, *supra*, app. I, at 14 (commenting negatively on Canadian experience); Linda Kozak, Testimony at the Public Hearing on Sablefish and Halibut IFQs, in Minutes of the Ninety-ninth Plenary Session of the North Pacific Fishery Management Council, *supra*, app. I, at 15 (same); *see also* Minutes of the 101st Plenary Session of the North Pacific Fishery Management

individual transferable quotas to regulate the groundfish fisheries that historically have been important in New England and Atlantic Canada.¹⁵⁰ Although tradable rights have been used in the Atlantic Canadian groundfish fishery since the early 1980s, individual transferable quotas have not yet been introduced in the groundfish fishery in New England.¹⁵¹

Why have U.S. fisheries been slow to adopt tradable rights, notwithstanding over thirty years of proselytizing by economists and others? The standard explanations for the evolution of property rights would suggest that the answer lies in underlying economic and social conditions.¹⁵² Consistent with my emphasis on the significance

Council 6 (Apr. 22, 1992) (transcript on file with the *New York University Law Review*) (before voting to reconfirm its recommendation of individual transferable quotas for halibut and sablefish, Council "received an overview of Canada's individual vessel quota programs for halibut and sablefish").

¹⁵⁰ See generally MARK KURLANSKY, *COD: A BIOGRAPHY OF THE FISH THAT CHANGED THE WORLD* (1997) (documenting significance of cod fishing); WEBER, *supra* note 89, at 19, 59 (noting historical importance of groundfish fishery).

¹⁵¹ See generally POLICY & ECON. BRANCH, *supra* note 148 (describing individual quota programs in Atlantic Canada and other parts of country as of early 1990s).

Notably, under a court-imposed deadline, the regime for managing New England groundfish recently was changed in ways that eventually may facilitate the introduction of individual transferable quotas in the groundfish fishery that has resisted such measures for decades. In particular, the management changes create tradable "days-at-sea." Tradable days-at-sea differ from individual transferable quotas since days-at-sea limit input into the fishery (days are traded). In contrast, individual transferable quotas limit output (shares of the catch are traded). However, tradable days-at-sea may promote industry consolidation, which, in turn, may facilitate the introduction of individual transferable quotas. In addition, the management changes allow groups of fishers to establish a sector and receive an allocation of the harvest for the sector which the group would manage. If this mechanism takes hold, it may enable groups of fishers to establish their own community-based versions of individual transferable quotas. For example, in Atlantic Canada, communities of fishers managing shares of the total allowable catch of groundfish have established individual transferable quota programs within their communities. See N.E. REGION, NAT'L MARINE FISHERIES SERV., *SMALL ENTITY COMPLIANCE GUIDE 1* (2004) (providing background on Amendment 13), available at <http://www.nero.noaa.gov/amend13/phl/amend13.pdf>; Beth Daley, *Various Sides Angle to Cut Overfishing: New Rules Enter the Final Stages*, BOSTON GLOBE, Nov. 7, 2003, at C19 (reporting on New England Fishery Management Council deliberations on Amendment 13); Doug Fraser, *New Rules Deal Cape Fishermen a Blow*, CAPE COD TIMES, May 2, 2004 (reporting on Amendment 13), at <http://www.capecodonline.com/archives/index.htm>; Janice M. Plante, *Hook Fishermen Form Sector*, COMM. FISHERIES NEWS, Sept. 2004, at 1A (reporting July 2004 formation of first sector in Northeast, which is comprised of fifty-eight fishers in Cape Cod groundfish fishery); Alcock, *supra* note 28, at 268, 278-95 (discussing community management in Atlantic Canada).

¹⁵² See generally LIBECAP, *supra* note 10 (discussing obstacles to changes in property rights in various natural resources, including fisheries); Edwards, *Rent-Seeking*, *supra* note 69 (offering largely bottom-up explanation for why tradable rights have been slow to emerge in U.S. Atlantic sea scallop fishery); Hannesson, *supra* note 115 (discussing political economy of individual transferable quotas); Johnson & Libecap, *supra* note 31 (explaining persistence of common property in fisheries, focusing on Texas shrimp fishery);

of political institutions, I begin instead by discussing the collective-choice rules for introducing tradable rights and then analyze the impact of underlying economic and social factors in light of these rules.

C. Analysis of the Pattern of Tradable Rights Formation

1. Political Institutions

Earlier, I suggested that the more political institutions collectively generate a decisionmaking rule that approximates the rule of unanimity prevailing in the marketplace, the more difficult it will be to introduce private property.¹⁵³ Conversely, the more concentrated in fewer institutions the decisionmaking process is, the lower the expected decisionmaking costs and the higher the probability of a more rapid transition to private property.¹⁵⁴ It might be argued, then, that tradable rights have been slow to evolve in U.S. federal coastal fisheries because the political institutions governing these fisheries collectively generate a decisionmaking rule that is relatively close to requiring the unanimity of the affected parties.

In this Section, I argue that while implementing tradable rights typically does not require the unanimous agreement of everyone in the fishing industry who would be affected, the standard U.S. decisionmaking process is highly inclusive and generates decisionmaking costs that have delayed the pace of change. I begin by discussing the decisionmaking costs generated by the design and the operation of the collective bodies that typically must propose individual transferable quotas, the regional fishery management councils. Then I underscore the decisionmaking costs generated by other veto players whose agreement may be required to implement tradable rights. I focus especially on the role of Congress, and in particular on a small group of senators from coastal states.

Repetto, *supra* note 76 (explaining divergence in management approaches in U.S. and Canadian sea scallop fisheries and arguing for rights-based approach in U.S. sea scallop fishery); Alcock, *supra* note 28 (examining pattern of property rights formation in four North Atlantic fisheries, including New England fisheries, by primarily focusing on implications of uncertainty among fishers about distributional consequences of rearranging rights and industry heterogeneity, especially degree of vertical integration of harvesting and processing operations). *But see* Andrew W. Kitts & Steven F. Edwards, *Cooperatives in US Fisheries: Realizing the Potential of the Fishermen's Collective Marketing Act*, 27 MARINE POL'Y 357, 365 (2003) (recognizing government's important role in "facilitating new property rights").

¹⁵³ See *supra* Part I.A.

¹⁵⁴ This statement assumes that the overall level and distribution of demand are constant.

At first glance, the political institutions discussed below may not seem particularly exogenous to economic and social forces, as the councils, NMFS, the courts, and Congress all are susceptible to interest group influence to varying degrees. Nonetheless, in combination, these institutions generate a decisionmaking process that has influenced the evolution of property rights in fisheries. That process has contributed to the delay in implementing tradable rights by providing many opportunities for fishers opposed to tradable rights, or to a proposed initial allocation of rights, to veto change. In addition, the process may have aggravated the conflicts about the expected distribution of rents from tradable rights by lowering the costs of voicing opposition to proposed allocations.¹⁵⁵

a. Regional Fishery Management Councils

As mentioned above, Congress legislated a regulatory apparatus for managing the fisheries that came under federal jurisdiction when it was expanded to 200 miles in 1976.¹⁵⁶ While the regulatory apparatus has been amended several times since, the standard initiators of federal fisheries regulation remain the eight regional fishery management councils created in 1976 to manage different parts of the U.S. EEZ.¹⁵⁷ Under the Magnuson-Stevens Act, fishery-management measures, including individual transferable quotas, typically must originate in a recommendation from one of the councils to NMFS.¹⁵⁸ There are only two exceptions. The first is the small number of fisheries directly managed by the Secretary of Commerce under the Act, in which the councils play no role.¹⁵⁹ The second is the small number of circumstances in which fishing industry participants are able to agree privately on fishery-management measures, typically because the councils already have limited the number of participants in a fishery and initiated other regulations that facilitate private contracting, such

¹⁵⁵ See *infra* Part II.C.2.a; see also *supra* note 37 (noting proposals, which would add to difficulty of creating such quotas through councils, to require referenda of fishers before introducing individual transferable quotas).

¹⁵⁶ See *supra* text accompanying note 90.

¹⁵⁷ See *supra* note 89 (noting that zone managed by councils originally was called "fishery conservation zone").

¹⁵⁸ See 16 U.S.C. § 1854(c)(3) (2000) (identifying respective roles of councils and Secretary of Commerce in preparation and approval of fishery management plans and indicating that councils must approve individual fishing quota programs); *supra* note 37 (indicating that Magnuson-Stevens Act is main statute governing regulation of fisheries in federal waters).

¹⁵⁹ See § 1854(g) (stating that Secretary of Commerce is responsible for preparing fishery management plan for Atlantic highly migratory species).

as a total allowable catch subdivided among different categories of industry participants.¹⁶⁰

Assigning the councils primary responsibility for proposing and initially allocating tradable rights in most fisheries increases the difficulty of introducing tradable rights. This is because the councils are collective decisionmaking bodies made up of representatives who are very susceptible to interest group pressures. The members of the councils are divided into voting and non-voting members.¹⁶¹ Most of the voting members are representatives of commercial and recreational fishing interests who are appointed by the U.S. Secretary of Commerce based on recommendations from state governors.¹⁶² The other voting members are primarily state marine fisheries regulators who acquire their voting seats by virtue of their positions. Finally, a senior NMFS administrator also has a voting seat on each of the councils.¹⁶³ The appointed members of the councils tend to advocate for particular sectors of the fishing industry defined by geography, gear, or species fished, while the state regulatory officials tend to promote the interests of their home-state fisheries.¹⁶⁴

¹⁶⁰ See *supra* note 129 and accompanying text (referring to procedures for establishing cooperatives); see also *infra* tbl.6 (indicating that one fishery directly under the supervision of the Secretary of Commerce has switched to tradable rights and that four fisheries have shifted through cooperative agreements). It should be emphasized that the experience to date probably exaggerates the likelihood of shifting to tradable rights through cooperative agreements, given that the 1996-2002 moratorium on the councils recommending, and NMFS approving, individual transferable quotas likely increased the incentive for fisheries to shift to tradable rights via cooperation.

¹⁶¹ 16 U.S.C. § 1852(b)-(c) (2000); EAGLE ET AL., *supra* note 37, at 12.

¹⁶² § 1852(b)(1)-(2). Appointed members are chosen by the Secretary of Commerce based on recommendations from coastal state governors who must consult with commercial and recreational fishing interests; the Secretary must ensure fair and balanced apportionment between recreational and commercial fisheries. *Id.*; see also EAGLE ET AL., *supra* note 37, at 24-26 (providing statistics on composition of councils).

¹⁶³ § 1852(b)(1)(B). The senior NMFS regional administrator in each region is a voting member of the council for his or her region, resulting, for example, in the Northeast regional administrator sitting as a voting member on the New England Fishery Management Council. *Id.*

¹⁶⁴ EAGLE ET AL., *supra* note 37, at 26. This advocacy on the part of the appointed and state members is consistent with the wishes of the original coalition behind the Magnuson-Stevens Act, which sought direct industry and state involvement in managing federal fisheries because fishers feared regulation by a distant federal government. See WEBER, *supra* note 89, at xxi, 78, 83 (explaining allocation of responsibilities in fisheries management before 1976 and referring to pressures behind changes legislated in 1976); William R. Rogalski, *The Unique Federalism of the Regional Councils Under the Fishery Conservation and Management Act of 1976*, 9 B.C. ENVTL. AFF. L. REV. 163, 173-75 (1980) (explaining state representation on regional councils); see also 141 CONG. REC. S234 (1995) (reporting that Senator Stevens introduced bill to amend Magnuson-Stevens Act in 1995, indicating "I still believe in the basic goal Senator Magnuson and I had for the original Act—that the councils should be made up of the people directly affected by fishery management decisions").

Since they are drawn predominantly from the fishing community, council members are cautious about recommending fishery-management measures such as individual transferable quotas that will affect fishers differentially. As a result, the councils are unwilling to proceed until they have crafted a proposal, including an initial allocation of tradable rights, that satisfies a broad range of the fishing interests represented on the councils.¹⁶⁵ The councils' preference for consensus is indicated by council votes on proposals to recommend individual transferable quotas. Formally, the support of only a majority of the voting members is required in order to make such a recommendation.¹⁶⁶ However, the councils' voting records suggest that council members will vote in favor of individual transferable quotas only if there is close to two-thirds support on the council.¹⁶⁷

Notably, there are parallels between the federal regimes for managing fisheries legislated in 1976 and the regime for managing public rangelands created in the 1930s. In particular, the latter regime also included powerful boards of users. See George Cameron Coggins & Margaret Lindeberg-Johnson, *The Law of Public Rangeland Management II: The Commons and the Taylor Act*, 13 ENVTL. L. 1, 48-49, 56-60 (1982) (discussing original Grazing Advisory Boards); Todd M. Olinger, *Public Rangeland Reform: New Prospects for Collaboration and Local Control Using the Resource Advisory Councils*, 69 U. COLO. L. REV. 633, 656-81 (1998) (discussing subsequent reforms to rangelands management); see also EAGLE ET AL., *supra* note 37, at 41 (drawing parallels between federal regulation of fishing and grazing).

¹⁶⁵ See, e.g., B.J. McCay, *Initial Allocation of Individual Transferable Quotas in the U.S. Surf Clam and Ocean Quahog Fishery*, in CASE STUDIES ON THE ALLOCATION OF TRANSFERABLE QUOTA RIGHTS IN FISHERIES 86, 89 (FAO Fisheries Technical Paper No. 411, R. Shotton ed., 2001), available at http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/005/Y2684E/y2684e00.htm ("The appointed Mid-Atlantic Council members voted in favor of the fishery management plan amendment that introduced ITQs to these fisheries, only when they knew that there was widespread, nearly unanimous, agreement."). See generally Shepherd R. Grimes, *The Federal Regional Fishery Management Councils: A Negotiated Rulemaking Approach to Fisheries Management*, 6 OCEAN & COASTAL L.J. 187 (2001) (comparing councils to negotiated rulemaking committees).

¹⁶⁶ 16 U.S.C. § 1852(e)(1) (2000) ("All decisions of any Council shall be by majority vote of the voting members present and voting."); § 1854(c)(3) (stating that individual fishing quota programs require approval of majority of voting members of council).

¹⁶⁷ The following table lists the council votes that I have identified on motions to recommend that the Secretary of Commerce establish individual transferable quotas. These votes typically were preceded by many other votes on individual components of the package that a council submits to the Secretary in recommending individual transferable quotas.

The following votes cover six individual transferable quota and analogous programs that have been implemented, one program (for Gulf of Mexico red snapper) that was approved, but subsequently blocked, by Congress, and two programs that have been recommended by the North Pacific Council but not yet approved by NMFS (halibut charter and crab rationalization). It should be noted that the vote on crab rationalization was not a vote to submit formally a scheme to the Secretary for approval, but rather a vote on the council's preferred alternative for rationalizing the Bering Sea/Aleutian Islands crab fisheries. This vote came in response to a congressional directive to analyze rationalization for the crab and other fisheries.

Although the process seems to require a reasonably high degree of consensus among council members to introduce individual transferable quotas, it should be emphasized that the councils often are not representative of the various components of the industry. Consistent with the predictions of public choice theory, the councils tend to be more representative of the larger, better-capitalized segments of the fishing industry.¹⁶⁸ This overrepresentation of the larger, better-capi-

Council	Fishery	Date of Vote	Vote	Percent of Members Voting for Tradable Rights
Mid-Atlantic	Surfclam and ocean quahog	October 1989	16-2, 1 abstention	84%
South Atlantic	Wreckfish	August 1991	Motion passed without objection	100%
North Pacific	Halibut and sablefish	December 1991	7-4	64%
Gulf of Mexico	Red snapper	May 1995	12-4	75%
Pacific	Sablefish permit stacking	October 2000	14-0	100%
North Pacific	Halibut charter	April 2001	8-3	73%
North Pacific	Crab rationalization	June 2002	11-0	100%

See Minutes of the Mid-Atlantic Fishery Management Council Meeting 83 (Nov. 22, 1989) (transcript on file with the *New York University Law Review*); Minutes of the Full Counsel Session of the South Atlantic Fishery Management Council 22-24 (Aug. 28, 1991) (transcript on file with the *New York University Law Review*); Minutes of the Ninety-ninth Plenary Session of the North Pacific Fishery Management Council, *supra* note 149, at 7-9 (meeting on December 3, 1991); Minutes of the 139th Meeting of the Gulf of Mexico Fishery Management Council 43-44 (May 11, 1995) (transcript on file with the *New York University Law Review*); Minutes of the Pacific Fishery Management Council Meeting 30-34 (Oct. 31, 2000) (transcript on file with the *New York University Law Review*); Minutes of the 150th Plenary Session of the North Pacific Fishery Management Council 12-13 (Apr. 11, 2001), available at <http://www.cdqdb.org/reading/npfmcminutes/npfmcplenaryminutes0104.pdf>; Minutes of the 157th Plenary Session of the North Pacific Fishery Management Council 37-38 (June 6, 2002), available at <http://www.fakr.noaa.gov/npfmc/minutes/Council602.pdf>; see also Letter from David Benton, Chairman, and Chris Oliver, Executive Director, North Pacific Fishery Management Council, to Senators and Representatives (Aug. 5, 2002), in N. PAC. FISHERY MGMT. COUNCIL, NAT'L MARINE FISHERIES SERV., BERING SEA ALEUTIAN ISLANDS CRAB FISHERIES DRAFT ENVIRONMENTAL IMPACT STATEMENT app. 2 (2004) (mentioning 11-0 vote in favor of crab rationalization program at June 2002 meeting of North Pacific Fishery Management Council), available at http://www.fakr.noaa.gov/npfmc/current_issues/crab/BSAICrab%20report%20to%20congress802.pdf.

¹⁶⁸ See Laura Loucks et al., *Experiences with Fisheries Co-Management in North America*, in THE FISHERIES CO-MANAGEMENT EXPERIENCE: ACCOMPLISHMENTS, CHALLENGES AND PROSPECTS 153, 156 (Douglas Clyde Wilson et al. eds., 2003) (indicating that small-scale fishers are disadvantaged in local and higher level decisionmaking); Thomas A. Okey, *Membership of the Eight Regional Fishery Management Councils in the United States: Are Special Interests Over-Represented?*, 27 MARINE POL'Y 193, 199 (2003)

talized interests likely helps to mitigate, although not eliminate, the otherwise high cost of bargaining a consensus on the introduction and initial allocation of individual transferable quotas.¹⁶⁹

b. Additional Veto Players

In addition to the difficulty of reaching agreement in the regional fishery management councils, another factor that increases the decisionmaking costs of establishing tradable rights is the existence of three veto players that may block council recommendations to proceed. NMFS, the courts, and Congress offer interest groups disgruntled with council recommendations opportunities to challenge those proposals. Moreover, there are indications that the existence of these veto players has feedback effects on the council process, as the councils appear to have internalized the possibility that these institutions may veto council proposals.¹⁷⁰

(noting that “commercial interests generally dominate the appointed council seats,” and “the interests within this category are generally skewed towards the larger corporate interests”); Matthew Turner & Quinn Weninger, *Meetings with Costly Participation: An Empirical Analysis* 27 (2004) (unpublished manuscript) (describing recent empirical study suggesting that “[l]arger, closer, and more influential firms” are more likely to attend council meetings), available at <http://www.chass.utoronto.ca/ecipa/archive/UT-ECIPA-MTURNER-01-02.pdf>.

¹⁶⁹ Given the overrepresentation of certain interests on the councils, it is not surprising that individual transferable quotas have been implemented without widespread support in some fisheries. See, e.g., Gunnar Knapp, *Thalassorama: Alaska Halibut Captains' Attitudes Towards IFQs*, 11 MARINE RESOURCE ECON. 43, 43 (1996) (reporting survey of Alaskan halibut vessel captains indicating that only minority supported individual fishing quotas in year before they were implemented). In addition, in another reflection of the overrepresentation of certain interests, the formulae for allocating rights have tended to produce concentrated initial distributions. See, e.g., ALASKA REGION, NAT'L MARINE FISHERIES SERV., FINAL ENVIRONMENTAL IMPACT STATEMENT FOR AMERICAN FISHERIES ACT AMENDMENTS 61/61/13/8, at 3-120 (2002) (describing North Pacific Council's regulatory framework for inshore pollock cooperatives as favoring inshore pollock processors over independent catcher vessels), available at http://www.fakr.noaa.gov/sustainablefisheries/afa/final_eis/cover.pdf; Knapp, *supra*, at 45 (noting North Pacific Council's initial allocation of halibut shares was concentrated among few holders from fishery of thousands); J.R. Pegg, *Controversial Fishery Rider Drifting Toward Final Passage*, ENV'T NEWS SERV., Nov. 19, 2003 (describing North Pacific Council's crab rationalization plan as benefiting primarily onshore processors).

¹⁷⁰ For anecdotal evidence that council members consider the oversight of the three institutions in debating individual transferable quotas, see, for example, the minutes of a Mid-Atlantic Council meeting discussing individual transferable quotas for ocean quahogs and Atlantic surfclams; Minutes of the Mid-Atlantic Fishery Management Council Meeting, *supra* note 167, at 34 (statement of Lee Anderson) (referring to congressional intervention in establishment of individual transferable quota for Atlantic surfclams and ocean quahogs); *id.* at 35-36 (discussing NMFS's preliminary review of individual transferable quota plan); *id.* at 39 (referring to possibility of lawsuit challenging plan).

Under the Magnuson-Stevens Act, council recommendations cannot take effect unless they are approved by NMFS.¹⁷¹ An agency housed in the Department of Commerce, NMFS is limited to approving, disapproving, or partially approving council recommendations.¹⁷² NMFS rarely explicitly disapproves a fisheries management measure,¹⁷³ and its reaction to individual transferable quota proposals transmitted by the councils is no exception. To my knowledge, it has never directly vetoed a suggestion to implement tradable rights.¹⁷⁴

Nonetheless, NMFS's history of approving individual transferable quotas should not be taken as an indication that agency approval is merely a formality in the process of implementing tradable rights. Combined with the voting seat of a NMFS regional administrator on each of the councils, NMFS's formal power of approval enables the agency to influence the development of individual transferable quota proposals before the councils. Indeed, the councils first considered using individual transferable quotas in the late 1980s and early 1990s partly because there were vocal proponents of tradable rights within NMFS in this period.¹⁷⁵ Lacking the authority to introduce the quotas

¹⁷¹ See 16 U.S.C. § 1852(h)(1) (2000) (describing council functions as including preparation of fishery management plans and plan amendments for submission to Secretary); § 1854(a) (specifying that Secretary must review plans and plan amendments submitted by councils).

¹⁷² § 1854(a). Formally, fishery-management measures require the approval of the Secretary of Commerce. In practice, however, the Secretary typically delegates his or her authority to approve measures.

¹⁷³ EAGLE ET AL., *supra* note 37, at 32 (noting that "disapprovals of council management measures are rare"). During the period of the authors' study, "NMFS disapproved at best 0.4% of the individual management measures submitted by the councils—or only one in every 250 measures." *Id.*

¹⁷⁴ In the early 1990s, before the moratorium on Secretarial approval of individual transferable quotas, NMFS approved proposals for individual transferable quotas submitted by the councils for five fisheries in their entirety. See generally Pacific Halibut Fisheries; Groundfish of the Gulf of Alaska; Groundfish Fishery of the Bering Sea and Aleutian Islands; Limited Access Management of Fisheries off Alaska, 58 Fed. Reg. 59,375 (Nov. 9, 1993) (to be codified at 50 C.F.R. pts. 204, 672, 675, 676); Snapper-Grouper Fishery of the South Atlantic, 57 Fed. Reg. 7,886 (Mar. 5, 1992) (to be codified at 50 C.F.R. pt. 646); Atlantic Surf Clam and Ocean Quahog Fishery, 55 Fed. Reg. 24,184 (June 14, 1990) (to be codified at 50 C.F.R. pt. 652).

Although there could be others, I have come across only one instance in which NMFS objected in this period to an individual transferable quota plan: the proposal from the Gulf of Mexico Council for individual transferable quotas for the red snapper fishery. Moreover, in that case the agency limited itself to disapproving only three measures in the proposal and ultimately approved the remainder of the plan. However, the plan was not implemented due to the moratorium included in the 1996 amendments to the Magnuson-Stevens Act. Reef Fish Fishery of the Gulf of Mexico, 60 Fed. Reg. 61,200 (Nov. 29, 1995) (to be codified at 50 C.F.R. pt. 641); Reef Fish Fishery of the Gulf of Mexico, 60 Fed. Reg. 44,825 (Aug. 29, 1995) (to be codified at 50 C.F.R. pt. 641).

¹⁷⁵ See, e.g., COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 32 ("From the late 1970s and particularly the 1980s, leading scientists and officials in NMFS

in most federal fisheries directly, these proponents promoted the use of individual transferable quotas indirectly, for example, by disseminating information about them.¹⁷⁶

In addition to NMFS, the federal courts are a potential veto player in the fisheries management process. In the early 1990s, disgruntled commercial fishing interests brought two suits challenging

avored limited entry and IFQs.”); WEBER, *supra* note 89, at 184–85 (noting that, after Bill Fox became director of NMFS in 1990, agency developed strategic plan which, among other matters, “proposed addressing over-capitalization in fisheries by moving from open access to closed access through such measures as ITQs”); *Reauthorization of the Magnuson Fishery, Conservation, and Management Act: Hearings Before the Comm. on Commerce, Sci., and Transport.*, 103rd Cong. 8, 11–12, 17 (1993) (statement of Douglas K. Hall, Assistant Sec’y of Commerce for Oceans & Atmosphere, Nat’l Oceanic & Atmospheric Admin.) (outlining arguments for individual transferable quotas and describing recent U.S. experience with them in positive light, but expressing somewhat greater caution about individual transferable quotas in response to question from Senator Kerry on administration’s position); *id.* at 23–24 (statement of Michael Sissenwine, Ph.D., Senior Scientist for Fisheries) (explaining that, while ITQs are not “unique panacea that apply everywhere . . . , there is a widespread need for some sort of access control”); *Transferable Quotas Under the Magnuson Act: Hearings Before the Subcommittee on Fisheries Management of the House Committee on Merchant Marine and Fisheries*, 103rd Cong. 68–69 (1994) (statement of Rolland A. Schmitt, Assistant Adm’r for Fisheries, Nat’l Marine Fisheries Serv.) (supporting individual transferable quotas, but recognizing that “they are not a panacea,” stating that “[i]t is my hope that through better understanding and example, the ‘benefits’ to be derived through ITQ systems as applied to fisheries ‘where the shoe fits’ will lead to increased industry support”); *see also* 1 LEE G. ANDERSON, *Forward to CONSIDERATION OF THE POTENTIAL USE OF INDIVIDUAL TRANSFERABLE QUOTAS IN U.S. FISHERIES* (1992) (attempting, in first of five-volume report commissioned by NMFS, “to explain the general principles of ITQs and to show how they might be applied to specific fisheries”); Jeffrey P. Cohn, *Fish Story*, GOV’T EXECUTIVE MAG. (Apr. 1, 2000) (quoting former NMFS Administrator Rolland Schmitt as stating that agency had “aggressively campaigned for [quotas] before [1996],” and that he would “ask Congress to remove the moratorium and allow the choice to rest with the fishing community and councils”) (first alteration in original), at <http://www.govexec.com/features/0400/0400s3.htm>.

¹⁷⁶ At first glance, it may seem paradoxical that top officials in a regulatory agency such as NMFS would support an instrument that devolves decisions about allocating resources to the marketplace. Nonetheless, the agency’s support for individual transferable quotas is understandable even if civil servants are characterized as budget-maximizers. In the short term, individual transferable quotas would devolve few of NMFS’s functions to the market. Under the bifurcated management regime, the councils, not NMFS, are largely responsible for allocating access to fisheries among different sectors of the industry. Accordingly, it is the councils, not NMFS, that might suffer a reduction in their responsibilities if markets replaced government agencies as the vehicle for allocating access to fisheries. Furthermore, as discussed *infra* Part II.C.2.b, demand for the functions that NMFS performs—enforcement and fisheries science—actually may increase under individual transferable quotas. *See infra* text accompanying notes 212–20; Reef Fish Fishery of the Gulf of Mexico, 60 Fed. Reg. 61,200, 61,204 (Nov. 29, 1995) (to be codified at 50 C.F.R. pt. 641) (forecasting increased enforcement costs); Clarence G. Pautzke & Chris W. Oliver, Development of the Individual Fishing Quota Program for Sablefish and Halibut Longline Fisheries off Alaska, Presentation to the National Research Council’s Committee to Review Individual Fishing Quotas 18 (Sept. 4, 1997) (forecasting “significant additional enforcement burdens”), at http://www.fakr.noaa.gov/npfmc/sci_papers/ifqpaper.htm.

the rules implementing individual transferable quotas in four fisheries. Just as NMFS tended to approve individual transferable quota proposals submitted by the councils in the early 1990s, so the courts in these cases deferred to NMFS and the councils, upholding the individual transferable quota programs.¹⁷⁷ Even so, the availability of judicial review provided a check on council arbitrariness in fashioning individual transferable quota programs.¹⁷⁸ Moreover, the rise in litigation challenging fishery-management measures since the early 1990s and NMFS's deteriorating win-loss record suggest that the courts might become more active players in the establishment of tradable rights.¹⁷⁹

Of the three institutional actors who may block council recommendations to establish individual transferable quotas, members of Congress from coastal states, especially senators, have been the most visible veto players to date. The role of coastal-state senators in blocking the establishment of tradable rights was most evident between 1996 and 2002. During this period, a small group of coastal-state senators used the Senate's individualistic voting rules to significantly increase the costs of establishing tradable rights in many coastal fisheries.¹⁸⁰

¹⁷⁷ See *Alliance Against IFQs v. Brown*, 84 F.3d 343 (9th Cir. 1996) (rejecting challenge to halibut and sablefish individual transferable quota programs brought by harvesters who did not receive initial allocations either because they did not fish in qualifying years, or because they did not own or lease boats and accordingly were ineligible as threshold matter); *Sea Watch Int'l v. Mosbacher*, 762 F. Supp. 370 (D.D.C. 1991) (rejecting challenges to individual fishing quotas implemented in Atlantic surfclam and ocean quahog fisheries).

For a constitutional rather than an administrative law challenge, see *Arctic King Fisheries, Inc. v. United States*, 59 Fed. Cl. 360 (Fed. Cl. 2004), which denied the plaintiff's challenge to the enactment of the American Fisheries Act and held that the exclusion of the plaintiff's vessel from the fishery in question was not a "taking" of the plaintiff's property.

¹⁷⁸ For example, the Mid-Atlantic Council considered the possibility of a lawsuit challenging its individual transferable quota proposals for the surfclam and ocean quahog fisheries. See Minutes of the Mid-Atlantic Fishery Management Council Meeting, *supra* note 167, at 39.

¹⁷⁹ See NAT'L ACAD. PUB. ADMIN., COURTS, CONGRESS, AND CONSTITUENCIES: MANAGING FISHERIES BY DEFAULT 13-16 (2002). According to this report, there were ninety-seven cases pending challenging federal fishery-management measures in 2001. *Id.* at 13. Notably, only ninety-one cases challenging federal fisheries measures were decided between 1977 and 2001. *Id.* at 14. Moreover, the report points out that NMFS's win-loss record has deteriorated substantially in recent years. Before 1997, the government won eighty-three percent of decided cases, while, between 1998 and 2001, it won only forty-five percent of decided cases. *Id.* The amendments to the Magnuson-Stevens Act passed in 1996 correlate closely to the increase in litigation and NMFS's deteriorating win-loss record. *Id.* at 12.

¹⁸⁰ See STEVEN S. SMITH, *THE AMERICAN CONGRESS* 70-72 (2d ed. 1999) (comparing rules in House and Senate).

Despite the fact that by 1995 individual transferable quotas had been established in a number of coastal fisheries and were under consideration for others,¹⁸¹ individual transferable quotas had attracted enough opposition from segments of the fishing industry and some environmentalists to inspire congressional opposition.¹⁸² When the Magnuson-Stevens Act was reauthorized in 1996, this opposition succeeded in obtaining a moratorium on the creation of new individual transferable quotas under the Act. Enacted against the wishes of NMFS and the councils, the moratorium prevented the councils from recommending, and NMFS from approving, individual transferable quotas for four years.¹⁸³

The intervention of coastal-state senators in the debate about individual transferable quotas is only one example of senators intervening in fisheries management on behalf of fishing industry constituents. Indeed, many commentators have argued in recent years that fisheries governance is plagued by 'end runs,' with interest groups regularly circumventing the councils and NMFS and taking their arguments to Congress and the courts. See, e.g., NAT'L ACAD. PUB. ADMIN., *supra* note 179, at ix-xiv (describing pressures on federal fisheries management system); Sutinen, *supra* note 100, at 6 (referring to "persistent pattern of 'end runs' in management decisionmaking," and pointing to growth of litigation and congressional intervention in fisheries governance in form of "[p]ressure on Councils & NOAA [fisheries]"); Beth Daley, *It's All About End Runs for the Special Interests*, BOSTON GLOBE, Oct. 28, 2003, at A17 (quoting unnamed "high-ranking National Marine Fisheries Service employee" as stating that "[i]n New England fishing, it's all about end runs' for the special interests"). Some commentators have suggested that the recent pattern of legislator intervention is nothing new, and possibly endemic. See Carr & Scheiber, *supra* note 89, at 57-58 (describing fishers as concentrated minority with powerful political patrons, today and in past); David A. Dana, *Existence Value and Federal Preservation Regulation*, 28 HARV. ENVTL. L. REV. 343, 380 (2004) ("A member from a coastal district with large commercial fisheries must care about, and work hard to advance, the interests of commercial fishermen.").

Accounts of environmental lawmaking in other policy areas suggest a similar pattern among senators and House members from states or districts with extractive industries blocking reform. See Olinger, *supra* note 164, at 640, 657-58, 676 (referring to Senate, and to lesser extent, House, efforts to block reform of public rangeland management in 1990s at behest of western ranchers); Dana, *supra*, at 382 (mentioning reaction of western Senators to Clinton-era proposals to reform grazing policy). See generally Zywicki, *supra* note 39 (discussing role of Senate as representative of "special interests").

¹⁸¹ The North Pacific Council was considering individual transferable quotas for pollock and crab. In addition, the New England Council may have been considering individual transferable quotas. Carolyn F. Creed & Bonnie J. McCay, *Property Rights, Conservation, and Institutional Authority: Implications of Magnuson Act Reauthorization for the Mid-Atlantic Region*, 9 TUL. ENVTL. L.J. 245, 247 (1996).

¹⁸² See WEBER, *supra* note 89, at 190 (discussing split among environmentalists about individual transferable quotas, which prevented important lobbying organization from taking position on them in debate preceding 1996 reauthorization of Magnuson-Stevens Act).

¹⁸³ 16 U.S.C. § 1853(d)(1) (Supp. II 1996). The moratorium was preceded by a 1995 letter from the chairmen of the House and Senate Appropriations Committees to the NMFS Administrator requesting that no further work be done to develop new individual quota programs, or to implement the plan to introduce individual quotas for red snapper advanced by the Gulf of Mexico Council. Gloria Godsell & Mary Penny Thompson, *Issues*

Ted Stevens, Republican senator from Alaska, took the lead in advocating for the moratorium, as well as on the final version of the entire 1996 reauthorization bill.¹⁸⁴ The most powerful figure in U.S. fisheries politics, Stevens was joined in a bipartisan effort by two other senators from coastal states with fishing industries: Trent Lott, Republican senator from Mississippi and Majority Leader beginning in June 1996, and John Kerry, Democratic senator from Massachusetts.¹⁸⁵ When initially enacted, the moratorium was characterized as a compromise between more extreme opponents of individual transferable quotas who were calling for an indefinite moratorium or other severe restrictions on individual quotas and proponents of tradable rights.¹⁸⁶

Surrounding the Gulf of Mexico Red Snapper Fishery and the Impact of the Magnuson Act Reauthorization, 9 TUL. ENVTL. L.J. 267, 279 (1996).

There was support in the councils for retaining the authority to propose individual transferable quotas. See David Fluharty, *Magnuson Fishery Management and Conservation Act Reauthorization and Fishery Management Needs in the North Pacific Region*, 9 TUL. ENVTL. L.J. 301, 325 n.65 (1996) (noting that in annual meeting of council chairs before Magnuson-Stevens Act was reauthorized, chairs "advocated that Congress '[g]ive Councils clear authority to use ITQs, [community development quotas] or other allocation systems, with sufficient guidelines to protect national interests, existing participants, and resource conservation'" (first alteration in original).

On NMFS's support for individual transferable quotas in the early 1990s, see *supra* note 175. Consistent with NMFS's support for expanded use of individual transferable quotas, the reauthorization bill the Clinton Administration proposed in 1994 did not include a moratorium on approving individual transferable quotas. See H.R. 4430, 103rd Cong. (1994); S. 2138, 103rd Cong. (1994).

¹⁸⁴ Fluharty, *supra* note 183, at 326 ("In his teleconference with the [North Pacific Fishery Management Council] and the Alaska Board of Fish on January 30, 1996, Senator Stevens made it clear that his goal is to place a moratorium of three to five years on further development of IFQ programs.").

¹⁸⁵ Notably, the idea of the moratorium did not originate in a reauthorization bill introduced by Senator Stevens. Suggesting again the bipartisan nature of the effort, the first reauthorization bill that I have been able to identify as including a moratorium on approvals of individual transferable quota programs by the Secretary was introduced by Senator Kerry, for himself and Senators Stevens and Murkowski. S. 2538, 103rd Cong. § 111(f) (1994). This bill proposed a different moratorium from the one that was enacted. The Secretary of Commerce would have been prohibited from approving management plans with individual transferable quotas until the Secretary promulgated guidelines for establishing individual transferable quotas that satisfied legislated criteria. *Id.* As the earlier date of Senator Kerry's bill indicates, the reauthorization debate began before 1996. The first hearing on reauthorization before the Senate Commerce Committee was held in September 1992 and momentum further increased in the 103rd Congress in 1993 and 1994. 141 CONG. REC. 591-92 (1995) (statement of Rep. Young) (referring to hearings in 103rd Congress); SUZANNE IUDICELLO ET AL., *FISH, MARKETS & FISHERMEN: THE ECONOMICS OF OVERFISHING* 165 (1999); see also *infra* text accompanying notes 202-207 (describing allocation disputes in Alaska that were behind Senator Stevens's support for moratorium); *infra* note 202 (discussing interest group pressures behind support of Senators Kerry and Lott).

¹⁸⁶ 142 CONG. REC. 23,708 (1996) (statement of Sen. Murkowski) (describing moratorium as "compromise"); IUDICELLO ET AL., *supra* note 185, at 167.

Notwithstanding the significance attached to the temporary nature of the moratorium by the supporters of individual transferable quotas in 1996,¹⁸⁷ it was renewed in 2000 for two more years.¹⁸⁸ The extension was instigated primarily by another coastal-state senator, Olympia Snowe, Republican from Maine, in response to concerns about individual transferable quotas among fishing communities in her home state.¹⁸⁹ In extending the moratorium, Senator Snowe was assisted by Senator Stevens, then the Chairman of the powerful Senate Appropriations Committee.¹⁹⁰

While the moratorium significantly increased the obstacles to introducing tradable rights in coastal fisheries by removing the possibility of going through the councils, it did not impose infinite transac-

The more extreme opposition to individual transferable quotas was reflected in the version of the bill that passed the House in the fall of 1995. The version that passed the House, H.R. 39, 104th Cong. § 16 (1995), would not have imposed an explicitly time-limited moratorium. Instead, it would have prohibited the Secretary of Commerce from approving new programs until a review of individual transferable quotas had been completed and regulations enacted in accordance with the recommendations of the review and legislated criteria. In addition, the House bill would have prohibited the sale of individual quotas issued after the passage of the bill. *Id.*; see also 142 CONG. REC. 23,701 (1996) (statement of Sen. Gorton) (referring to “the House approach of crippling all prospective quota programs before we have had the chance to assess them adequately”).

At the other end of the spectrum, senators and representatives from Washington State tended to support individual transferable quotas, reflecting the interests of the larger off-shore trawler fleets based in their state. For example, Slade Gorton, Republican senator from Washington State, unsuccessfully offered an amendment before the Senate Commerce Committee on March 28, 1996, that would have limited the moratorium to three years and only applied the moratorium to Secretarial approval of individual fishing quotas, not council consideration. See Robert T. Nelson, *State's Fishing Interests Threatened*, SEATTLE TIMES, Mar. 28, 1996, at B1 (“Washington state fishermen suffered a series of major setbacks . . . as the U.S. Senate Commerce Committee revised the Magnuson Act . . . to favor smaller boats and Alaska fishermen.”).

My history of the moratorium differs from the brief histories offered by other scholars who emphasize the disputes in the North Pacific and leave out the role of Senators Lott and Kerry. E.g., IUDICELLO ET AL., *supra* note 185, at 167; David Dana, *Overcoming the Political Tragedy of the Commons: Lessons Learned from the Reauthorization of the Magnuson Act*, 24 ECOLOGY L.Q. 833, 845–46 (1997); Shi-Ling Hsu & James E. Wilen, *Ecosystem Management and the 1996 Sustainable Fisheries Act*, 24 ECOLOGY L.Q. 799, 810 (1997); Alison Rieser, *Prescriptions for the Commons: Environmental Scholarship and the Fishing Quotas Debate*, 23 HARV. ENVTL. L. REV. 393, 410–12 (1999).

¹⁸⁷ See, e.g., 142 CONG. REC. 23,704 (1996) (statement of Sen. Murray) (expressing support for individual transferable quotas, and explaining that she has “agreed to a short moratorium on the implementation of IFQ’s” because of “controversy” surrounding them).

¹⁸⁸ Consolidated Appropriations Act, 2000, Pub. L. No. 106-554, § 144, 114 Stat. 2763, 2763A-238 (2001).

¹⁸⁹ Senator Ted Stevens, Key Note Address at the Managing Our Nation’s Fisheries Conference (Nov. 13, 2003) (transcript available at <http://stevens.senate.gov/pr/2003/november/pr111403.htm>); see also Alcock, *supra* note 28, at 163 (“New England Congressional representatives were partially responsible for extending the moratorium for an additional two years.”).

¹⁹⁰ Stevens, *supra* note 189.

tion costs. During the six-year moratorium, four fisheries still were able to establish tradable rights, two of them in Alaska, the home state of Senator Stevens. Two of these four fisheries were able to proceed, in part, because regional councils already had limited the number of participants in these fisheries and allocated to them defined shares of the catch.¹⁹¹ By limiting entry into these two fisheries and assigning them shares of the harvest, the councils effectively eased the way for the small number of parties in the fisheries to allocate privately their assigned share of the catch.¹⁹² The other two fisheries were able to implement tradable rights partly because they were granted the equivalent of congressional exemptions to the moratorium through the appropriations process (in which Senator Stevens played a key role during the relevant period).¹⁹³

¹⁹¹ These two fisheries are the Alaska weathervane scallops fishery and the offshore catcher processor fishery for Pacific whiting.

On the history of the cooperative in the Pacific whiting fishery, see COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 130 (describing history and implications of cooperative agreement); Sullivan, *supra* note 129, at 4–6 (discussing shared harvesting agreement among four companies in Pacific whiting fishery); Letter from Joseph M. Sullivan, Attorney, Mundt MacGregor L.L.P. to Joel I. Klein, Acting Assistant Attorney General, Antitrust Division, Department of Justice 2–3 (Apr. 22, 1997) (on file with the *New York University Law Review*) (describing management and sub-allocation of Pacific Coast whiting fishery).

On the background to the North Pacific Council's decision to limit entry in the Alaska scallop fishery in 1999, see N. PAC. FISHERY MGMT. COUNCIL ET AL., ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW INITIAL REGULATORY FLEXIBILITY ANALYSIS FOR AMENDMENT 4 TO THE FISHERY MANAGEMENT PLAN FOR THE SCALLOP FISHERY OFF ALASKA TO ESTABLISH A LICENSE LIMITATION PROGRAM 7–14 (1999) (on file with the *New York University Law Review*), which chronicles the history of measures regulating the Alaska scallop fishery. The scallop fishery had been subject to Guideline Harvest Levels, which are similar to a total allowable catch, established by the State of Alaska even before the Council limited entry. Notably, not all of the vessels in the Alaska scallop fishery agreed to be part of the cooperative that was formed in 2000. But the cooperative members nonetheless believed that the parties that agreed to participate held "enough of the harvesting power" to proceed. Brawn & Scheirer, *supra* note 140, at 14.

¹⁹² See Kitts & Edwards, *supra* note 152, at 358–59, 363 (implying that limited entry and total allowable catch quotas are preconditions for negotiating cooperatives privately).

¹⁹³ These two fisheries were the Pacific fixed-gear sablefish fishery and the Bering Sea/Aleutian Islands pollock fishery. Consolidated Appropriations Act, Pub. L. No. 106-554, § 144, 114 Stat. 2763, 2763A-238 (2001) (including exemption for Pacific fixed-gear sablefish); Omnibus Consolidated and Emergency Supplemental Appropriations Act, Pub. L. No. 105-277, 112 Stat. 2681, 2681-621 (1999) (including American Fisheries Act of 1998 for pollock). On the legislative history of the American Fisheries Act of 1998 for pollock, see 144 CONG. REC. S12,777–78 (daily ed. Oct. 21, 1998) (statement of Sen. Stevens); 144 CONG. REC. S12,801–02 (daily ed. Oct. 21, 1998) (statement of Sen. Gorton); 144 CONG. REC. S12,707–78 (daily ed. Oct. 20, 1998) (statement of Sen. Murray).

As implied above, a number of important provisions concerning fisheries were legislated through the appropriations process during Senator Stevens's chairmanship of the Senate Appropriations Committee (from 1997 to 2001 and from 2003 to 2004). These include the American Fisheries Act in 1998 facilitating the creation of pollock coopera-

* * *

Considered in its totality, the typical decisionmaking process for introducing tradable rights in U.S. fisheries likely has impeded greater individuation of rights because the process includes many veto points at which disgruntled fishing interests can block change. Introducing tradable rights typically requires the support of over a majority of the council members involved. Moreover, those who disagree with council decisions have enjoyed the ability to block change by appealing to NMFS, the federal courts, and especially to the small group of coastal-state senators who have shown themselves willing to veto the introduction of individual transferable quotas.

Nonetheless, the decisionmaking process is not sufficient on its own to explain the slow progress in implementing tradable rights. The mere existence of veto points in the process does not explain why the vetoes were exercised to impede change. To take one example, it is unlikely that the coastal-state senators responsible for the six-year moratorium were acting on deeply felt views of the merits of these instruments. For these senators, fisheries likely represent constituent casework,¹⁹⁴ and the senators' support for the moratorium therefore probably is best viewed as a response to pressures from interest groups in their home states.¹⁹⁵ But why would interest groups incur

tives, and the extension of the moratorium in December 2000. From 2003 to 2004, Senator Stevens similarly was responsible for an appropriations rider facilitating the creation of crab processor quotas and individual fishing quotas in the Gulf of Alaska groundfish fishery. See Press Release, Senator Stevens Formally Named Chairman of the Senate Appropriations Committee (Jan. 16, 2003), available at <http://stevens.senate.gov/pr/2003/january/pr011603.htm>; see also Carl Hulse, *A Senator Whom Colleagues Are Hesitant to Cross*, N.Y. TIMES, Oct. 25, 2003, at A13 (profiling Senator Stevens and noting his engagement in fisheries policy); Sarah Kershaw, *In Solidly Republican Alaska, a Charged Senate Race May Signal a Thaw*, N.Y. TIMES, Oct. 21, 2004, at A18 (describing Senator Stevens's role in steering federal money and other benefits to Alaska); *supra* note 130 (discussing appropriations rider for crab and Gulf of Alaska groundfish).

Fred McChesney has suggested that politicians may redirect rents to themselves by legislating (or threatening to legislate) a statute that is harmful to private interests and then forbearing from legislating, or repealing the offensive statute if it is passed. Fred S. McChesney, *Rent Extraction and Rent Creation in the Economic Theory of Regulation*, 16 J. LEGAL STUD. 101, 102–03 (1987). From a distance, it may seem tempting to explain the passage of the moratorium in 1996 and the exemptions subsequently granted to selective fisheries in these terms. However, I have seen no empirical evidence establishing that the moratorium and the exemptions fit the pattern McChesney identifies.

¹⁹⁴ See WEBER, *supra* note 89, at 185, 210 (referring to fisheries as “congressional ‘constituent casework’”); Dana, *supra* note 180, at 380 (“A member from a coastal district with large commercial fisheries must care about, and work hard to advance, the interests of commercial fishermen.”).

¹⁹⁵ See *infra* text accompanying notes 202–07 (discussing factors behind Senator Stevens's leadership on moratorium); *infra* note 202 (discussing interests behind support of Senators Kerry and Lott for moratorium).

the costs of appealing to senators or work to delay the introduction of tradable rights locally at the council level? The remainder of Part II considers what factors may have led affected parties to lobby for the exercise of vetoes.

Following the organization used in Part I, I consider the underlying factors that may have impeded greater individuation of rights under two headings. First, I discuss variables loosely related to economic and physical characteristics of fish, in particular the aggregate level and the distribution of rents expected from fishing under tradable rights, measurement and monitoring costs, and utilization levels. Second, I analyze the possibility that characteristics of the resource users in fisheries, specifically the degree of heterogeneity and the number of fishers, may have impeded change.

Overall, I conclude that conflicts about the distribution of the rents expected under tradable rights have been an important reason why change has been slow through the highly inclusive decision-making process for introducing tradable rights in most fisheries. In particular, fishers and processors seeking to maximize their share of the rents by obtaining a greater portion of the rights initially distributed for free have made considerable use of the veto points that the councils and coastal-state senators represent.¹⁹⁶ In turn, I hypothesize that utilization levels in fisheries and insufficient heterogeneity in industry structure may have exacerbated conflicts about the distribution of rents and further slowed the pace of change. Thus the story of the slow evolution of tradable rights in fisheries provides an empirical basis for reconsidering the standard hypotheses about aggregate levels of rents, measurement costs, utilization levels and the characteristics of groups most amenable to the development of private property.

2. *Attributes of the Resource*

a. *Changes in Prices*

As explained above, a standard bottom-up story is that the creation of private property is induced by increases in prices because these

¹⁹⁶ As a historical matter, conflicts about the distribution of rents in fisheries (although not about individual transferable quotas per se) may help to explain some of the many veto points in the current federal fisheries management process, especially the significant role of industry-dominated councils. See *supra* note 164 (citing sources discussing origins of regulatory regime legislated in 1976 when national jurisdiction was extended to 200 miles). However, other veto points in the management process are less easily characterized as endogenous to distributional conflicts in fisheries. For example, the ability of a few coastal-state senators to introduce and then extend through the appropriations process a moratorium on the creation of rights through the council process is not a product of distributional conflicts within fisheries but rather of decisionmaking rules originating in the Constitution, the Senate's rules, and other American legislative norms.

generate expectations of higher aggregate levels of rents under private property.¹⁹⁷ As applied to fisheries, a standard Demsetzian account might suggest that there has been considerable opposition to greater individuation of rights because fish prices have not been rising. The prices of the fish that have shifted to tradable rights therefore might be expected to have increased absolutely before tradable rights were adopted. In addition, the prices of these fish might be expected to have risen relative to the price of fish that have not adopted tradable rights, before the decision to switch was made. If the prices of non-tradable rights fish were rising faster, then price would not appear to be determinative.

The bar graphs below display estimates of the annual change in prices of the fish that switched to tradable rights in the five- and ten-year periods before the decision to convert was made.¹⁹⁸ In addition, for each fishery that switched, the bar graphs identify the annual change in the price of a comparator comprised of two fish that had not switched to tradable rights as of 2002. This comparator provides a basis for assessing the relative performance of the prices of the fish that shifted to tradable rights before individual rights were adopted.¹⁹⁹ The year in which the decision to convert the fishery to tradable rights was made is identified in brackets underneath the name of the fish species.²⁰⁰

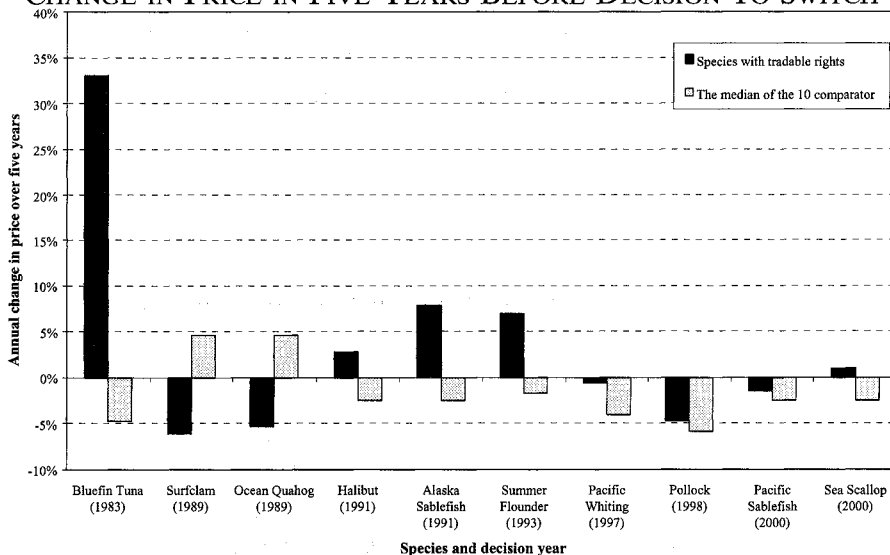
¹⁹⁷ See *supra* Part I.B.1.

¹⁹⁸ In the text above, annual change refers to the compound annual change. Thus, the two bar graphs below display the compound annual change in the price of the fisheries that switched to tradable rights, and a comparator. The compound annual change is the geometric average annual change in price, in the relevant five- and ten-year periods. See *infra* app. (explaining calculation of information in bar graphs, why no information is provided about wreckfish, and why information is provided about whiting only in five-year graph).

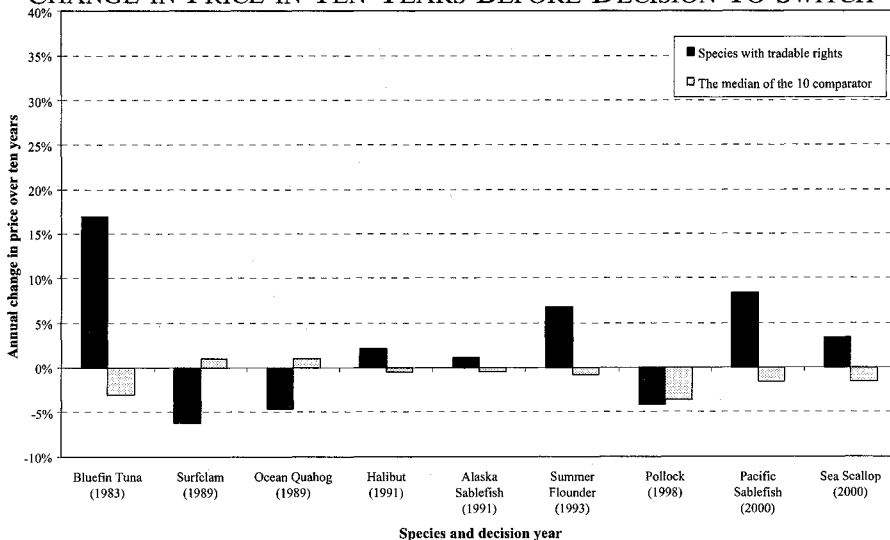
¹⁹⁹ See *infra* app. (further explaining comparator displayed in bar graphs and two other comparators that were developed).

²⁰⁰ See *infra* app. (explaining that year decision effectively was made to switch to tradable rights depends on which of three methods was used to implement tradable rights); *infra* tbl.4 (identifying effective decision year and sources); *infra* tbl.6 (identifying implementation method).

CHANGE IN PRICE IN FIVE YEARS BEFORE DECISION TO SWITCH



CHANGE IN PRICE IN TEN YEARS BEFORE DECISION TO SWITCH



The price data provides only modest support for the hypothesis that coastal fisheries may have been slow to shift to tradable rights because fish prices have not been rising. This is because the data indicates that a fish may shift to tradable rights even if the price of the fish is falling absolutely, and relative to the price of other fish. For the five-year period, the data covers ten fisheries. In the five years before these ten fisheries switched at least partially to tradable rights, the prices of only five of the fish (fifty percent) increased absolutely, and

relative to the comparator. The prices of the remaining five tradable rights fish declined absolutely (and the prices of two of these five fish also dropped relative to the comparator). For the ten-year period, the data covers nine fish that switched to tradable rights. In the ten years before the decision effectively was made to introduce tradable rights, the prices of six out of the nine fisheries (approximately sixty-seven percent) rose absolutely, and faster than the comparator. Thus, the data for the ten-year period is more consistent with the hypothesis that price increases are conducive to changes in property rights. But, even in this period, the prices of one-third of the fish that switched were falling in absolute and relative terms.

It is important to keep these ambiguous findings about prices in perspective. I am analyzing changes in prices, not rents. Moreover, since only a small number of fisheries have switched to tradable rights, I have a limited number of data points about the history of the prices of fish that have adopted tradable rights. Furthermore, the prices calculated for the fisheries that switched are estimates of the prices harvesters in these fisheries received before the decision was made to implement tradable rights, not actual prices. A fourth limitation is that I am comparing the prices of the species that switched to a comparator, not the entire universe of the many hundreds of fish not covered by tradable rights. To determine more conclusively whether fish prices have affected the development of tradable rights, it would be necessary to undertake a formal statistical analysis of the prices over time of each fish species that switched and each that did not switch.²⁰¹

Nonetheless, the difficulty of establishing a relationship between trends in fish prices and the adoption of tradable rights is suggestive because it squares with my argument that property rights do not arise smoothly in response to economic changes. Indeed, in a notable contrast with my ambiguous findings about the impact of fish prices, there is tangible evidence that disputes among powerful fishing interests about how to distribute the rents expected under tradable rights have increased the hurdles to implementing them.

Consider, in particular, the backdrop to Senator Stevens's decision to champion the moratorium on introducing individual transferable quotas through the councils that lasted from 1996 to 2002. His leadership seems to have been motivated primarily by two conflicts about how to distribute tradable rights initially in Alaska fisheries.²⁰²

²⁰¹ See *infra* app. (discussing limitations of analysis of fish prices in greater detail).

²⁰² As discussed above, Senator Stevens took the lead on the moratorium, which also was championed by Senators Kerry and Lott. See *supra* notes 184–85 and accompanying text. Like Senator Stevens, they apparently also supported the moratorium primarily because of pressures from fishing interests in their home states.

The first concerned the initial allocation of individual transferable quotas in the Alaskan halibut and sablefish fisheries, which shifted to individual quotas in 1995. Reflecting the political clout of the fishing industry, quota shares initially were distributed for free in the halibut and sablefish fisheries, as they have been in all the U.S. tradable rights programs.²⁰³ But a number of harvesters did not receive shares in the initial allocation in these two fisheries because they failed to satisfy the eligibility criteria.²⁰⁴ In addition, other harvesters who were awarded rights received very small initial allocations, which required the harvesters to buy additional quota if they wanted to continue to fish profitably for halibut or sablefish. There was little that could be done to adjust the initial allocation of quotas in the halibut and sablefish fisheries when the moratorium was legislated, since these fisheries had switched to tradable rights the year before. But Senator Stevens was aware of the concerns that still prevailed about the distribution of

Senator Lott seems to have supported the moratorium in response to a dissident group of commercial fishers and processors in the Gulf of Mexico who wanted to prevent the implementation of an individual quota program for the red snapper fishery in the Gulf. Notably, the dissidents seem to have included commercial fishing interests based in Pascagoula, Mississippi, Senator Lott's hometown. See JAMES RASBAND ET AL., *NATURAL RESOURCES LAW AND POLICY* 501-02 (2004) (explaining controversy about red snapper plan); Letter from Julius Collins et al., Chairman, Gulf of Mexico Fishery Management Council, to Dr. Andrew J. Kemmerer, Regional Director, National Marine Fisheries Service, (May 24, 1995) (on file with the *New York University Law Review*) (explaining opposition of three council members to red snapper plan). The plan, which the Gulf Council passed over the objections of the dissidents and which NMFS approved in 1995, was scheduled to be implemented in 1996. It was repealed by the statutory language creating the moratorium. 16 U.S.C. § 1853(d)(1) (Supp. II 1996). In addition, the reauthorized Magnuson-Stevens Act specifically prohibited the Gulf Council from submitting a revised version of the red snapper plan during the moratorium. See § 1883(b).

Senator Kerry's support of the moratorium seems to have been influenced by New England harvesters concerned about the mere prospect of individual quotas as well as by a number of environmentalists. New England fishers long have feared the consolidation that individual transferable quotas likely would bring, although their opposition now may be waning. See *Reauthorization of the Magnuson Fishery, Conservation, and Management Act: Hearings on S.39 Before the Comm. on Commerce, Sci., and Transport.*, 103rd Cong. 21 (1993) (statement of Sen. John Kerry) ("[S]ome industry groups and environmental groups have suggested that . . . there ought to be a moratorium on the issuance of further ITQ's . . . until we have resolved [outstanding] . . . issues [related to them]."); Alcock, *supra* note 28, at 211-29 (discussing widespread opposition to individual fishing quotas in New England); *supra* note 151 (noting that components of Amendment 13—tradable days-at-sea and provision for sectoral management—may pave way for individual transferable quotas in New England groundfish fishery); see also *supra* note 110 (discussing division among environmentalists on individual transferable quotas).

²⁰³ See Tietenberg, *supra* note 68, at 208 (suggesting that fishers may favor free allocation because it "cause[s] the least disruption from historic patterns" and "involves a much smaller financial burden on users than an auction").

²⁰⁴ See *Alliance Against IFQs v. Brown*, 84 F.3d 343, 346, 348 (9th Cir. 1996) (discussing elements of eligibility requirements in rejecting challenge to initial allocation).

rights in 1996, and they reportedly were part of the reason that he advocated a time-out in the implementation of individual transferable quotas.²⁰⁵

The second dispute about the initial allocation of tradable rights that contributed to Senator Stevens's decision to champion the moratorium was a live one in 1996. In the mid-1990s, individual transferable quotas were being discussed in Alaska as an option for the valuable pollock fishery. By then, the Alaskan pollock fishery had evolved into two sectors that were competing for shares of the catch—an offshore sector comprised of catcher processors that took and processed most of the catch at sea, and an onshore sector made up of onshore processors and the fishing vessels supplying them that took a smaller share of the harvest. The home base of most of the offshore sector was Washington State, while the onshore sector by definition was based in Alaska.²⁰⁶ In championing the moratorium, Senator Stevens responded to the wishes of the onshore sector from his home state and did battle with Senator Gorton, who represented the offshore catcher processors in favor of tradable rights. The Alaska onshore sector feared it would lose out in the initial allocation if individual transferable quotas were distributed in the mid-1990s based on then current catch history, given the Washington State-based offshore sector's predominant share of the catch at that point.²⁰⁷

²⁰⁵ For evidence of the dissatisfaction in certain quarters with the individual transferable quota programs for Alaskan halibut and sablefish around the time the moratorium was under discussion, see *id.* at 345–48, 351. The court rejected a challenge to the Alaskan halibut and sablefish individual transferable quota programs brought by harvesters who did not receive individual quotas for free in initial allocation, either because the harvesters did not fish halibut or sablefish in qualifying years or because they did not own or lease boats and accordingly were ineligible as a threshold matter. *Id.* See generally GUNNAR KNAPP & DAN HULL, ALASKA DEP'T OF COMMERCE & ECON. DEV. & THE ALASKA DEP'T OF FISH AND GAME, *THE FIRST YEAR OF THE ALASKA IFQ PROGRAM: A SURVEY OF SABLEFISH QUOTA SHARE HOLDERS* (1996) (describing follow-up survey of sablefish quota holders in first year of program); Gunnar Knapp, *Thalassorama: Initial Effects of the Alaska Halibut IFQ Program: Survey Comments of Alaska Fishermen*, 12 MARINE RESOURCE ECON. 239 (1997) (describing follow-up survey, conducted in first year of program, of individuals who received quotas in Alaskan halibut program); Lisa Busch, *Hook, Line and Quotas*, U.S. NEWS & WORLD REP., Nov. 4, 1996, at 56 (describing implementation and impact of IFQs for sablefish and halibut in Alaska).

²⁰⁶ However, there was (and is) foreign ownership of onshore processors located in Alaska. See James E. Wilen, *Alaska Fisheries Management: A Case Study of Power and Politics*, in EMERGING ISSUES IN NATIONAL OCEAN AND COASTAL POLICY 45, 46 (Harry N. Scheiber ed., 1998) (referring to foreign ownership of inshore and offshore pollock fisheries).

²⁰⁷ Within the onshore sector, onshore processors had their own reason to oppose individual transferable quotas: concern about losing bargaining power. The processors feared that individual quotas would strengthen the position of harvesters in price negotiations with processors, because the quotas would allow the harvesters to choose when they fished and thereby enhance their bargaining power to the detriment of processors that depend on

The disputes about the distribution of rents in Alaska that seem to have prompted Senator Stevens's support for the moratorium are not the only conflicts about the allocation of rents among competing fishing interests that have delayed the evolution of rights. Many of the other tradable rights programs that have been implemented in fisheries elsewhere in the country similarly were delayed by fierce competition between fishers for free shares. For example, it took over a decade, due primarily to competition for shares, for the Mid-Atlantic Council to craft an initial allocation of tradable rights in two fisheries.²⁰⁸ Moreover, disgruntled interests still challenged the allocation in court after it was approved by federal regulators, albeit unsuccessfully.²⁰⁹

The conflicts among competing interest groups about the initial allocation of tradable rights emphasize that concerns about the distribution of the rents anticipated under tradable rights have impeded

independent catcher vessels for supplies of fish. See *infra* note 280 (referring to competition between harvesters and processors for control in establishment of tradable rights in crab).

A number of sources refer to the divergent perspectives in the onshore and offshore pollock fisheries. See IUDICELLO ET AL., *supra* note 185, at 163-65 (describing various interest groups in "regional squabble over the groundfish of the North Pacific"); WEBER, *supra* note 89, at 189-90 (describing disputes between senators representing different jurisdictions over use of ITQs in managing fisheries); Dana, *supra* note 186, at 845-46 (describing Alaskan fishers' fear that individual transferable quotas would disadvantage them with respect to larger offshore trawler fleet based in Washington); Hsu & Wilen, *supra* note 186, at 810 (discussing battle between Alaskans and out-of-state industry interests to control fishery resources off Alaska); Rieser, *supra* note 186, at 410 (describing moratorium as "a battle over which sectors of the Washington and Alaska commercial fishing and processing industries would gain permanent rights to the lucrative groundfish fisheries of the North Pacific").

On Senator Gorton's role in the debate on the moratorium, see *supra* note 186.

²⁰⁸ RICHARD APOSTLE ET AL., ENCLOSING THE COMMONS: INDIVIDUAL TRANSFERABLE QUOTAS IN THE NOVA SCOTIA FISHERY 22 (2002) (noting that eleven years passed "between general agreement that some kind of individualized quota or boat quota would be a good way to manage the [surfclam and ocean quahog] fishery and agreement on ITQs . . . largely because of disputes over the basis for making the original allocation").

²⁰⁹ Sea Watch Int'l v. Mosbacher, 762 F. Supp. 370 (D.D.C. 1991). Many sources refer to difficulties encountered in agreeing on the initial allocation of rights. See generally J.R. Gauvin, *Initial Allocation of Transferable Quotas in the US Wreckfish Fishery*, in CASE STUDIES ON THE ALLOCATION OF TRANSFERABLE QUOTA RIGHTS IN FISHERIES, *supra* note 165, at 91 (discussing allocation in wreckfish); M. Hartley & M. Fina, *Allocation of Individual Vessel Quota in the Alaskan Pacific Halibut and Sablefish Fisheries*, in CASE STUDIES ON THE ALLOCATION OF TRANSFERABLE QUOTA RIGHTS IN FISHERIES, *supra* note 165, at 8-14 (discussing allocation in halibut and sablefish); Letter from Julius Collins et al., Chairman, Gulf of Mexico Fishery Management Council, to Dr. Andrew J. Kemmerer, Regional Director, National Marine Fisheries Service, *supra* note 202 (explaining opposition of three council members to individual transferable quotas for red snapper). But see Sullivan, *supra* note 129, at 5 (noting ease with which four members of Pacific whiting cooperative negotiated harvesting share agreement, and contrasting this process with difficulty of achieving initial allocation of individual quotas through councils).

change even when rights promised higher rents overall. This underscores that conflicts among powerful interest groups about the distribution of rents merit at least as much attention as economic factors such as trends in fish prices in explaining why tradable rights have been slow to emerge from the decisionmaking process that typically governs their creation.

b. Measurement and Monitoring Costs

The cost of measuring and monitoring resources is another prominent theme in prevailing accounts of the evolution of private property.²¹⁰ In particular, many scholars suggest that private property has been slow to develop in environmental resources such as fisheries, air, and water because of the higher aggregate cost of enforcing individual rights in resources that are often “fugitive.”²¹¹

Consistent with these theoretical arguments, there is empirical evidence that implementing tradable rights increases overall measuring and monitoring costs in fisheries.²¹² Under tradable rights, the

²¹⁰ See *supra* Part I.B.2.

²¹¹ LIBECAP, *supra* note 10, at 73 (arguing that “fugitive nature” of fisheries “raises the costs of defining and enforcing property rights or other regulatory arrangements”); see, e.g., DANIEL H. COLE, POLLUTION & PROPERTY 82 (2002) (arguing that introduction of emissions trading to regulate air pollution was delayed by technological constraints that limited ability “to adequately monitor point-source emissions”); EGGERTSSON, *supra* note 9, at 266 (“[H]igh exclusion costs will push the ownership structure of a resource toward a large commons, which is consistent with the organization of ocean fisheries of today.”); LIBECAP, *supra* note 10, at 26 (“[P]roperty rights arrangements to mitigate common pool losses will be more complete for stationary, observable resources, than for migratory, unobservable resources.”); Daniel B. Klein, *Fencing the Airshed: Using Remote Sensing to Police Auto Emissions*, in THE HALF-LIFE OF POLICY RATIONALES: HOW NEW TECHNOLOGY AFFECTS OLD POLICY ISSUES 86, 87 (Fred E. Foldvary & Daniel B. Klein eds., 2003) (arguing that increasing ability to fence air makes available new property rights approaches for addressing auto emissions); Jonathan H. Adler, *Conservation Through Collusion: Antitrust as an Obstacle to Marine Resource Conservation*, 61 WASH. & LEE L. REV. 3, 11–12 (2004) (arguing that mobility of many marine fish species increases costs of defining and enforcing property rights); Esty, *supra* note 55, at 175–81 (arguing that information gaps have delayed introduction of environmental property rights by increasing costs of establishing and enforcing rights, but that technological advances are increasing opportunities for establishing environmental markets, and referring to greater potential to implement individual fishing quotas in Information Age); Rose, *supra* note 27, at 22 (noting that monitoring and policing rights may be expensive, even in fisheries); Martin D. Smith & James E. Wilen, *The Marine Environment: Fencing the Last Frontier*, 24 REV. AGRIC. ECON. 31, 41 (noting that “[n]ew satellite-based global positioning systems” developed in past decade facilitate creation of spatially defined individual transferable quotas, among other instruments).

²¹² MARINE FISH CONSERVATION NETWORK, *supra* note 106, at 6 (arguing that individual fishing quotas increased management costs); COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 175–76 (citing 1997 OECD study indicating that worldwide individual transferable quotas generated higher enforcement costs or problems in eighteen fisheries, while five fisheries experienced improvements); *id.* at 316 (referring to

amount of fish taken by individual users must be monitored to ensure that they hold rights for all of the fish they harvest. Such harvester-specific information typically is not required under the management approaches that predate tradable rights because these approaches do not include individual allotments.

Nonetheless, there are grounds for doubting that the higher aggregate costs of measuring and monitoring fisheries under tradable rights have been an important factor delaying their introduction since national jurisdiction was extended almost thirty years ago.²¹³ Consider the following hypothesis: If measurement costs had been an important determinant of whether tradable rights were implemented in fisheries, then it might be expected that tradable rights would have developed first in the fisheries that are cheapest to measure and monitor. While fish often are migratory, certain species are comparatively sedentary. Since they do not roam far, sedentary species might be expected to be caught within a confined geographic area and sold at a relatively limited number of ports, which may facilitate monitoring of catches.²¹⁴ If measurement costs had been a significant factor in implementing tradable rights, then relatively sedentary species might have been expected to be the first to shift to individual transferable quotas.

However, individual transferable quotas and analogous instruments were not introduced first in relatively sedentary species, and many of the stocks governed by tradable rights are migratory.²¹⁵ This pattern of rights development casts doubt on the notion that aggregate increases in measurement and monitoring costs have been an important factor delaying the introduction of tradable rights. The pattern is far from conclusive, but the migratory character of many tradable rights fish nonetheless is suggestive because the first generation

"increased costs of managing and enforcing" individual transferable quotas in Alaskan halibut and sablefish); *id.* at 380–88 (discussing increased costs).

²¹³ As implied above, the costs of establishing individual transferable quotas likely were prohibitive before 1976 because the United States lacked jurisdiction over many fisheries throughout their range. See *supra* notes 122–24 and accompanying text.

²¹⁴ As Elinor Ostrom hypothesizes, "Where resource units move over vast terrain, the cost of measurement is higher than when they are contained (e.g., it is easier to develop effective withdrawal-rights systems for lobsters than for whales)." Ostrom, *supra* note 69, at 261. Ostrom describes individual transferable quotas as "'withdrawal' rights that are tied to resource units and not to a resource system." *Id.* at 260.

²¹⁵ The first coastal fishery in federal waters to shift to individual transferable quotas was a component of the fleet that fishes for Atlantic bluefin tuna, a highly migratory species. Notably, however, there are only three economically distinct vessel owners in the small component of the fleet governed by tradable rights and the small number of vessel owners probably has lowered measurement and monitoring costs. In total, of the eleven species covered by tradable rights, eight are migratory while only three are sedentary.

of species to shift to tradable rights might have been expected to be primarily sedentary if measurement and monitoring costs were a significant obstacle to individual rights.²¹⁶

Tradable Right Species	Migratory or Sedentary
Bluefin tuna	Highly migratory
Atlantic ocean quahog	Sedentary
Atlantic surfclam	Sedentary
South Atlantic wreckfish	Migratory
Maryland summer flounder	Migratory
Alaska halibut	Migratory
Alaska sablefish	Migratory
Bering Sea/Aleutian Islands pollock	Migratory
Pacific whiting	Migratory
Pacific sablefish	Migratory
Alaska weathervane scallops	Sedentary

E-mail from an employee of the Highly Migratory Species Management Division, National Marine Fisheries Service, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Oct. 18, 2004, 15:34 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) (discussing bluefin tuna); COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 283–84 (discussing ocean quahog and surfclams); E-mail from an employee of the Mid-Atlantic Fishery Management Council, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Oct. 14, 2004, 10:01 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) (discussing summer flounder); Joel Carlin et al., S.C. Dep't of Nat. Res., Fishery Biology, Life History and Genetic Population Structure of Globally-distributed Wreckfish, *Polyprion americanus*, at <http://www.dnr.state.sc.us/marine/mrri/wreckfish/wreckfish.html> (last visited Jan. 28, 2005) (discussing wreckfish); Telephone Interview with an employee of the Alaska Fisheries Science Center, National Marine Fisheries Service (Oct. 15, 2004) (name withheld to protect confidentiality) (notes on file with the *New York University Law Review*) (discussing Alaskan halibut, Alaskan sablefish and Bering Sea/Aleutian Islands pollock); E-mail from John DeVore, Groundfish Management Coordinator, Pacific Fishery Management Council, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Oct. 8, 2004, 18:46 EST) (on file with the *New York University Law Review*) (discussing Pacific sablefish and Pacific whiting); E-mail from an employee of the National Oceanic and Atmospheric Administration, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Oct. 8, 2004, 14:08 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) (discussing Alaska weathervane scallops).

²¹⁶ The pattern is suggestive rather than conclusive because of factors such as the small number of data points; the lack of comparative information about the mobility of the universe of fisheries in federal waters; the inability to hold constant factors other than sedentariness that may influence measurement and monitoring costs, such as the number of fishers; and the inability to examine potential interactions between sedentariness and other factors, such as changes in the price of fish.

In addition, it is possible that there are better predictors of measurement and monitoring costs than sedentariness. These other tests could include the relative ease of determining a total allowable catch for species under tradable rights and species not covered by tradable rights, or the relative number of participants in species under tradable rights and traditional forms of management. The expected impact of the number of participants

Assuming that measurement and monitoring costs have not been an important obstacle to the implementation of tradable rights in the past three decades, it may be partly because these costs often are borne by regulators rather than the fishing industry. Traditionally, regulatory agencies fund most of the costs of fisheries management out of agency appropriations, and the fishing industry in turn externalizes large portions of the cost of measuring and monitoring fisheries onto society.²¹⁷ In theory, one might expect that the introduction of individual transferable quotas would provide occasion for revisiting this longstanding practice of taxpayers subsidizing measurement and monitoring costs in fisheries. Enforcing tradable rights imposes new burdens on regulatory agencies, which consequently are motivated to seek cost recovery from the industry. In addition, the higher revenues that harvesters are expected to earn under tradable rights provide a new rationale for recovering at least a portion of management costs from the industry.²¹⁸

would depend on the relationship between participant numbers and monitoring costs in the fishery. See *infra* Part II.C.3.b. Still a third test of the impact of measurement and monitoring costs on the probability of adoption might examine a combination of factors, including group size, the number of landing ports, and the presence of processors. See, e.g., COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 381 ("In general, fisheries with a large number of participants with small vessels, landing at numerous ports in regions with easy access to markets for unprocessed products (e.g., New England fisheries, Gulf of Mexico shrimp) will be the most difficult to monitor and enforce.").

Notably, contrary to the hypothesis in the text, it might be argued that sedentary species would be less likely to be regulated by tradable rights, given that less mobile fish could be regulated through "exclusive use rights" assigned to particular geographic areas. See *id.*, at 134–35 (discussing territorial use rights in fishing).

²¹⁷ The Secretary of Commerce is authorized to recover management costs in only limited circumstances under the Magnuson-Stevens Act. The costs of issuing permits may be recovered. See 16 U.S.C. § 1853(b)(1) (2000) (noting that fishery management plan may establish fees to be paid to Secretary); § 1854(d)(1) (noting that level of authorized fees is limited to "administrative costs incurred in issuing the permits"). The Secretary is required to collect fees to maintain registries of limited access permits. See § 1855(h)(1), (5)(A) (noting that, upon registration and transfer of limited access permit (which includes an individual fishing quota), Secretary is required to collect fee which may be up to 0.5% of value of limited access permit). As discussed *infra* note 219, additional fees are recoverable in individual fishing quota fisheries.

The total amount of the fees collected from the fishing industry likely covers only a very small share of management costs in U.S. fisheries, which represented eighteen percent of the total landed value of U.S. fisheries in 1997, according to an OECD study. Paul Wallis & Ola Flaaten, Fisheries Management Costs: Concepts and Studies, Presentation at the International Institute of Fisheries Economics and Trade Conference 2 (July 10–14, 2000), available at <http://oregonstate.edu/dept/IIFET/2000/papers/wallisflaaten.pdf>.

²¹⁸ See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 214 (recommending greater cost recovery in individual fishing quota program fisheries); *Fisheries User Fees Under the Magnuson Act: Hearings on H.R. 4404 and H.R. 4430 Before the Subcomm. on Fisheries Mgmt. of the House Comm. on Merchant Marine and Fisheries*, 103rd Cong. 16–17 (1994) (statement of Douglas K. Hall, Assistant Sec'y for Oceans & Atmosphere,

In practice, however, harvesters are not required to pay the full incremental costs of measuring and monitoring tradable rights consistently, let alone shoulder the entire burden of managing tradable rights species.²¹⁹ In effect, measurement and monitoring costs in many fisheries under tradable rights continue to be at least partially externalized onto taxpayers, and thus the political salience of these costs as an obstacle to institutional change is undercut. In characterizing higher measurement and monitoring costs as an obstacle, the standard Demsetzian account assumes that these costs are borne proportionately by members of the same group that otherwise reap the benefits of private property. But since fishers are not required consistently to shoulder the full burden of the higher incremental costs of introducing tradable rights, the significance of the costs is reduced as an argument against tradable rights.²²⁰ Like the introduction of property rights, the allocation of measurement and monitoring costs is the product of a political decisionmaking process, and the clout of fishers presumably

National Oceanic & Atmospheric Admin.) (proposing greater cost recovery from industry for management, including fee on fish allocated through individual harvest shares).

²¹⁹ The industry is not assessed fees in the Atlantic bluefin tuna fishery taken by the purse seine fleet, the Mid-Atlantic ocean quahog and surfclams fisheries, or the South Atlantic wreckfish fishery. The industry is assessed fees for the entire incremental costs of individual transferable quotas in Alaskan halibut and sablefish. E-mail from Phil Smith, Restricted Access Management, National Marine Fisheries Service, to Katrina M. Wyman, Assistant Professor, New York University School of Law (June 24, 2004, 20:30 EST) (on file with the *New York University Law Review*); E-mail from Phil Smith, Restricted Access Management, National Marine Fisheries Service, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Jan. 10, 2005, 12:28 EST) [hereinafter Phil Smith Jan. 10, 2005 E-mail] (on file with the *New York University Law Review*). But since "25% of the receipts are diverted . . . for the North Pacific (IFQ) loan program[,] . . . fees cover only part (75%) of the incremental management costs." Phil Smith Jan. 10, 2005 E-mail, *supra*.

Fishers are more likely to shoulder the incremental burden of tradable rights in industry-organized schemes analogous to individual transferable quotas. For example, the industry members of the Pacific whiting and Bering Sea/Aleutian Islands catcher processor pollock cooperatives would seem to bear a significant portion (and perhaps most) of the incremental costs of tradable rights in these fisheries. See U.S. GEN. ACCOUNTING OFFICE, *supra* note 97, at 38, 40 (noting that members of Pacific whiting and offshore catcher processor pollock cooperatives maintain, and pay for, full-time federal observers on members' vessels).

The statutory authority to assess fees in individual transferable quota fisheries was introduced in 1996. See 16 U.S.C. § 1854(d)(2) (2000) (authorizing Secretary of Commerce to collect fee for "the actual costs directly related to the management and enforcement of any . . . individual fishing quota program"); § 1854(d)(2)(B) (fees collected may not "exceed 3 percent of the ex-vessel value of fish harvested under" individual fishing quota program). Fisheries that have shifted to cooperatives (such as Pacific whiting and Bering Sea/Aleutian Islands pollock) do not fall under the rubric of § 1854(d)(2) since these fisheries have allocated tradable rights outside the council process.

²²⁰ But see MARINE FISH CONSERVATION NETWORK, *supra* note 106, at 6 (criticizing individual fishing quotas based on higher management costs).

enables them to continue to externalize costs onto the many taxpayers whose agreement is not required to appropriate public funds for fish. However, regardless of why costs continue to be externalized in tradable rights fisheries, the phenomenon emphasizes that the allocation of measurement and monitoring costs may be at least as important a determinant of whether private property is introduced as the aggregate level of these costs.

c. Degree of Utilization

As described previously, prevailing explanations for the evolution of property rights suggest that there is a relationship between the degree of the exploitation of a resource and the introduction of private property.²²¹ Economist Gary Libecap provides the most detailed version of this sequential hypothesis. He suggests that private property is most likely to be introduced late in the history of exploitation, second most likely to be implemented very early, and least likely to be introduced in the interim stage between early and late exploitation.

Under Libecap's reasoning, the slow introduction of individual transferable quotas might be attributed to the existence of too few fisheries very early or very late in the history of their exploitation. Without a sufficient population of very over- or underexploited fisheries, the savings in harvesting costs from establishing individual transferable quotas may be too small to justify the costs of establishing tradable rights.²²²

Information available about the degree of utilization of U.S. coastal fisheries helps to shed light on this hypothesis. In the 1990s, NMFS issued five editions of *Our Living Oceans*, a report which offers qualitative assessments of the level of utilization of coastal fish stocks under federal and state jurisdiction. Notably, the information in these reports about the fisheries that did and did not adopt tradable rights does not square with Libecap's sequential hypothesis.

²²¹ See *supra* Part I.B.3.

²²² It should be noted that I am extending the argument that Libecap makes about the significance of the level of resource use to explain the pattern of rights development in fisheries. In *Contracting for Property Rights*, Libecap discusses the obstacles to establishing more elaborate forms of property rights in fisheries, including but not exclusively individual transferable quotas. LIBECAP, *supra* note 10, at 73-92. Libecap does not argue explicitly that property rights have been slow to evolve in U.S. fisheries because they have not been sufficiently exploited (or because they are insufficiently new) to warrant investing in new rights arrangements. Libecap describes "[m]any fisheries [as] . . . characterized by overharvest[ing], excessive capitalization, redundant labor, low incomes, and, for some, the biological depletion of species." *Id.* at 120. He attributes the delay in introducing property rights approaches such as individual transferable quotas to conflict about "the distribution of . . . resource rents." *Id.* In particular, he emphasizes that distributional conflict has "been exacerbated by heterogeneities among the bargaining parties." *Id.*

NMFS's utilization assessments can be conceived of as a "traffic light system."²²³ They provide a qualitative indication of whether there is room for the fishing industry to grow, given the need to protect the resource in the long term. An overutilized fishery is a fishery where there is far too much fishing effort, given the need to ensure healthy fish stocks well into the future. Accordingly, overutilization might be equated with a fishery late in the history of exploitation. An underutilized fishery would have capacity for more fishing effort, even taking into account the need to protect the resource. While an underutilized fishery might not be a new fishery in the sense of having been recently discovered, it is nonetheless likely to be a fishery early in the history of exploitation, with few preexisting claims relative to the abundance of the resource.²²⁴ Fishing effort in a fully utilized fishery is in better balance with the level required to conserve the resource. If there are no individual quotas, fishing effort in a fishery rated as fully utilized almost certainly is excessive in economic terms, with too many boats and fishers chasing the catch. But the level of effort is not threatening the resource, presumably because NMFS exercises sufficient control over the fishing industry through traditional management measures to protect the underlying stocks. A fully utilized fishery, then, might be analogized to the middling stage of resource exploitation that Libecap implies exists between underuse and overuse.²²⁵ As mentioned above, this is the

²²³ This description of the utilization assessments comes from a NMFS employee involved in assembling the assessments. Telephone Interview with an employee of the Alaska Fisheries Science Center, *supra* note 215.

²²⁴ Libecap defines a new fishery as a recently discovered fishery in which "there are no preexisting claims or historical catch differences that must be reconciled." LIBECAP, *supra* note 10, at 86; *see also* Libecap, *supra* note 60, at 168 (equating new resources with "newly discovered resources" in which "no production has occurred").

However, fishers in a recently discovered resource nonetheless might have accumulated a significant catch history. For example, the history of the wreckfish fishery illustrates the potential for resources to become aggressively exploited in very short periods of time. While the commercial fishery for wreckfish only began in the 1980s, it already was considered fully utilized in 1991 when the South Atlantic Council recommended individual transferable quotas. *See* NAT'L MARINE FISHERIES SERV., OUR LIVING OCEANS: THE FIRST ANNUAL REPORT ON THE STATUS OF U.S. LIVING MARINE RESOURCES 44 (1991) (classifying Atlantic wreckfish as fully utilized); COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 66-67 (describing history of wreckfish fishery).

Moreover, a fishery with few claims might not be a newly discovered fishery. Instead, it could be a fishery that was discovered many years earlier but for which a significant retail market has yet to develop.

²²⁵ *See* Libecap, *supra* note 60, at 188 (referring to "more general interim situation"). As with underutilization, the analogy is imperfect in this instance because a number of the fisheries that NMFS classifies as fully utilized likely are overcapitalized. *See infra* note 258 (describing utilization status of halibut at time decision was made to introduce tradable rights). However, in defense of the analogy, fisheries that NMFS classifies as overutilized

state of exploitation that Libecap implies is least conducive to privatization.²²⁶

Table 4 identifies the coastal fisheries that had shifted to tradable rights to varying degrees by the end of 2002. It also reproduces NMFS's assessment of the utilization level of the stocks published closest to the time that the decision to introduce tradable rights effectively was made.

presumably are in even worse biological and economic condition, suffering from overcapitalization, depleted stocks, and inadequate regulatory controls.

²²⁶ Formally, *Our Living Oceans* explains that in determining the utilization of a species, NMFS compares the existing fishing effort with the level of effort needed to achieve the long-term potential yield (LTPY) of the stock. LTPY is "the maximum long-term average yield (catch) that can be achieved through conscientious stewardship." NAT'L MARINE FISHERIES SERV., *supra* note 224, at 4. A fishery is "defined as fully utilized when the amount of fishing effort is about equal to the effort needed to achieve LTPY." *Id.* at 5. A fishery is "overutilized when more fishing effort is used than is necessary to achieve LTPY." A fishery is "underutilized when more effort is required to achieve LTPY." *Id.*; see also NAT'L MARINE FISHERIES SERV., *OUR LIVING OCEANS: REPORT ON THE STATUS OF U.S. LIVING MARINE RESOURCES 1992*, at 6-7 (1992) [hereinafter *OUR LIVING OCEANS: 1992 REPORT*] (describing classifications); NAT'L MARINE FISHERIES SERV., NAT'L OCEAN AND ATMOSPHERIC ADMIN., *OUR LIVING OCEANS: REPORT ON THE STATUS OF U.S. LIVING MARINE RESOURCES 1993*, at 7-8 (1993) [hereinafter *OUR LIVING OCEANS: 1993 REPORT*] (same); NAT'L MARINE FISHERIES SERV., *OUR LIVING OCEANS: REPORT ON THE STATUS OF U.S. LIVING MARINE RESOURCES 1995*, at 4, 6, 151-52 (1996) [hereinafter *OUR LIVING OCEANS: 1995 REPORT*] (same); NAT'L MARINE FISHERIES SERV., NAT'L OCEAN AND ATMOSPHERIC ADMIN., *OUR LIVING OCEANS: REPORT ON THE STATUS OF U.S. LIVING MARINE RESOURCES 1999*, at 13-15, 283 (1999) [hereinafter *OUR LIVING OCEANS: 1999 REPORT*] (same).

In 1992, NMFS added another characterization to *Our Living Oceans*: a measure of the stock level relative to long-term potential yield. This is a purely biological assessment of stock status which does not touch on any of the economic considerations embedded in Libecap's sequential hypothesis.

Stock Level Relative to LTPY is a measure of stock status. The present abundance level of the stock is compared with the level of abundance which on average would support the LPTY harvest. This level is expressed as below, near, above, or unknown relative to the abundance level that would produce LPTY.

OUR LIVING OCEANS: 1995 REPORT, *supra*, at 4. In addition, the fact that stock relative to LTPY was added only in 1992 reduces its usefulness for present purposes, given the timing of the effective decisions to introduce individual transferable quotas in a number of fisheries.

TABLE 4. DEGREE OF UTILIZATION IN FISHERIES
WITH TRADABLE RIGHTS²²⁷

Fishery	Effective Decision Year	Utilization of the Resource in Effective Decision Year
Atlantic bluefin tuna purse seine fleet	1983 ²²⁸	Overutilized ²²⁹
Atlantic surfclams	1989 ²³⁰	Fully utilized ²³¹
Atlantic ocean quahogs	1989 ²³²	Fully utilized ²³³
South Atlantic wreckfish	1991 ²³⁴	Fully utilized ²³⁵
Summer flounder	Early 1990s ²³⁶	Overutilized ²³⁷
Alaska Pacific halibut ²³⁸	1991 ²³⁹	
Bering Sea/Aleutian Islands		Fully utilized ²⁴⁰
Gulf of Alaska		Fully utilized ²⁴¹
Alaska sablefish ²⁴²	1991 ²⁴³	
Bering Sea/Aleutian Islands		Fully utilized ²⁴⁴
Gulf of Alaska		Fully utilized ²⁴⁵
Pacific whiting	1997 ²⁴⁶	Fully utilized ²⁴⁷
Bering Sea/Aleutian Islands pollock	1998 ²⁴⁸	Fully utilized ²⁴⁹
Alaska weathervane scallops	2000 ²⁵⁰	Fully utilized ²⁵¹
Pacific sablefish	2000 ²⁵²	Fully utilized ²⁵³

²²⁷ NMFS provides the assessments displayed in Table 4 in *Our Living Oceans* for species or fishery groups. As a result, the assessments typically cover more than the component of the fishery that actually shifted to individual transferable quotas or analogous instruments. For example, as mentioned above, tradable rights are used in only a small component of the Atlantic bluefin tuna fishery. But NMFS's assessment covers the entire bluefin tuna fishery. See *supra* note 215 (noting that only three vessel owners catching bluefin tuna were covered).

The year the decision effectively was made to switch is defined in the same way as in the earlier analysis of the impact of price changes. See *supra* note 200.

In three of the thirteen stocks listed in Table 4, the decision to establish individual transferable quotas was made before the publication of the first edition of *Our Living Oceans* in 1991 (the Atlantic bluefin tuna purse seine fishery, and the Atlantic surfclam and ocean quahog fisheries). To ensure that the information in Table 4 is drawn consistently from the same source, the table contains the assessment of the resource utilization level in these three fisheries offered in the 1991 edition of *Our Living Oceans*. Since the 1991 edition may rely on stock assessments that post-date the decision to establish individual transferable quotas, I have searched other sources for information about the utilization levels in these three fisheries at the time that the decision to introduce individual transferable quotas effectively was made. To a lay observer, this supplementary information suggests that the 1991 classifications likely reflect resource utilization levels at the time the decisions were made to establish individual transferable quotas in these three fisheries.

²²⁸ See *supra* note 131.

²²⁹ NAT'L MARINE FISHERIES SERV., *supra* note 224, at 37. The 1991 report provides anecdotal evidence that the West Atlantic bluefin tuna was overutilized in the early 1980s, stating that "[b]luefin tuna have been overharvested, severely reduced, and harvest cuts were implemented in 1982." *Id.* at 37; see also Atlantic Tuna Fisheries, 47 Fed. Reg. 17,086, 17,087-88 (proposed Apr. 21, 1982) (to be codified at 50 C.F.R. pt. 285) (discussing concerns that prompted rule changes); WEBER, *supra* note 89, at 68-69 (discussing evolution of Atlantic bluefin tuna fishery).

²³⁰ Minutes of the Mid-Atlantic Fishery Management Council Meeting, *supra* note 167.

²³¹ NAT'L MARINE FISHERIES SERV., *supra* note 224, at 32; *see also* APOSTLE ET AL., *supra* note 208, at 19–21 (suggesting that “catch per unit effort rates” were increasing before individual transferable quotas were introduced, and that major impetus for individual transferable quotas was overcapitalization in fishery in light of limits on allowable fishing time intended to protect the resource); MID-ATL. FISHERY MGMT. COUNCIL ET AL., AMENDMENT #8 FISHERY MANAGEMENT PLAN FOR THE ATLANTIC SURFLAM AND OCEAN QUAHOG FISHERY 10–11 (1990) (suggesting that introduction of individual transferable quotas in surfclams was not driven by concerns about condition of stock but rather by overcapitalization in harvesting sector, since surfclam fishery had increased after fishery management plan was adopted in 1977 when resource was “significantly lower than historical levels”); COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 282–87 (describing “[e]xcess harvesting capacity” and “administrative and enforcement difficulties” as major impetus for individual transferable quotas).

²³² Minutes of the Mid-Atlantic Fishery Management Council Meeting, *supra* note 167.

²³³ NAT'L MARINE FISHERIES SERV., *supra* note 224, at 32; *see also* APOSTLE ET AL., *supra* note 208, at 21 n.3 (“[T]he abundance and range of ocean quahogs are far greater than for surfclams, and although quotas existed for the former, they were never reached. Restrictions on the fishery, beyond a requirement for logbooks, were minimal.”); MID-ATL. FISHERY MGMT. COUNCIL ET AL., *supra* note 231, at 17 (indicating that “[e]ffort directed toward ocean quahogs” had “been increasing, in terms of the total catch and number of vessels fishing,” and that issue was “whether quahog management should be revised to match the revisions to surfclam management” to prevent reoccurrence of “problems” that had afflicted surfclam management); COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 282–87 (describing conditions in ocean quahog and surfclam fisheries prior to introduction of individual transferable quotas).

²³⁴ Minutes of the Full Counsel Session of the South Atlantic Fishery Management Council, *supra* note 167.

²³⁵ NAT'L MARINE FISHERIES SERV., *supra* note 224, at 44.

²³⁶ *See supra* note 135 (discussing difficulty of dating birth of cooperative).

²³⁷ NAT'L MARINE FISHERIES SERV., *supra* note 224, at 23; OUR LIVING OCEANS: 1992 REPORT, *supra* note 226, at 35; OUR LIVING OCEANS: 1993 REPORT, *supra* note 226, at 35 tbl.1-1. These reports characterize summer flounder in the Northeast as overutilized and do not refer to summer flounder landed in Maryland in particular.

²³⁸ The Pacific halibut fishery covers a single stock, but it is regulated by subareas. Table 4 follows NMFS in designating two subareas for the Alaska fishery. Most of the catch is from the Gulf of Alaska. NAT'L MARINE FISHERIES SERV., *supra* note 224, at 83–84.

²³⁹ Minutes of the Ninety-ninth Plenary Session of the North Pacific Fishery Management Council, *supra* note 149, at 9 (meeting on December 3, 1991).

²⁴⁰ NAT'L MARINE FISHERIES SERV., *supra* note 224, at 84.

²⁴¹ *Id.*

²⁴² Sablefish in the Bering Sea/Aleutian Islands and the Gulf of Alaska is considered a single stock. Table 4 follows NMFS in designating two populations for sablefish. Most of the catch is from the Gulf of Alaska. NAT'L MARINE FISHERIES SERV., *supra* note 224, at 85–87.

²⁴³ Minutes of the Ninety-ninth Plenary Session of the North Pacific Fishery Management Council, *supra* note 149, at 9 (meeting on December 3, 1991).

²⁴⁴ NAT'L MARINE FISHERIES SERV., *supra* note 224, at 85.

²⁴⁵ E-mail from an employee of the Office of Science, Technology, Assessment and Monitoring Division, National Marine Fisheries Service, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Mar. 16, 2004, 16:21 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) (noting that

While it is not possible to draw firm conclusions given the small number of data points, Table 4 suggests four observations about the relationship between the level of resource utilization and the timing of the introduction of tradable property rights. First, as Libecap and others argue, the degree of resource utilization appears to be relevant to the timing of the introduction of tradable rights.²⁵⁴ Of the thirteen coastal stocks that had shifted to some form of tradable rights by the end of 2002, eleven (almost eighty-five percent) were classified at the same level of resource utilization when the decision was made to establish tradable rights.²⁵⁴ Contrary to Libecap's hypothesis, however, these eleven stocks were classified as fully utilized. Thus, the second implication of Table 4 is that the level of resource utilization most conducive to introducing individual transferable quotas is full utilization, not over- or underutilization. In this regard, it is important to emphasize that the representation of fully utilized stocks among the stocks shifting to tradable rights does not reflect the proportion of fully utilized stocks in the universe of coastal fisheries in the 1990s.

For ease of reference, the graphs below illustrate the utilization status of the population of stocks that had adopted tradable rights as of 2002, and the whole population of stocks rated by NMFS in the five editions of *Our Living Oceans* published in the 1990s. As the graphs indicate, while almost eighty-five percent of the stocks that shifted to tradable rights were classified as fully utilized when the decision was

Gulf of Alaska sablefish was classified as fully utilized, not underutilized as indicated in NAT'L MARINE FISHERIES SERV., *supra* note 224, at 87).

²⁴⁶ Sullivan, *supra* note 129, at 5; Press Release, Department of Justice, Justice Department Approves Fish Catchers/Processors Proposal to Allocate Amongst Themselves the Amount of Government-Regulated Pacific Whiting They Can Harvest (May 20, 1997), available at http://www.usdoj.gov/atr/public/press_releases/1997/1132.htm.

²⁴⁷ OUR LIVING OCEANS: 1995 REPORT, *supra* note 226, at 86 tbl.15-1; OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 177 tbl.15-1.

²⁴⁸ See *supra* note 139 (discussing division of pollock fishery into cooperatives in stages).

²⁴⁹ OUR LIVING OCEANS: 1995 REPORT, *supra* note 226, at 104 tbl.19-2; OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 203 tbl.19-2.

²⁵⁰ Brawn & Scheirer, *supra* note 140, at 3.

²⁵¹ OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 225 tbl.21-6. But see *id.* at 225 ("While the status of the stock is not well known, they are not believed to be abundant and are vulnerable to overfishing."). The 1995 edition of *Our Living Oceans* also classifies the scallop fishery as fully utilized and includes a similar comment about the status of the stocks. See OUR LIVING OCEANS: 1995 REPORT, *supra* note 226, at 116-17.

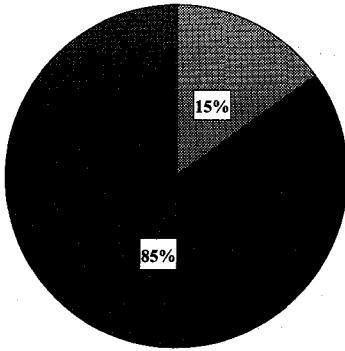
²⁵² Minutes of the Pacific Fishery Management Council Meeting, *supra* note 167.

²⁵³ OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 177 tbl.15-1.

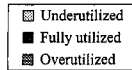
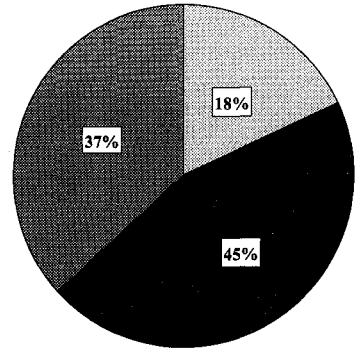
²⁵⁴ The text refers to thirteen coastal fisheries (rather than eleven fisheries) because I am following NMFS in *Our Living Oceans* in counting Alaskan halibut and sablefish as each encompassing two sub-units. See *supra* notes 238, 242.

made to shift, only approximately forty-five percent of the coastal stocks that were rated were classified as fully utilized in the 1990s.²⁵⁵

Tradable Rights Stocks as of Decision Year
n=13 stocks



Entire Population of Stocks Rated in 1990s
n=870 stocks



²⁵⁵ The following table identifies the number of stocks that NMFS assessed as fully utilized, underutilized and overutilized in each of the five editions of *Our Living Oceans* published in the 1990s. In parenthesis are the percentages of the stock groups rated fully utilized, underutilized or overutilized, as a share of the total number of stocks assessed. The figures in this table provide the basis for the graphs above.

Edition of <i>Our Living Oceans</i>	Total Number of Stocks Rated	Number of Stocks Rated Fully Utilized (as percent of total number of stocks rated)	Number of Stocks Rated Underutilized (as percent of total number of stocks rated)	Number of Stocks Rated Overutilized (as percent of total number of stocks rated)
1991	153	58 (38%)	30 (20%)	65 (42%)
1992	156	62 (40%)	27 (17%)	67 (43%)
1993	163	71 (44%)	27 (17%)	65 (40%)
1995	191	94 (49%)	34 (18%)	63 (33%)
1999	207	109 (53%)	36 (17%)	62 (30%)
Total	870	394 (45%)	154 (18%)	322 (37%)

For the summary statistics on which this table is based, see NAT'L MARINE FISHERIES SERV., *supra* note 224, at 16; OUR LIVING OCEANS: 1992 REPORT, *supra* note 226, at 11-12; OUR LIVING OCEANS: 1993 REPORT, *supra* note 226, at 11-12; OUR LIVING OCEANS: 1995 REPORT, *supra* note 226, at 6, 9; OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 15. It should be noted that I adjusted the 1991 summary statistics to reflect the rating of Gulf of Alaska sablefish as fully utilized rather than as underutilized, as incorrectly stated in NAT'L MARINE FISHERIES SERV., *supra* note 224, at 87. See *supra* note 245 (explaining correction). In addition, I used slightly different statistics than the summary statistics presented in the 1992 and the 1993 editions. See E-mail from an employee of the Office of Science, Technology, Assessment and Monitoring Division to Katrina M. Wyman, *supra* note 245 (confirming appropriateness of my statistics for 1992 and 1993).

There are several reasons why a resource might be more amenable to property rights when fully utilized, rather than underutilized or overutilized. The costs of organizing change might be lower in a fully utilized resource than in an underutilized resource. If the resource is underutilized, there may be no or few claimants who could be assigned ownership rights readily, so that it might be necessary to embark on an onerous process of collective action to identify potential rights holders. Even if the costs of such collective action are not prohibitive in absolute terms, it is unclear who would assume the burden of these costs, given the undeveloped character of the resource. Also, the savings that could be realized in harvesting costs by introducing individual transferable quotas in a fully utilized resource are likely to be more definite than in an underutilized resource. For an underutilized resource, the potential savings in harvesting costs under tradable rights must be discounted by the possibility that the savings might never arise, due to future changes in demand for a resource that may never be established fully in the marketplace. In general, hindsight is better than foresight in estimating both what losses may occur, as well as what savings might accrue from avoiding those losses.

The costs of organizing a shift to tradable property rights in particular will also likely be lower in a fully utilized resource than in an overutilized resource. By the time a resource is overutilized, there is likely to be an important constituency of entrenched users benefiting from the resource who will suffer tangible losses from a shift to tradable rights.²⁵⁶ Indeed, these users may suffer tangible losses even if they are granted tradable rights for free. For instance, the tradable rights these users receive may not be sufficient to enable them to continue catching the same amount of fish if the total allowable catch must be reduced simultaneously with the introduction of tradable rights because the resource is very depleted.²⁵⁷ Moreover, users granted insufficient shares at the outset may not be able to purchase additional shares due to limited access to capital. Also, opposition to tradable rights may come from third parties ineligible to receive tradable rights under a free distribution, such as suppliers to the fishing

²⁵⁶ See generally Barton H. Thompson, Jr., *Tragically Difficult: The Obstacles to Governing the Commons*, 30 ENVTL. L. 241, 256–57 (2000) (identifying reluctance of “resource users . . . to give up a current right” as major obstacle to addressing commons problems).

²⁵⁷ See LIBECAP, *supra* note 10, at 66 (“[D]istributional pressures in the allocation of federal land intensified after 1880 as the amount available for private claiming declined. With less to go around, recognizing the large land demands of ranchers and timber companies would have precluded others from obtaining a share.”).

industry, who may suffer if their customers in the harvesting sector consolidate after rights are granted.

Furthermore, it should be emphasized that shifting to tradable rights when a stock is fully utilized likely will generate significant savings in harvesting costs. If it is not covered by tradable rights, a stock that NMFS classifies as fully utilized likely is harvested inefficiently, using excessive amounts of fishing gear and too many fishers.²⁵⁸ The difference between fully- and overutilized stocks is that the inefficiencies are likely to be greater in an overutilized fishery and the scope for addressing the inefficiencies is likely to be more circumscribed in an overutilized stock due to the existence of entrenched interests and a more exploited resource.

The third point worth emphasizing in light of Table 4 is that if full utilization is the optimal degree of exploitation for establishing individual transferable quotas, then tradable rights may have been slow to be introduced in U.S. coastal fisheries partly because the conditions in the majority of coastal fisheries have been inauspicious. As mentioned above, throughout the five editions of *Our Living Oceans*, forty-five percent of the coastal stocks whose status was known were classified as fully utilized on average. Conversely, the remaining fifty-five percent of coastal stocks whose status was known were classified on average at the non-optimal levels of underutilized (eighteen percent) or overutilized (thirty-seven percent).²⁵⁹

Fourth, the potential significance of full utilization may help to make sense of the fact that tradable rights have made more headway in federal fisheries off Alaska than off other U.S. shores. As mentioned above, federally regulated Alaska fisheries account for a disproportionate share of the fisheries under individual transferable quotas and analogous instruments. Notably, the proportion of Alaska stocks classified as fully utilized also has been considerably higher than the proportion of stocks off other U.S. shores classified as fully utilized. If full utilization is the optimal degree of exploitation for introducing tradable rights, then they may have been disproportion-

²⁵⁸ For example, while NMFS classified the Alaskan halibut fishery as fully utilized in 1991, regulators had reduced the length of the fishing season significantly to protect the resource, given the industry's excess capacity. See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 306 (noting that length of fishing season for halibut "collapsed from 47 days to 2-3 days" in central Gulf of Alaska before individual transferable quotas were introduced). A short fishing season often is an indicator of inefficient harvesting, since regulators may shorten the season to protect the underlying fish populations from depletion when fishers have overinvested in equipment and labor.

²⁵⁹ See *supra* note 255 (including table indicating thirty-seven percent underutilization and eighteen percent overutilization).

ately introduced off Alaska partly because its stocks were more likely to be in the optimal state.²⁶⁰

Table 5 provides a snapshot of the degree of utilization in Alaska stocks and stocks off other U.S. shores. Throughout the editions of *Our Living Oceans*, seventy-four percent of Alaska stocks were classified on average as fully utilized. In contrast, only thirty-seven percent of stocks off other U.S. shores were characterized as fully utilized on average. More generally, Table 5 suggests that fishing activity in Alaska has been more in sync with existing resource abundance than fishing activity off other U.S. shores when considered as a single unit.²⁶¹

²⁶⁰ A factor complicating this analysis is that *Our Living Oceans* provides utilization assessments for fisheries under federal and state jurisdiction in a way that makes it impossible to calculate the incidence of fully utilized, overutilized and underutilized fisheries under federal jurisdiction only. Accordingly, it is worth emphasizing that I am suggesting that more federal fisheries may have switched to tradable rights in Alaska because of the utilization levels in Alaska state and federal fisheries combined.

However, it is notable that no fisheries managed solely by the state of Alaska have switched to tradable rights. This may be partly because of provisions in Alaska's state constitution. See ALASKA CONST. art. VIII, §§ 3, 15 (stating that fish "are reserved to the people for common use" and prohibiting exclusive rights or special privileges in fisheries, although permitting limited entry for certain purposes); Marine Advisory Program, University of Alaska, *Charting New Courses for Alaska Salmon Fisheries: The Legal Waters*, 9 ALASKA'S MARINE RESOURCES 1, 3 (2003), available at http://www.uaf.edu/seagrant/Pubs_Videos/pubs/M-28.pdf (noting that, unique among federal and state constitutions, Alaska's constitution reserves natural resources including fisheries for "common use" although it also explicitly permits limited entry programs, pursuant to amendment approved by voters in 1972). In addition, one of the state fisheries that might be a candidate for tradable rights, the valuable Alaska salmon fishery, may not be suitable for individual transferable quotas. Salmon fishing is characterized by short runs, which make it unlikely that introducing individual transferable quotas would generate gains by extending the fishing season. Moreover, it is difficult to predict the number of salmon that will return to a particular location to spawn, a factor which has impeded establishing a total allowable catch for salmon. In the face of these complications, the state of Alaska has allowed a group of salmon fishers in Chignik to establish perhaps the closest approximation of an individual transferable quota program that could be created in the salmon fishery—a harvesting cooperative with a share of "the returning run based on in-season determinations from indices," rather than a share of a total allowable catch. See Memorandum in Support of Defendant's Cross-Motion for Summary Judgment and in Opposition to Plaintiffs' Motion for Summary Judgment on Plaintiffs' Declaratory Judgment Action at 8, *Grunert v. Alaska* (Sup. Ct. Alaska 2002) (No. 1JU-02-349 CI); Associated Press, *Fish Board Gives Chignik Salmon Co-op Another Year*, ANCHORAGE DAILY NEWS, Nov. 20, 2003, at F2.

²⁶¹ Indeed, another hypothesis for why federal fisheries off Alaska have been faster to introduce tradable rights is that the state not only has a higher percentage of fully utilized fisheries, but also a modest number of underutilized fisheries, and no overutilized fisheries. The lack of overutilized fisheries in particular might be significant. For example, it is conceivable that harvesters, processors, and regulators who are not distracted with managing overutilized fisheries may have more time and resources to devote to considering tradable rights.

Fishing conditions off Alaska presumably reflect in part the relatively recent advent of large-scale commercial fishing in the region compared with other parts of the country such as New England, where commercial fisheries are well established.²⁶² However, other factors also may be important. For example, the share of the workforce employed in fisheries in Alaska may have encouraged a conservation ethic, although economic dependence on fisheries also could have encouraged overharvesting as a way of sustaining employment levels.²⁶³

TABLE 5: UTILIZATION STATUS OF ALASKA AND
NON-ALASKA FISHERIES²⁶⁴

	Percent of Overutilized Fisheries	Percent of Fully Utilized Fisheries	Percent of Underutilized Fisheries
Alaska	0%	74%	26%
Remainder of the Country	46%	37%	16%

²⁶² See ALASKA REGION, *supra* note 169, at 3-120 (noting that fisheries for salmon, Pacific cod, and other species began off Alaska in late 1800s); Wilson & Lent, *supra* note 149, at 367-68 (noting that New England groundfish fishery was undertaken "before 1625").

²⁶³ See *A Fish Story*, WALL ST. J., Nov. 6, 2003, at A14 (describing fishing as "the No. 1 employer in Alaska"); Associated Press, *Battle for the Senate 2004*, ANCHORAGE DAILY NEWS, Oct. 19, 2004, at B4 (emphasizing role of fish politics in 2004 Alaska Senate race between Lisa Murkowski and Tony Knowles). *But see* E-mail from an employee of the Alaska Department of Labor and Workforce Development, Research and Analysis, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Nov. 15, 2004, 10:56 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) [hereinafter Alaska Department of Labor and Workforce Development Nov. 15 E-mail] (estimating that only 6.4% of private sector wage and salary employment directly comes from fish harvesting and processing in Alaska); E-mail from an employee of the Alaska Department of Labor and Workforce Development, Research and Analysis, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Nov. 9, 2004, 17:56 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) (reporting that harvesting and processing employment "declined significantly since the late [19]80s," and that other sectors account for larger shares of private employment). The definition of private sector in this estimate "is a hybrid that includes wage and salary jobs and a selected slice of agricultural employment. All other agricultural jobs and all self-employment are excluded." Alaska Department of Labor and Workforce Development Nov. 15 E-mail, *supra*.

²⁶⁴ The statistics in this table were calculated based on the utilization assessments reported in the five editions of *Our Living Oceans*. National aggregates reported in these five editions were disaggregated into two components: utilization assessments covering Alaska fisheries, and the remaining utilization assessments for the rest of the country. See *supra* note 255 (identifying national aggregates, and pages in *Our Living Oceans* indicating national aggregates along with errors). I counted the following categories of fisheries in *Our Living Oceans* as Alaska fisheries: Alaska salmon fisheries, NAT'L MARINE FISHERIES SERV., *supra* note 224, at 60; OUR LIVING OCEANS: 1992 REPORT, *supra* note 226, at 79; OUR LIVING OCEANS: 1993 REPORT, *supra* note 226, at 80; OUR LIVING OCEANS: 1995

It is important to keep in perspective the finding that most of the fisheries that have shifted to tradable rights have been fully utilized, not under- or overutilized. The finding is based on a limited number of data points. Moreover, there are counterexamples. During the 1990s, many stocks classified as fully utilized did not shift to tradable rights.²⁶⁵ Furthermore, among the fully utilized stocks that shifted, it often was the case that only a part of the fleet shifted to tradable rights.²⁶⁶ Over time, the level of resource utilization most propitious for introducing tradable rights also might expand to include overutilization. In particular, the knowledge gained from initially introducing tradable rights in fully utilized stocks might lower the obstacles to establishing individual transferable quotas in more precarious fisheries in the future.²⁶⁷ Thus, while U.S. fisheries' experience to date

REPORT, *supra* note 226, at 77; OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 159; Alaska pelagic fisheries, NAT'L MARINE FISHERIES SERV., *supra* note 224, at 62; OUR LIVING OCEANS: 1992 REPORT, *supra* note 226, at 80; OUR LIVING OCEANS: 1993 REPORT, *supra* note 226, at 82; OUR LIVING OCEANS: 1995 REPORT, *supra* note 226, at 80; OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 169; Alaska groundfish fisheries, NAT'L MARINE FISHERIES SERV., *supra* note 224, at 84-85, 87; OUR LIVING OCEANS: 1992 REPORT, *supra* note 226, at 102-03, 105; OUR LIVING OCEANS: 1993 REPORT, *supra* note 226, at 105-06, 108; OUR LIVING OCEANS: 1995 REPORT, *supra* note 226, at 104-05; OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 202-04; Alaska shellfish fisheries, NAT'L MARINE FISHERIES SERV., *supra* note 224, at 90; OUR LIVING OCEANS: 1992 REPORT, *supra* note 226, at 108; OUR LIVING OCEANS: 1993 REPORT, *supra* note 226, at 110; OUR LIVING OCEANS: 1995 REPORT, *supra* note 226, at 105; OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 210; and selected nearshore fisheries, NAT'L MARINE FISHERIES SERV., *supra* note 224, at 93-95; OUR LIVING OCEANS: 1992 REPORT, *supra* note 226, at 111-12; OUR LIVING OCEANS: 1993 REPORT, *supra* note 226, at 113-14; OUR LIVING OCEANS: 1995 REPORT, *supra* note 226, at 117; OUR LIVING OCEANS: 1999 REPORT, *supra* note 226, at 225.

²⁶⁵ See *supra* note 255 (indicating that number of stocks classified as fully utilized never dropped below fifty-eight in any of five editions of *Our Living Oceans*). As explained above, only eleven stocks classified as fully utilized shifted in any degree to tradable rights by 2002.

²⁶⁶ It is difficult to quantify the percentages of the thirteen stocks taken at least partially under tradable rights that are in fact harvested under tradable rights. Based on my understanding of the coverage of the existing tradable rights programs, only a very small percentage of the summer flounder stock assessed in *Our Living Oceans* is taken under tradable rights. Larger, but still limited, components of the Atlantic bluefin tuna, Pacific whiting, and Pacific sablefish stocks assessed in *Our Living Oceans* are taken under tradable rights.

²⁶⁷ Since the last edition of *Our Living Oceans* was published in 1999, there are no current NMFS assessments of the level of utilization in the fisheries for which individual transferable quotas currently are under consideration. See *supra* note 130 (identifying fisheries where individual transferable quotas are contemplated). However, several of these fisheries include stocks classified as overfished in the most recent version of another series of reports that NMFS produces on the status of stocks in the geographic area managed by the regional councils. See, for example, the characterization of the status of Alaska crab fisheries, Gulf of Mexico red snapper and Pacific groundfish in NAT'L MARINE FISHERIES SERV., *supra* note 143, at 33, 36-38, 41, 63-65, 74-75. See also N. PAC. FISHERIES MGMT.

seems contrary to Libecap's sequential hypothesis, it does not disprove the hypothesis conclusively.

3. *Characteristics of Resource Users*

As discussed above, in the standard accounts of the evolution of property rights, the characteristics of the users of a resource as well as the economic and physical attributes of the resource itself may be obstacles to change. More specifically, standard bottom-up explanations imply that individual tradable rights may have been slow to develop in U.S. fisheries because the fishing industry is too heterogeneous and includes too many fishers and processors.²⁶⁸

a. *Heterogeneity*

Consistent with the argument that heterogeneity is an obstacle to collective action,²⁶⁹ a number of commentators suggest that U.S. fisheries have been slow to adopt tradable rights because these fisheries are plagued by heterogeneous interests.²⁷⁰

COUNCIL, *Summary of the North Pacific Fishery Management Council's Bering Sea and Aleutian Islands Crab Rationalization Program*, in *BERING SEA ALEUTIAN ISLANDS CRAB FISHERIES DRAFT ENVIRONMENTAL IMPACT STATEMENT*, *supra* note 167, app. 2 at 4-5 (describing closures or limited seasons for several Alaska crab fisheries).

However, stocks designated as overfished in NAT'L MARINE FISHERIES SERV., *supra* note 143, may not be characterized as overutilized in the next edition of *Our Living Oceans*, since the assessments in the two series of reports are distinct. See *OUR LIVING OCEANS: 1999 REPORT*, *supra* note 226, at 283-84 (discussing relationship between *Our Living Oceans* and NMFS's annual report to Congress on status of U.S. fisheries).

²⁶⁸ See *supra* Part I.C. While I analyze the importance of the degree of homogeneity and group size for the probability of adopting tradable rights, the influence of other aspects of the structure of the fishing industry on property rights formation also could be investigated.

For example, it might be worth investigating the impact of the extent to which fishing firms compete with foreign suppliers in U.S. markets on the probability of the adoption of tradable rights, given the influence of the earlier adoption of individual vessel quotas in British Columbia on the decision to switch in Alaska.

Another potential variable is the impact of the presence or the absence of foreign fishers in a fishery when national jurisdiction was extended to 200 miles in 1976. Important fisheries were taken away from non-U.S. fishers when the United States extended national jurisdiction out to 200 miles in 1976. See *ALASKA REGION*, *supra* note 169, at 3-127 to 3-139 (noting that many groundfish fisheries off Alaska were mostly foreign when national jurisdiction was extended in 1976, and discussing Americanization of pollock fishery in particular). Over time, the participation of non-American fishers and fishing firms in U.S. fisheries has declined. However, the speed with which non-U.S. fishers have been eliminated from U.S. fisheries may have affected the timing of the introduction of tradable rights in a number of fisheries, assuming that regulators and harvesters are reluctant to grant rights in coastal fisheries to non-U.S. interests.

²⁶⁹ See *supra* Part I.C.1.

²⁷⁰ See, e.g., LIBECAP, *supra* note 10, at 73, 74, 80-81, 82-85 (emphasizing obstacles created by differences among fishers); *ALASKA REGION, Executive Summary*, in *FINAL IMPACT STATEMENT FOR AMERICAN FISHERIES ACT AMENDMENTS 61/61/13/8*, *supra* note

It is true that fisheries often are populated by diverse interest groups that are likely to compete for shares in the initial allocation of individual transferable quotas.²⁷¹ For example, a single species might be fished by two groups—recreational and commercial harvesters—with very different motivations for fishing. Each of these groups in turn may attempt to use the introduction of individual transferable quotas for the commercial sector to secure a larger share of the total catch.²⁷² Within the commercial harvesting sector, fishers may be further subdivided into competing camps based on fishing skill,²⁷³ the type of gear and vessels they use,²⁷⁴ where they fish,²⁷⁵ firm size,²⁷⁶

169, at ES-9 (implying that establishment of pollock cooperatives was facilitated by congressional legislation dividing fishery into “relatively homogeneous groupings”); Edwards, *Rent-Seeking*, *supra* note 69, at 273 (characterizing heterogeneity as obstacle); Daniel S. Holland & Jay J.C. Ginter, *Common Property Institutions in the Alaskan Groundfish Fisheries*, 25 MARINE POL’Y 33, 40 (2001) (arguing that size and heterogeneity of Alaskan groundfish fisheries originally prevented creation of property rights); Daniel S. Holland, *Thalassorama: Fencing the Fisheries Commons: Regulatory Barbed Wire in the Alaskan Groundfish Fisheries*, 15 MARINE RESOURCE ECON. 141, 147 (2000) (arguing that “[t]he extensive size of the Alaskan groundfish fisheries and the high degree of heterogeneity in the user groups initially inhibited the formation of effective common property institutions”); Johnson & Libecap, *supra* note 31, at 1010 (emphasizing significance of heterogeneity among fishers as obstacle to contracting); Alcock, *supra* note 28, at 173 (arguing based on analysis of fisheries in New England and three foreign countries that “species harvested by homogeneous segments or sectors of the industry are more inclined to adopt IFQs”).

²⁷¹ Moreover, even before they begin competing for shares in an individual transferable quota program, heterogeneous users may disagree about whether individual transferable quotas should be introduced in the first place.

²⁷² The ill-fated proposal in 1995 to introduce individual transferable quotas in the Gulf of Mexico red snapper fishery was opposed by a number of commercial fishing interests, in part because they believed that it favored recreational interests. See RASBAND ET AL., *supra* note 202, at 501–02; Letter from Julius Collins et al., Chairman, Gulf of Mexico Fishery Management Council, to Dr. Andrew J. Kemmerer, Regional Director, National Marine Fisheries Service, *supra* note 202.

For an article reporting on a study suggesting that recreational fishers account for a surprisingly large share of harvests in certain fisheries, see Associated Press, *Sport Anglers Said to Catch More Fish Than Thought*, N.Y. TIMES, Aug. 27, 2004, at A15. In light of the significant presence of recreational fishers in certain fisheries, it might be worth examining the impact of the presence of large-scale recreational fishing on the probability of adopting tradable rights for the commercial harvest.

²⁷³ See LIBECAP, *supra* note 10, at 73, 74, 82–85, 120 (emphasizing significance of differences in skills among fishers); Johnson & Libecap, *supra* note 31, at 1005, 1010–11 (same).

²⁷⁴ See Edwards, *Rent-Seeking*, *supra* note 69, at 273 (referring to “several hundred permits on otter trawl, gillnet, and trawl line vessels” in New England groundfish fishery); Snidal, *supra* note 73, at 66 (noting that “some fishers have several nets, others only a share in one”).

²⁷⁵ See Snidal, *supra* note 73, at 65 (noting that “inshore fishers often are against off-shore trawlers”).

²⁷⁶ Large firms tend to be viewed as more likely to support individual transferable quotas and analogous instruments than small firms for several reasons. For one thing, large firms may benefit more than small firms from more predictable supplies of fish.

access to capital,²⁷⁷ how close they are to retirement,²⁷⁸ and whether they own a boat in the first place.²⁷⁹ Moreover, fish processors also may attempt to acquire shares at the expense of harvesters in order to secure sources of supply.²⁸⁰

However, notwithstanding the presence of many heterogeneous interest groups in fisheries, it is not clear that heterogeneity consistently has been an obstacle to the introduction of tradable rights. On the contrary, there is evidence consistent with the argument discussed above that heterogeneity may be conducive to private property rights formation in certain circumstances.²⁸¹ In particular, there are indications that the presence of a distinct subgroup of wealthy and politi-

Smaller firms also may be more threatened by the consolidation of the harvesting sector that tradable rights facilitate. See Frank Alcock, *Bargaining, Uncertainty, and Property Rights in Fisheries*, 54 *WORLD POL.* 437, 449–50 (2002) (discussing concerns of small-scale fishers regarding individual fishing quotas); Neal D. Black, *Balancing the Advantages of Individual Transferable Quotas Against Their Redistributive Effects: The Case of Alliance Against IFQs v. Brown*, 9 *GEO. INT'L ENVTL. L. REV.* 727, 728 (1997) (noting that individual transferable quotas “tend to favor larger, more efficient fishing operations”); Dana, *supra* note 186, at 839 (speculating why fisheries dominated by small fishers are more resistant to reform, citing Scott, *supra* note 94); Scott, *supra* note 94, at 31 (suggesting “oligopsonistic, multi-gear, multi-port corporations” support individual transferable quotas).

²⁷⁷ Firms with greater access to capital may support individual transferable quotas because these firms are more likely to be able to consolidate shares after tradable rights are introduced. See *Sea Watch Int'l v. Mosbacher*, 762 F. Supp. 370, 377–78 (D.D.C. 1991) (discussing and rejecting arguments that individual transferable quotas inherently disadvantage small fishers, including argument that they are disadvantaged because they “lack the capital to purchase sufficient ITQs to operate their vessels at full capacity”); MACINKO & BROMLEY, *supra* note 119, at 34 (arguing that lack of “financial assets” drives fishers out of industry); Scott C. Matulich & Murat Sever, *Reconsidering the Initial Allocation of ITQs: The Search for a Pareto-Safe Allocation Between Fishing and Processing Sectors*, 75 *LAND ECON.* 203, 215 (1999) (“The need to acquire more harvesting quota . . . disadvantages poorly capitalized but efficient harvesters (e.g., relatively new entrants with large debt loads, or only recent catch histories during qualifying years) who are unable to finance sufficient additional quota to continue operating.”).

²⁷⁸ Harvesters who are close to retirement may be more supportive of tradable rights than younger harvesters. Assuming the rights are distributed for free, the older fishers might sell the rights granted to finance retirement. Younger fishers may need to buy rights to gain entry into the fishery or to expand their share of the fishery. See Casey et al., *supra* note 99, at 227 (noting that eighty-four percent of British Columbia halibut license holders who responded to survey undertaken after introduction of individual vessel quotas indicated that they “feel more secure about [their] retirement under IVQs [individual vessel quotas]”).

²⁷⁹ *Alliance Against IFQs v. Brown*, 84 F.3d 343 (9th Cir. 1996) (rejecting challenge to individual transferable quotas for halibut and sablefish in Alaska on ground that initial allocation formula did not award rights to crew who did not own or lease fishing vessels).

²⁸⁰ Until the issue was settled in favor of the processors by an appropriations rider introduced by Senator Stevens, Alaska crab harvesters had been arguing against a component of a proposal to introduce individual transferable quotas that would give processors rights to process shares of the crab catch. For a taste of the debate, which attracted national attention, see generally Pegg, *supra* note 169; *A Fish Story*, *supra* note 263.

²⁸¹ See *supra* Part I.C.1.

cally influential parties, such as large firms combining harvesting and processing operations, may facilitate the implementation of tradable rights. These firms may stand to gain disproportionately from tradable rights because they may allow the firms to reduce their harvesting costs, for example, by consolidating operations on fewer vessels. In addition, large vertically integrated harvesters and processors may be well positioned to pay the costs of lobbying for change, given the size of these costs relative to the magnitude of the benefits these firms stand to gain.²⁸²

Consider, for instance, the history of harvesting cooperatives in the Alaskan pollock fishery, one of the most valuable commercial fisheries in the United States.²⁸³ An important impetus for establishing the cooperatives was a subset of the roughly ten large, mainly Washington State-based firms that operated combined harvesting and processing operations offshore in the 1990s. These catcher processors began arguing for individual transferable quotas for pollock in the early 1990s, when the catcher processor fleet harvested the vast majority of Alaska pollock. These firms promoted tradable rights because they believed that they would be more profitable if they held guaranteed rights to a portion of the harvest, enabling them to slow the pace of harvesting and reduce the number of vessels used in the fishery. To ease the acceptance of cooperatives, catcher processors not only assumed the initial cost of organizing for change in the Alaska pollock fishery, but also gave up part of the fleet's historical

²⁸² See *supra* notes 276–77 (noting reasons why individual transferable quotas might be supported by large firms and firms with greater access to capital, two categories that likely overlap).

Based on his research on the evolution of property rights in fisheries in Atlantic Canada, Iceland, New England, and Norway, Frank Alcock argues that fisheries dominated by vertically integrated firms are more likely to adopt individual fishing quotas “swiftly.” Alcock, *supra* note 28, at 172. This is a slightly different argument from the one advanced above in that Alcock is suggesting that fisheries comprised of vertically integrated firms will be the first to shift. See Scott, *supra* note 94, at 31 (suggesting that fisheries dominated by “oligopsonistic, multi-gear, multi-port corporations” have been more likely to adopt individual transferable quotas). Notably, Alcock also suggests, as I do above, that in heterogeneous fisheries, vertically integrated catcher processors may act as catalysts. Alcock, *supra* note 28, at 172 (“[I]t is the vertically integrated segment that is the first to adopt IFQs.”).

The entrepreneurial role that vertically integrated firms may be playing in promoting change in fisheries may be similar to the role attributed to firms with large holdings in oil field unitization. See LIBECAP, *supra* note 10, at 105 (“Available evidence . . . supports the notion that firms with large holdings on a given field will be the agents of institutional change.”).

²⁸³ In 2002, the Alaska walleye pollock fishery accounted for six percent of the total U.S. commercial catch from state and federal waters combined. NAT'L MARINE FISHERIES SERV., *supra* note 124, at 10 (providing base figures for statistic).

take from the pollock fishery and agreed not to increase the fleet's share of other Alaska fisheries.²⁸⁴

²⁸⁴ The pollock cooperatives were the culmination of an extended series of discussions among the various participants in the pollock fishery, regulators and legislators, to which the brief summary in the text does not do justice. For example, the arrangements facilitating the introduction of the cooperatives also included a buyout of nine factory trawlers from the offshore catcher processor fleet funded partially by the federal government and by a tax on the inshore sector. The buyout reduced the burden on the offshore sector of giving up a share of the pollock catch and limiting the sector's share of other Alaska fisheries.

My understanding of the background to the introduction of the pollock cooperatives is based on a number of sources, including interviews with past and present NMFS officials and congressional staffers. Many sources discuss the history of the pollock cooperatives. See *Arctic King Fisheries, Inc. v. United States*, 59 Fed. Cl. 360, 361, 364 (Fed. Cl. 2004) (denying takings challenge that includes background on the American Fisheries Act); Ralph E. Townsend, *Producer Organizations and Agreements in Fisheries: Integrating Regulation and Coasian Bargaining*, in *EVOLVING PROPERTY RIGHTS IN MARINE FISHERIES* (Donald R. Leal ed., forthcoming 2005) (manuscript at 221, on file with the *New York University Law Review*) (discussing history of pollock cooperatives in arguing that fishing industry is developing regulatory approaches through Coasian bargaining); James E. Wilen, *Property Rights and the Texture of Rents in Fisheries*, in *EVOLVING PROPERTY RIGHTS IN MARINE FISHERIES*, *supra* at 45 (discussing rent generation in pollock fishery in making broader argument about rent generation in fisheries); Keith R. Criddle & Seth Macinko, *A Requiem for the IFQ in US Fisheries?*, 24 *MARINE POL'Y* 461, 463 (2000) (discussing history of pollock cooperatives in arguing that cooperatives represent emerging alternative that will displace individual fishing quotas); Jay J.C. Ginter & Ben Muse, *Rights-Based Fishery Management Systems in Marine Fisheries off Alaska*, Presentation at the International Institute of Fisheries Economics and Trade Conference 2 (Aug. 19–22, 2002) (unpublished manuscript, on file with the *New York University Law Review*) (discussing history of cooperatives in chronicling evolution of rights-based approaches in Alaska fisheries); Holland & Ginter, *supra* note 270, 38–39 (discussing history of cooperatives in chronicling evolution of rights-based approaches in Alaska fisheries); AT-SEA PROCESSORS ASS'N, *PRELIMINARY ASSESSMENT OF THE POLLOCK CONSERVATION COOPERATIVE 2* (1999), available at http://www.atsea.org/concerns/apa_coop_report.pdf (assessing impacts of cooperative formed by pollock catcher processors); Letter from Joel I. Klein, Assistant Attorney General, Antitrust Division, Department of Justice, to Joseph M. Sullivan, Attorney, Mundt MacGregor L.L.P. 5 (Feb. 29, 2000), available at <http://www.usdoj.gov/atr/public/busreview/5023.pdf> (indicating, in business review letter, that Department of Justice is not inclined to initiate enforcement action against members of cooperative of offshore catcher processors formed after passage of American Fisheries Act); see also 144 CONG. REC. S12,707–08, S12,777–78, S12,801–02 (daily ed. Oct. 20, 1998) (statements of Sens. Gorton, Murray, and Stevens) (discussing American Fisheries Act). See generally *ALASKA REGION*, *supra* note 169 (providing environmental impact statement for measures implementing American Fisheries Act); N. PAC. FISHERY MGMT. COUNCIL, *REPORT TO U.S. CONGRESS AND THE SECRETARY OF COMMERCE, IMPACTS OF THE AMERICAN FISHERIES ACT* (2002) (reporting on impact of American Fisheries Act); Proposed Rulemaking: Amendment 18 to the Fishery Management Plan for Alaska Groundfish Fisheries in the Bering Strait and Aleutian Islands, Comments of the Dep't of Justice Before the Nat'l Marine Fisheries Serv., Nat'l Oceanic & Atmospheric Admin. (Docket No. 911215-1315, Jan. 30, 1992) (commenting on proposal from early 1990s to divide pollock catch between inshore and offshore sectors); Sullivan, *supra* note 129 (discussing history of pollock cooperatives in addressing motivations and obstacles to establishing cooperatives).

Similar stories probably could be told of small, distinct subgroups of resource users incurring the costs of lobbying for change and making compromises to facilitate it in other fisheries that have switched to tradable rights.²⁸⁵ These distinct subgroups would not always be comprised of vertically integrated catcher processors. For example, the groups instead might be fishers owning more than a single vessel who could reduce their harvesting costs by consolidating their operations on fewer of their own boats.²⁸⁶

While counter to the conventional wisdom in the evolution of private property scholarship, the possibility that heterogeneity sometimes may be helpful is not surprising given the political character of property rights formation. Heterogeneity may be conducive to institutional change in legislative and regulatory settings if it gives rise to a distinct subgroup motivated and well positioned to incur the costs of collective action.²⁸⁷ The history of property rights formation in the Alaska pollock fishery provides an example of this dynamic, with the catcher processors playing the role of the politically entrepreneurial subgroup. Additional information would be needed about the struc-

²⁸⁵ In addition to the Bering Sea/Aleutian Islands pollock fishery, federal coastal fisheries that have shifted to tradable rights that included or were comprised entirely of vertically integrated catcher processor firms before tradable rights were introduced include the Atlantic surfclam and ocean quahog fisheries, the offshore catcher processor Pacific whiting fishery, and the Alaska weathervane scallop fishery. See COMM. TO REVIEW INDIVIDUAL FISHING QUOTAS, *supra* note 92, at 285 (indicating that, during 1980s, "a few large, vertically integrated firms dominated the [surfclam] industry in their dealings with numerous smaller processors and 'independent' vessel owners"); APOSTLE ET AL., *supra* note 208, at 25 (noting that surfclam fishery included vertically integrated catcher processor firms and independent catcher firms, but arguing that heterogeneity of interests delayed agreement on initial allocation of rights); Brawn & Scheirer, *supra* note 140, at 8 ("By 1996, all vessels fishing for Alaskan weathervane scallops were converted to catcher processors."); Sullivan, *supra* note 129, at 5 (noting that four firms that formed whiting cooperative were catcher processors).

²⁸⁶ Fisheries without significant vertically integrated catcher processor firms that have switched to tradable rights, or similar instruments, include the Atlantic bluefin tuna purse seine fishery, the Alaskan halibut and sablefish fisheries, the Pacific fixed gear sablefish fishery, and the South Atlantic wreckfish fishery. See U.S. GEN. ACCOUNTING OFFICE, *supra* note 101, at 6 (noting that "halibut and sablefish fishing fleets are primarily owner-operated vessels of various lengths"); PAC. FISHERY MGMT. COUNCIL, *supra* note 141, at 21 ("The current [Pacific fixed gear sablefish] fishery is generally characterized by individual owner-operator fishing operations."); Gauvin, *supra* note 209, at 92-94 (referring to ownership structure in wreckfish fishery before individual transferable quotas were implemented, in way that suggests fishery did not include significant vertically integrated catcher processors, although indicating in passing that there were processors that fully or partially owned fishing vessels); E-mail from an employee of the Highly Migratory Species Management Division to Katrina M. Wyman, *supra* note 215 (describing ownership structure in purse seine fleet).

I do not have information on whether there were subgroups of vessel owners with multiple boats who pushed for change in the above mentioned fisheries.

²⁸⁷ See *supra* Part I.C.1.

ture of the industry in many of the fisheries that have (and have not) adopted tradable rights to argue persuasively that heterogeneity along economic dimensions may be propitious for introducing tradable rights. Nonetheless, it is possible to hypothesize that tradable rights may have been slow to develop because many fisheries are comprised of fishers who are too similar to each other and lack a distinctive subgroup, such as the catcher processors in the Alaska pollock fishery.

b. Group Size

The standard accounts of the evolution of property rights predict that small groups are more likely to establish or rearrange property rights than large groups.²⁸⁸ By extension, it might be argued that federal coastal fisheries have been slow to adopt tradable rights because many of these fisheries are populated by large numbers of fishers. If this were true, then fisheries that have adopted tradable rights should contain fewer fishers than those fisheries without tradable rights.

Testing the impact of group size on the probability of adopting tradable rights is complicated because it is difficult to define the universe of U.S. federal fisheries that could adopt tradable rights. A fishery is, in large part, a political construct with boundaries that are subject to change. These factors make it difficult to determine which fisheries might have switched to tradable rights, a prerequisite to counting the number of harvesters in each fishery.²⁸⁹ Moreover, even if it were possible to define the universe of U.S. fisheries that could adopt tradable rights, information about the number of U.S. fishers is not readily available.²⁹⁰ As a second best, I have gathered information about the number of parties that received tradable rights as part of the initial allocation in the eleven fisheries that have adopted tradable rights.

The number of parties who received rights in the initial allocation provides some evidence that the introduction of new property rights is not neatly correlated with group size. As Table 6 indicates, the number of economically distinct rights holders in the fisheries that shifted to tradable rights varied from as few as three (for the Atlantic bluefin tuna purse seine fleet) to as many as 4828 (in the Alaskan

²⁸⁸ See *supra* Part I.C.2.

²⁸⁹ The Magnuson-Stevens Act definition of a fishery underscores the scope regulators have for defining fisheries. 16 U.S.C. § 1802(13) (2000) ("The term 'fishery' means: (A) one or more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics, and (B) any fishing for such stocks.").

²⁹⁰ EUGENE H. BUCK, CONGRESSIONAL RESEARCH SERVICE REPORT TO CONGRESS: HOW MANY COMMERCIAL FISHERMEN? 1-2 (2002) (describing inconsistency and unreliability of current estimates of U.S. fishers).

halibut fishery). While four of the eleven fisheries to shift had ten or fewer initial rights holders, it is important to recognize that these small fisheries are not naturally arising entities. To a significant degree, this small group size is the consequence of the councils and the Secretary of Commerce artificially restricting the number of participants in these fisheries through limited entry programs.²⁹¹

TABLE 6: INITIAL NUMBER OF RIGHTS HOLDERS AND METHOD OF ESTABLISHMENT

Fishery	Implementation Year	Implementation Method	Number of Distinct Rights Holders
Atlantic bluefin tuna purse seine fleet	1983 ²⁹²	Directly by Secretary of Commerce	3 ²⁹³
Pacific whiting catcher processor cooperative	1997 ²⁹⁴	Harvesting cooperative agreement	4 ²⁹⁵
Alaska weathervane scallop cooperative	2000 ²⁹⁶	Harvesting cooperative agreement	5 ²⁹⁷
Maryland summer flounder	Early 1990s ²⁹⁸	Informal agreement among harvesters	10 ²⁹⁹
Atlantic ocean quahog	1990 ³⁰⁰	Council recommendation and rulemaking	48 ³⁰¹
South Atlantic wreckfish	1992 ³⁰²	Council recommendation and rulemaking	49 ³⁰³
Atlantic surfclam	1990 ³⁰⁴	Council recommendation and rulemaking	59 ³⁰⁵
Bering Sea/Aleutian Islands pollock cooperatives	1998 ³⁰⁶	Harvesting cooperative agreements	Maximum of 117 ³⁰⁷
Tiered permit-stacking program for Pacific fixed gear sablefish harvesters	2002 ³⁰⁸	Council recommendation and rulemaking	164 ³⁰⁹
Alaska sablefish	1995 ³¹⁰	Council recommendation and rulemaking	1051 ³¹¹
Alaska halibut	1995 ³¹²	Council recommendation and rulemaking	4828 ³¹³

²⁹¹ The following sources refer to regulatory measures limiting the number of players in the small fisheries that have shifted to tradable rights. See Atlantic Tuna Fisheries, Monitoring of the Status of Stock, 48 Fed. Reg. 27,745, 27,757–58 (June 17, 1983) (to be codified at 50 C.F.R. pt. 285) (describing regulatory process for Atlantic bluefin tuna); 1 MID-ATL. FISHERY MGMT. COUNCIL ET AL., *supra* note 135 (describing moratorium in commercial summer flounder fishery); N. PAC. FISHERY MGMT. COUNCIL ET AL., *supra* note 191, at 1–3 (describing Council's preferred alternative for license limitation program for scallop); Sullivan, *supra* note 129, at 4 (describing regulatory process for Pacific whiting, noting that “[b]y late 1996, a fairly restrictive limited entry license program had been implemented in the U.S. Pacific Coast whiting fishery”); see also Snidal, *supra* note 73, at 56 (noting that “number and heterogeneity of actors may themselves be a product of prior institutional choice rather than independent factors”).

²⁹² See *supra* note 131.

²⁹³ Atlantic Tuna Fisheries, 47 Fed. Reg. 17,086, 17,087–88 (proposed Apr. 21, 1982) (to be codified at 50 C.F.R. pt. 285); E-mail from an employee of the Highly Migratory Species Management Division to Katrina M. Wyman, *supra* note 215.

Even though the wide variation in the number of initial rights holders in the fisheries that have shifted to tradable rights is not consistent with the hypothesis that large group size is detrimental to the transition to tradable rights, there is nonetheless a relationship between the transition to tradable rights and group size. Specifically, group size seems to correlate with the method by which tradable rights are introduced. Fisheries with smaller numbers of fishers that have shifted to tradable rights have tended to do so by way of cooperatives. In contrast, the fisheries with larger numbers that have switched have tended to do so through the political process that begins with a recommendation from one of the regional fishery management councils. Notably, of the four fisheries with ten or fewer initial rights holders, three used cooperatives to shift to tradable rights.

²⁹⁴ See Sullivan, *supra* note 129, at 5.

²⁹⁵ *Id.*

²⁹⁶ See *supra* note 140.

²⁹⁷ See Edwards, *Rent-Seeking*, *supra* note 69, at 273 (“[A] year after license limitation was implemented in the young Alaska weathervane scallop fishery in 1999, the five large-vessel companies negotiated a private harvesting cooperative contract independent of the North Pacific Council which allocated shares of the scallop and crab by catch harvest quotas.”).

²⁹⁸ See *supra* note 135 (discussing difficulty of specifying implementation year).

²⁹⁹ E-mail from an employee of the Fisheries Service to Katrina M. Wyman, *supra* note 135.

³⁰⁰ See U.S. GEN. ACCOUNTING OFFICE, *supra* note 101, at 36 tbl.9.

³⁰¹ *Id.*, at 16. Based on its analysis of NMFS’s data, the GAO concluded in 1992 that “no more than 48 . . . individuals or entities controlled ocean quahog quota in 1990.” *Id.*

³⁰² See *id.*, at 35 tbl.8.

³⁰³ *Id.*

³⁰⁴ See *id.*, at 36 tbl.9.

³⁰⁵ *Id.*, at 15. Based on its analysis of NMFS’s data, the GAO concluded in 2002 that “no more than 59 . . . individuals or entities controlled surfclam quota in 1990.” *Id.*

³⁰⁶ See *supra* note 139.

³⁰⁷ Cross-ownership in the Bering Sea/Aleutian Islands pollock fishery makes it difficult to specify the number of economically distinct rights holders in 1998. For an indication of the complexity of the ownership structure in the fishery, see ALASKA REGION, *supra* note 169, at 3-139 to 3-144; N. Econ., Inc. & N. Pac. Fishery Mgmt. Council, Analysis of AFA Processor Sideboard Limits for Groundfish and Excessive Share Caps for BSAI Pollock Processing 31-52 (July 14, 2000) (unpublished manuscript, on file with the *New York University Law Review*).

³⁰⁸ See PAC. FISHERY MGMT. COUNCIL, *supra* note 141.

³⁰⁹ *Id.*, at 24 (referring to 164 vessels with endorsed permits); *id.* at 21 (“The current fishery is generally characterized by individual owner-operator fishing operations.”).

³¹⁰ See U.S. GEN. ACCOUNTING OFFICE, *supra* note 101, at 35 tbl.7.

³¹¹ *Id.*; see also *id.* at 6 (noting that “sablefish fishing fleets are primarily owner-operated vessels”).

³¹² See *id.*, at 35 tbl.7.

³¹³ *Id.*; see also *id.* at 6 (noting that “halibut . . . fishing fleets are primarily owner-operated vessels”).

Six of the seven fisheries with more than ten initial rights holders shifted to tradable rights through the process described in the Magnuson-Stevens Act. The remaining fishery with a large number of participants—the Alaska pollock fishery—shifted by way of cooperatives, but only after Congress divided the fishery into smaller groups, with the expectation that the groups would negotiate cooperatives.³¹⁴

The tendency for fisheries with small numbers of initial rights holders to shift by way of cooperatives, while fisheries with larger numbers switch through the management councils, alludes to the importance of decisionmaking rules. When a fishery shifts to tradable rights by way of a cooperative, a rule of unanimity applies: All of the harvesters in that fishery must agree to shift. Presumably, smaller groups have had an easier time using cooperatives because the costs of reaching agreement about who will fish and the initial allocation of the catch are lower among smaller groups. When a fishery switches to tradable rights through the process laid out in the Magnuson-Stevens Act, there is no formal requirement for any vote, let alone a unanimous one, of the harvesters who will be affected.³¹⁵ Given the decisionmaking process, the council process represents a lower cost route than the unanimity of the cooperative process for introducing tradable rights among large groups.³¹⁶

The argument that large group size complicates the introduction of tradable rights assumes that the decisionmaking rule is unanimity, as in the marketplace. As described above, the political decisionmaking process contemplated in the Magnuson-Stevens Act does not provide each harvester and processor with a veto over change, and the absence of that veto likely has played an important role in facilitating

³¹⁴ It is probably not a coincidence that the Alaska pollock and Pacific whiting catcher processor fisheries shifted to tradable rights by way of cooperatives, while the moratorium on the councils recommending, and on NMFS approving, individual transferable quotas was in force.

³¹⁵ *But see supra* note 37 (discussing proposals to require referenda of fishers).

³¹⁶ *See ENSMINGER, supra* note 10, at 140 (noting that state enforcement reduced “need for near unanimity in support of the new property rights”); KANTOR, *supra* note 10, at 7–8 (noting that interest groups may “seek political solutions” because high transaction costs may complicate voluntary agreements); *id.* at 125 (“[T]he decision to alter traditional property rights arrangements ultimately is a political one because the transaction costs of voluntarily reaching agreements, say to protect wildlife, are usually too high.”); *id.* at 146 (noting that “voluntary agreement among all Georgians . . . was obviously unrealistic, because too many people were involved and each had an incentive to hold out for a disproportionate share of the expected gains”); Anderson & Grewell, *supra* note 2, at 83 (noting that top-down property rights may arise “because transaction costs may preclude agreement among individuals or between competing groups”); McChesney, *Tragedy Exiting, supra* note 19, at 232–33, 238–40 (discussing why decisionmaking costs may be lower under government than under private internal governance, but identifying other costs that may be higher if governments become involved in allocating private property).

the transition of large fisheries to tradable rights. But, as also emphasized above, because that decisionmaking process still is highly participatory, it is more difficult to introduce tradable rights in U.S. coastal fisheries than it would be under a less inclusive process.

4. *Summary*

The standard hypotheses about the evolution of property rights presume that they develop primarily through private ordering. However, examining a concrete instance of property rights formation such as the slow emergence of tradable rights in federal coastal fisheries underscores the implications of the common practice of rearranging rights through the political process.

My findings about why tradable rights have been slow to develop in coastal fisheries in federal waters are necessarily tentative, given the limited number of fisheries that have shifted to tradable rights and that other factors have not been held constant while considering individual hypotheses. Nonetheless, two factors stand out as having contributed to the delay in introducing tradable rights in federal coastal fisheries.

First, the political institutions through which tradable rights typically must be established provide multiple veto points for interest groups to delay the pace of change. While these institutions certainly are subject to economic and social forces, the institutions collectively generate a decisionmaking process which arguably has had an important independent impact on the timing of the introduction of tradable rights. When fisheries must proceed to tradable rights through the regional fishery management councils, support from significantly more than a majority of council members is required. Moreover, interested parties who disagree with council decisions on matters such as the initial allocation of rights may be able to block change by appealing to NMFS, the federal courts, and especially to the small group of coastal-state senators who have proven themselves willing to veto the introduction of individual transferable quotas.

The second major cause of the delay in introducing tradable rights is the existence of conflicts among fishing interest groups over how to allocate the increased rents that tradable rights are expected to generate. The data about fish prices discussed in this Article provide only modest support for the proposition that fish prices must increase for tradable rights to be implemented.³¹⁷ However, there is compelling evidence that conflicts over the distribution of expected rents have slowed the transition to tradable rights. While trends in fish

³¹⁷ See *supra* Part II.C.2.a.

prices may matter at the margin, distributional considerations seem to matter at the core.

Indeed, disputes about how tradable rights should be allocated when they first are implemented would seem to be the main reason that many of the veto points in the highly inclusive decisionmaking process have been exercised. Conflicts between interest groups in Alaska and Washington State about the initial allocation of rights provided an important initial impetus for the six-year moratorium on introducing individual transferable quotas through the council process. In addition, councils have taken a long time to develop proposals for individual transferable quotas, often because of disagreements among fishing interests seeking to maximize their share of the rights initially distributed for free.³¹⁸ To be sure, the initial allocation of rights is not the sole determinant of who wins and loses under tradable rights, as parties who do not receive any or many rights at the outset still may benefit from more efficient fishing under tradable rights. Nonetheless, the initial allocation is an important determinant because the fishing industry's political clout has allowed it to ensure that rights are allocated for free at the outset, rather than sold. This means, in turn, that the parties who obtain large initial allocations will enjoy disproportionate gains should the rights increase in value.

Digging deeper, the role that allocation conflicts have played in delaying change raises the question of why distributional conflicts within fisheries have been vociferous, if not intractable. I hypothesize that two factors may have exacerbated these conflicts about the distribution of rents.

First, utilization levels in many fisheries may have contributed to the acrimoniousness of the conflicts. Experience to date suggests that full utilization may be the optimal level at which to introduce tradable rights, at least while they remain a relatively new concept in fisheries management. The costs of organizing the transition may be lower in fully utilized fisheries than overutilized fisheries where entrenched interests are competing for shares of a comparatively depleted resource. In addition, fully utilized fisheries may have a greater propensity to switch than underutilized fisheries because there are more fishers who would like to acquire property rights in a resource for which there is a well-developed market.

Second, the structure of the commercial fishing industry may have aggravated conflicts about the distribution of rents. My research suggests that heterogeneity along certain dimensions may be condu-

³¹⁸ See *supra* Part II.C.2.a.

cive to establishing tradable rights. In particular, the presence of a distinct subgroup of vertically integrated catcher processors, or other firms with access to capital, may facilitate rearranging rights. Since firms such as these stand to benefit from lower harvesting costs and more secure supplies of fish under tradable rights, these firms have an incentive (and the resources) to make compromises such as those made by the offshore pollock catcher processors in Alaska in the 1990s to obtain tradable rights.³¹⁹ While more information about the industrial structure of individual U.S. fisheries is needed to make this argument conclusively, it is possible that distributional conflicts have been aggravated in fisheries by a lack of sufficient heterogeneity along economic dimensions. As discussed above, the prospect that heterogeneity is conducive to change runs counter to the prevailing hypothesis that private property is more likely to emerge when users are homogenous.

CONCLUSION

In recent years, there has been a revival of interest in the legal academy in why private property rights evolve and assume the forms that they do. However, reduced to their core, a number of the most recent property theory articles are Demsetzian accounts of property rights which discount or ignore the political process by which property rights often are formed.³²⁰

Transitions between property regimes are not just a theoretical matter. On the contrary, there are many lively contemporary debates about whether to establish or to rearrange private property rights. In addition to the discussion about establishing tradable rights in fisheries, there are similar debates in the United States and elsewhere about whether to broaden the use of property rights and markets to regulate environmental resources such as air, water and public lands. Even more prominent are the debates currently taking place in the popular press, legislatures, and the courts about rights in intellectual property, such as the scope of copyright in light of the digital revolution.³²¹ Moreover, longstanding debates about property rights in the

³¹⁹ See *supra* notes 276–77 (discussing why large firms and firms with access to capital may support tradable rights).

³²⁰ For citations to the recent scholarship, see sources cited *supra* note 31.

³²¹ See, e.g., William Fisher, *Don't Beat Them, Join Them*, N.Y. TIMES, June 25, 2004, at A23 (arguing that response to music industry's alarm about file sharing should be "a monthly licensing fee paid by Internet users"); Kembrew McLeod, *Share the Music*, N.Y. TIMES, June 25, 2004, at A23 (supporting Electronic Frontier Foundation proposal for small monthly licensing fee that could be bundled with other bills and resemble cable bill). See generally LAWRENCE LESSIG, *FREE CULTURE: HOW BIG MEDIA USES TECHNOLOGY*

human body have been recast in response to advances in medical technology, among other factors.³²²

Demsetz's seminal article and the scholarship it spawned offer a rich theoretical account of the evolution of property rights that helps to make sense of aspects of contemporary changes in the evolution of property rights. But there remains a large gap between the actual evolution of property rights, and the theoretical approaches to understanding the evolution of property rights pioneered by Demsetz and elaborated in increasingly sophisticated terms by his successors. Filling this gap will involve two major tasks.

First, on a theoretical level, it is necessary to move beyond the prevailing bottom-up accounts of private property formation. The incipient recognition in the most sophisticated scholarship that private property formation is fundamentally a political process must be translated into a robust positive theory about why property rights evolve. Second, more formal empirical work should be undertaken to investigate the factors both conducive and detrimental to the evolution of private property. To a considerable extent, the evolution of property rights scholarship is dominated by qualitative case studies of property rights formation in a particular natural resource in a single jurisdiction over a relatively finite period of time. Uniting the practice and theory of the evolution of property rights requires more formal systematic research into the variables concerning the formation of private property rights in a wider range of goods.³²³

AND THE LAW TO LOCK DOWN CULTURE AND CONTROL CREATIVITY (2004) (expressing alarm about growth of copyright).

Indeed, there is a growing legal literature on the evolution of copyright. *See, e.g.*, Levmore, *Property's Uneasy Path*, *supra* note 2, at 187–94 (discussing two stories of evolution of intellectual property rights); Levmore, *Two Stories*, *supra* note 2, at S443–48 (same); Robert P. Merges, *One Hundred Years of Solitude: Intellectual Property Law, 1900–2000*, 88 CAL. L. REV. 2187, 2191–206, 2233–40 (2000) (arguing that “the law . . . accommodated the advent of new technology with admirable flexibility” in twentieth century, but sounding note of caution about interest group rent seeking). *See generally* Timothy Wu, *Copyright's Communications Policy*, 103 MICH. L. REV. 278 (2005) (emphasizing copyright's role in “regulating competition among rival disseminators”).

³²² *See, e.g.*, JAMES BOYLE, *SHAMANS, SOFTWARE, & SPLEENS: LAW AND THE CONSTRUCTION OF THE INFORMATION SOCIETY* 97–107 (1996) (criticizing *Moore v. Regents of the Univ. of California*, 793 P.2d. 479 (Cal. 1990) (en banc), *cert. denied*, 499 U.S. 936 (1991), and concluding court's reasoning was flawed); MARGARET JANE RADIN, *CONTESTED COMMODITIES* 125–26 (1996) (discussing sales of body parts, although not specifically linking dilemma raised by such sales with emerging technology); Larry Rohter, *Tracking the Sale of a Kidney on a Path of Poverty and Hope*, N.Y. TIMES, May 23, 2004, at A1 (describing international market for organs and noting that “[a]s medical science advances and health care increasingly becomes a marketplace transaction, a fierce debate about commercializing transplants has emerged”).

³²³ *See* Lee J. Alston et al., *Property Rights and the Preconditions for Markets: The Case of the Amazon Frontier*, 151 J. INSTITUTIONAL & THEORETICAL ECON. 89, 90 (1995)

APPENDIX: FISH PRICES

This Appendix provides information about the test developed to assess the relationship between fish prices and the decision to implement tradable rights. Four topics are covered: the data sources used, the calculation of the changes in the prices of tradable rights fisheries, the derivation of comparators, and the limitations of the analysis.

I

DATA SOURCES

To test the hypothesis that the delays in introducing tradable rights are due to the recent history of fish prices, I arranged for data to be collected from NMFS's online databases of fisheries landings.³²⁴ Landings are "[q]uantities of fish, shellfish, and other aquatic plants and animals brought ashore and sold."³²⁵

All data were taken from the Annual Commercial Landings Statistics database,³²⁶ except for data about bluefin tuna, which was drawn from the Annual Commercial Landings by Gear Type

("[T]here has been little systematic empirical research on the development of property rights arrangements."); Ostrom, *supra* note 69, at 261 ("Exactly which attributes of both physical and social systems are most important to the success of individual withdrawal rights from common-pool resources is not as well established as the attributes of common-pool resource systems conducive to group proprietorship or ownership."). A limited amount of empirical scholarship systematically addresses the determinants of the introduction of private property. See ALSTON ET AL., *supra* note 2, at 128 n.2 (citing sources). See generally ALSTON ET AL., *supra* note 2 (examining development of property rights on Brazilian Amazon frontier); KANTOR, *supra* note 10 (tracing development of livestock enclosure in postbellum Georgia); LIBECAP, *supra* note 10 (offering four case studies of evolution (and non-evolution) of property rights in four U.S. natural resources); Edwards, *Rent-Seeking*, *supra* note 69 (examining property rights formation in Atlantic sea scallop fishery); Johnson & Libecap, *supra* note 31 (examining persistence of common property in fisheries, focusing on Texas shrimp fishery).

For a similar call for more formal research into the factors conducive to the durability of communal property arrangements, see Arun Agrawal, *Common Property Institutions and Sustainable Governance of Resources*, 29 WORLD DEV. 1649, 1665 (2001), who argues for new directions in research on communal management of commons.

³²⁴ I am especially grateful to Ioan Voicu and Xufeng Qian of the Furman Center for Real Estate and Urban Policy at the New York University School of Law, and to Amanda Lockshin, for their help in thinking through a way of testing the impact of fish prices on the development of tradable rights. Xufeng Qian performed the statistical work about fish prices that is discussed in Part II.C.2.a and this Appendix. Amanda Lockshin drafted a memorandum summarizing her work which was particularly helpful in completing this Appendix. Jacob Kreutzer also provided valuable research assistance for the study of fish prices.

³²⁵ NAT'L MARINE FISHERIES SERV., *supra* note 124, at 122.

³²⁶ See Fisheries Statistics Div., NOAA Fisheries, Annual Commercial Landings Statistics, at http://www.st.nmfs.gov/st1/commercial/landings/annual_landings.html (last visited Jan. 28, 2005).

database.³²⁷ This database was used for bluefin tuna because only the segment of the fishery using purse seine gear has adopted tradable rights, and this database allows searches to be conducted by gear type. Both databases include information about “fish and shellfish that are landed and sold in the 50 states by U.S. fishermen and do not include landings made in U.S. territories or by foreign fishermen.”³²⁸

NMFS’s online databases are updated regularly. The information used in this Article was downloaded during the week of August 16, 2004. The downloaded data includes the volume (in pounds) and the ex-vessel dollar value of the landings of selected individual fisheries and groups of fisheries (not prices, since they are not available online). The ex-vessel value is the value fishers receive for the fish they catch. It does not include value added through processing.³²⁹ The downloaded volume and value information was used to derive estimates of fish prices.

II

TRADABLE RIGHTS FISHERIES

As explained in this Article, eleven fisheries had switched to tradable rights as of 2002. Information about the volume and the ex-vessel value of these eleven fisheries was downloaded for selected years. In downloading the information, every effort was made to use search terms that would provide data about the fisheries that had switched to tradable rights, and not about the same species of fish in areas that had not adopted tradable rights. However, as discussed below, this objective was accomplished only imperfectly. Table A1 identifies the species and geographic areas searched, and the years for which data were obtained.

³²⁷ See Fisheries Statistics Div., NOAA Fisheries, Annual Commercial Landings by Gear Type, at http://www.st.nmfs.gov/st1/commercial/landings/gear_landings.html (last visited Jan. 28, 2005).

³²⁸ See *supra* notes 326–27.

³²⁹ NAT’L MARINE FISHERIES SERV., *supra* note 124, at 121.

TABLE A1: SEARCHES FOR PRICES FOR TRADABLE RIGHTS SPECIES

Tradable Rights Fishery	Species Search Term	Geographic Area	Years for Which Data Were Requested and Available
Bluefin tuna (purse seine fleet only)	Tuna, Bluefin	Atlantic (purse seine only)	1973–85, 1987–2002
Atlantic surfclams	Clam, Atlantic Surf	Atlantic	1976–2002
Atlantic ocean quahogs	Clam, Ocean Quahog	Atlantic (except Maine) ³³⁰	1976–2002
Alaska halibut	Halibut, Pacific	Alaska	1976–2002
Alaska sablefish	Sablefish	Alaska	1976–2002
Maryland summer flounder	Flounder, Summer	Maryland	1976–95
Pacific whiting	Hake, Pacific (Whiting)	At-sea process ³³¹	1990–2002
Bering Sea/ Aleutian Islands pollock	Pollock, Walleye	Alaska	1976–2002
Pacific sablefish	Sablefish	California, Oregon and Washington (combined)	1976–2002
Alaska weathervane scallops	Scallop, Sea	Alaska	1976–77, 1981–2002
South Atlantic wreckfish	Wreckfish	South Atlantic	1988–96, 1998

Using the volume and ex-vessel value data, an annual average price per pound then was calculated for each year for each of the species that shifted, except for wreckfish. No prices were calculated for wreckfish, as NMFS indicated that its online wreckfish landings data are unreliable; much information about landings cannot be included in the databases due to data confidentiality rules intended to protect the identity of industry participants.³³²

The nominal annual average prices per pound then were converted into 2002 dollars using the Producer Price Index series for

³³⁰ Maine was excluded based on information provided by staff at the Mid-Atlantic Fishery Management Council about the Maine ocean quahog fishery. See E-mail from Clay Heaton, Mid-Atlantic Fishery Management Council, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Jan. 14, 2004, 11:46 EST) (on file with the *New York University Law Review*).

³³¹ This geographic search term is used even though it only yields data from 1990 onwards because it corresponds best to the portion of the whiting fishery that is covered by the catcher processor cooperative off the Pacific coast.

³³² E-mail from an employee of the Fisheries Statistics Division to Katrina M. Wyman, *supra* note 124; E-mail from an employee of the Fisheries Statistics Division to Katrina M. Wyman, *supra* note 128.

unprocessed and packaged fish, from the commodity-based index, maintained by the Bureau of Labor Statistics.³³³

For each species, the year in which the decision was made to shift to tradable rights was identified. This decision year was identified based on which of three methods was used to introduce tradable rights in the fishery. In fisheries that switched to individual transferable quotas through the process contemplated by the Magnuson-Stevens Act, the year of the council recommendation to introduce tradable rights is considered the effective decision year. This year was chosen because of the high degree of deference NMFS and the federal courts pay to council decisions. In the only fishery to shift that is under the direct control of the Secretary of Commerce, the effective decision year is the year of the Secretary's announcement in the Federal Register that tradable rights will be used. In fisheries that formally shifted by way of private harvesting agreements, the decision was made when the participants in the cooperative reached an agreement. Table A2 indicates the decision years identified for the various tradable rights species.

TABLE A2: EFFECTIVE DECISION YEARS FOR TRADABLE RIGHTS SPECIES

Species	Effective Decision Year ³³⁴
Tuna, Bluefin	1983
Clam, Atlantic Surf	1989
Clam, Ocean Quahog	1989
Halibut, Pacific	1991
Sablefish (Alaska)	1991
Flounder, Summer	1993 (deemed) ³³⁵
Hake, Pacific (Whiting)	1997
Pollock, Walleye	1998 (deemed) ³³⁶
Sablefish (Pacific)	2000
Scallop, Sea	2000

Using these decision years, calculations were made of the compound annual change in the price of each species with tradable rights for the five years before the decision year, and separately for the ten years before the decision year. The compound annual change is the

³³³ See Bureau of Labor Statistics, U.S. Dep't of Labor, Producer Price Index Commodity Data, at <http://data.bls.gov/labjava/outside.jsp?survey=wp> (last visited Jan. 28, 2005).

³³⁴ See *supra* tbl.4 (identifying effective decision year and sources).

³³⁵ See *supra* note 135 (explaining difficulty of dating birth of informal cooperative in summer flounder fishery).

³³⁶ See *supra* note 139 (explaining development of cooperatives in pollock fishery).

geometric average annual change in price over the five- or ten-year period, assuming a constant rate of increase each year. The compound annual change figures are displayed in the two bar graphs in the body of this Article.³³⁷

III COMPARATORS

Time and resource constraints prevented individual calculation of prices for the several hundred fish species in NMFS's online databases.³³⁸ Accordingly, it was necessary to identify a comparator to provide a basis for assessing the significance of the compound annual price changes in the species that switched to tradable rights in the years leading up to the decision to do so. Three comparators were developed for each fishery that switched: the median of the ten, the mean of the ten, and all non-tradable rights fisheries. Only one of these three comparators is identified in the bar graphs in the main text, the median of the ten.

The Median of the Ten

The "median of the ten" comparator was derived in the following way: NMFS has maintained indexes of the prices of thirty-three species of fish for perhaps two decades.³³⁹ No written information is available about why the agency tracks the prices of these thirty-three species out of the universe of hundreds fished. But it is possible that

³³⁷ See *supra* Part II.C.2.a.

³³⁸ See E-mail from an employee of the Fisheries Statistics Division, National Marine Fisheries Service, to Katrina M. Wyman, Assistant Professor, New York University School of Law (May 19, 2004, 16:27 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) ("There are about 555 species domestically landed as reported by the annual and gear databases between 1997 and 2002."); see also Fisheries Statistics Division, *supra* note 326 (referring to "all 715 species names" in directions provided when one clicks "species locator" button); Fisheries Statistics Division, *supra* note 327 (same).

³³⁹ See E-mail from an employee of the Fisheries Statistics Division, National Marine Fisheries Service, to Katrina M. Wyman, Assistant Professor, New York University School of Law (Oct. 13, 2004, 13:49 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) (noting that NMFS began to compile such price data "back in the mid-1970's"); E-mail from an employee of the Fisheries Statistics Division, National Marine Fisheries Service, to Jacob Kreutzer, Research Assistant to Katrina M. Wyman, Assistant Professor, New York University School of Law (Aug. 11, 2004, 13:33 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*) ("The index table species/groups have remained constant since at least 1982.").

For a recent example of the indexes, see NAT'L MARINE FISHERIES SERV., *supra* note 124, at 93, which provides "Indexes of Exvessel Prices for Fish and Shellfish, By Years, 1996-2002."

the thirty-three originally were selected because these species “have high economic value and because” the agency has “relatively long time series of their landings.”³⁴⁰ Notably, seven of the thirty-three had switched to tradable rights as of 2002.³⁴¹ This overlap suggests a relationship between the species whose prices are indexed, and tradable rights fisheries, and arguably makes the non-tradable rights species whose prices NMFS tracks a plausible comparator group.

Since the seven species among the thirty-three that had switched to tradable rights could not serve as comparators, they were removed from the pool of potential comparator species. Given this Article’s focus on fisheries in federal waters, the remaining twenty-six species then were sorted based on whether they are fished mainly in federal or state waters. The sixteen (out of twenty-six) species estimated to be caught mainly in state waters were removed as comparators.³⁴² That left ten species that could be comparators, since each of these are caught primarily in federal waters, and, to my knowledge, none had switched to tradable rights as of 2002. However, it should be noted that the Alaska components of two of these ten species—king crab and snow crab—likely will be shifting to tradable rights beginning in 2005, in light of a recommendation made by the North Pacific Fishery Management Council in 2002 and a provision in an appropriations bill passed by Congress in 2004.³⁴³

Volume and ex-vessel data were downloaded from NMFS’s Annual Commercial Landings database for the ten species. Table A3 identifies the species and geographic search terms used, and the years for which data were requested and available using these terms.

³⁴⁰ E-mail from an employee of the Fisheries Statistics Division, National Marine Fisheries Service, to Jacob Kreutzer, Research Assistant to Katrina M. Wyman, Assistant Professor, New York University School of Law (Aug. 11, 2004, 12:26 EST) (name withheld to protect confidentiality) (on file with the *New York University Law Review*).

³⁴¹ Of the thirty-three species, the seven that had switched at least partly to tradable rights as of 2002 are Alaska pollock, flounder, halibut, bluefin tuna, ocean quahogs, surf-clams and sea scallops.

³⁴² The sixteen species were determined to be fished mainly in state waters using the estimates of where fish are caught in NAT’L MARINE FISHERIES SERV., *supra* note 124, at 8–13.

³⁴³ N. PAC. FISHERIES MGMT. COUNCIL, *Summary of the North Pacific Fishery Management Council’s Bering Sea and Aleutian Islands Crab Rationalization Program*, in *BERING SEA ALEUTIAN ISLANDS CRAB FISHERIES DRAFT ENVIRONMENTAL IMPACT STATEMENT*, *supra* note 167, app. 2, at 4 (identifying species that would be covered by “the rationalization program” as including various species of king crab and snow crab); see *supra* note 130 (discussing 2004 appropriations provision about crab rationalization in Alaska).

TABLE A3: SEARCH TERMS FOR TEN COMPARATOR SPECIES

Species ³⁴⁴	Species Search Term	Geographic Area Search Term	Years for Which Data Were Requested and Available
Cod	Cod	All states	1973–2002
Haddock	Haddock	All states	1973–2002
Atlantic pollock	Pollock	Atlantic	1973–2002
Swordfish	Swordfish	All states	1973–2002
Albacore tuna	Tuna, Albacore	All states	1973–2002
Yellowfin tuna	Tuna, Yellowfin	All states	1973–2002
Skipjack tuna	Tuna, Skipjack	All states	1973–2002
King crabs	Crab, King	All states	1973–2002
Snow crabs	Crab, Snow/Tanner ³⁴⁵	All states	1973–80, 1983, 1994–95, 1997, 2000, 2002
	Crab, Snow	All states	1981–2002
Other shrimp (not from the Gulf and South Atlantic)	Shrimp, Bay ³⁴⁶	All states	1973–80
	Shrimp, Ghost	All states	1973–2002
	Shrimp, Ocean	All states	1973–2002
	Shrimp, Penaeid	All states	1973–2002
	Shrimp, Marine, Other	All states	1973–2002
	Shrimp, FW	All states	1974–75, 1977, 1999–2000
	Shrimp, Pacific Rock	All states	1974, 1979–2002
	Shrimp, Brine	All states	1975, 1976, 1978–2002
	Shrimp, Pink	All states	1978–2002
	Shrimp, Rock	All states	1978–2002
	Shrimp, Brown	All states	1978–2002
	Shrimp, White	All states	1978–2002
	Shrimp, Seabob	All states	1978–2002
	Shrimp, Royal Red	All states	1978–2002
	Shrimp, Spot	All states	1979–2002
	Shrimp, Atlantic & Gulf, Roughneck	All states	1984–85, 1987–2002
	Shrimp, Blue Mud	All states	1985–2002
	Shrimp, Marine, Other ³⁴⁷	Gulf	1973–77, 1983–84, 1989, 1992–2002
	Shrimp, FW	Gulf	1974–75, 1977, 1999–2000
	Shrimp, Pink	Gulf	1978–2002
	Shrimp, Rock	Gulf	1978–2002
	Shrimp, Brown	Gulf	1978–2002
	Shrimp, White	Gulf	1978–2002
	Shrimp, Seabob	Gulf	1978–2002
	Shrimp, Royal Red	Gulf	1978–2002
	Shrimp, Atlantic & Gulf, Roughneck	Gulf	1984–85, 1987–2002
	Shrimp, Marine, Other ³⁴⁸	South Atlantic	1973–78, 1980–81, 1983–84, 1987–2002
	Shrimp, Pink	South Atlantic	1978–2002
	Shrimp, Rock	South Atlantic	1978–2002
	Shrimp, Brown	South Atlantic	1978–2002
	Shrimp, White	South Atlantic	1978–2002
	Shrimp, Seabob	South Atlantic	1979, 1992, 1995, 1999
	Shrimp, Royal Red	South Atlantic	1990–2002

Annual average prices per pound then were calculated for each of the ten comparator species, applying the same method used to calculate annual average prices per pound for the tradable rights species. A single price was calculated for snow crab, using the data available for "crab, snow/tanner" and "crab, snow." A single price also was calculated for other shrimp. This was done by subtracting the information about the various species of shrimp landed in the "Gulf" and "South Atlantic" from the information about shrimp landed in "all states." The annual average prices for the ten species then were converted into 2002 dollars, using the same index applied to adjust the prices of the tradable rights species.

As mentioned above, the species that have shifted to tradable rights did so in different years, and the decision to shift also was made at different times, depending on the fishery. This complicated the use of the ten species as a comparator. To deal with this, the compound annual changes in the prices of each of the ten non-tradable rights species were calculated for the five- and ten-year periods before the decision was made to introduce rights in the various tradable rights fisheries. For example, the compound annual change in the price of cod was calculated for the five years before the decision to switch bluefin tuna in 1983, and separately for the five years before the decision to shift Atlantic surfclams in 1989.

For each fishery that switched to tradable rights, the comparators on the bar graphs in the body of the Article are the median compound annual price changes, of the price changes of the ten non-tradable rights species. The median was obtained by ranking the compound annual price changes of the ten non-tradable rights species, and calculating the average of the fifth- and sixth-ranked species.

³⁴⁴ This column identifies the species names as they are set out in NAT'L MARINE FISHERIES SERV., *supra* note 124, at 93.

³⁴⁵ The species search term that was used was "crab, snow." It yielded results for "crab, snow" and "crab, snow/tanner."

³⁴⁶ The species search term that was used to obtain information about the value and volume of information for shrimp from all states was "shrimp." "Shrimp" combined with the geographic search term "all states" yielded information about the various species identified in the table.

³⁴⁷ The species search term that was used to obtain information about the value and volume of information for shrimp from the Gulf was "shrimp." "Shrimp" combined with the geographic search term "Gulf" yielded information about the various species identified in the table.

³⁴⁸ The species search term that was used to obtain information about the value and volume of information for shrimp from the South Atlantic was "shrimp." "Shrimp" combined with the geographic search term "South Atlantic" yielded information about the various species identified in the table.

The Mean of the Ten

The mean of the compound annual price changes of the ten comparator species also was calculated for the five and ten years before the decision was made to shift each tradable rights fishery. The median rather than the mean of the ten is used in the bar graphs in the body of this Article, since the mean is more sensitive to outliers.

All Non-tradable Rights Fisheries

In addition to the median and the mean of the ten, a third comparator also was calculated. Indeed, this third comparator—the compound annual change in the price of all non-tradable rights species—was the first comparator to be calculated.

NMFS's Annual Commercial Landings Statistics database allows information about the volume and ex-vessel value of the hundreds of species in the database from all states to be downloaded as an aggregate, year by year. This can be done using the species search term "all species combined" and the geographic search term "all states," and specifying the year for which the information is sought. Taking advantage of this, aggregate information was downloaded for "all species combined" in "all states" for the years between 1973 and 2002.

The total volume and ex-vessel value of all the tradable rights species then was subtracted from the volume and ex-vessel value for all species combined. Next, an annual average price was calculated for all non-tradable rights species, and adjusted for inflation using the same index used in converting the prices of the tradable rights species and the ten comparator species.

In turn, for each of the tradable rights fisheries, the compound annual change in the price of the non-tradable rights fisheries as a group was calculated. This calculation was performed for the five- and ten-year periods before the decision was made to shift to tradable rights in each of the fisheries that had adopted them by 2002. The only exception was bluefin tuna, for which the compound annual change in the price of the non-tradable rights fisheries was calculated for only the five-year period before a component of the fishery switched to tradable rights in 1983. No compound annual change in the price of the non-tradable rights fisheries was calculated for the ten years before bluefin tuna switched (1973–83) because data about the value and volume of all the tradable rights fisheries were downloaded only as far back as 1976.

The change in the price of the large group of non-tradable rights fisheries then became a basis for assessing the changes in the prices of

the tradable rights fisheries in the five and ten years before they shifted.

Ultimately, however, I decided not to use the changes in the price of all fisheries that had not adopted tradable rights as a comparator because this group, by definition, includes many hundreds of fish taken from federal and state waters. Moreover, within this group there may be many fish whose prices increased over the past few decades, but for which tradable rights have not been adopted.

IV LIMITATIONS

There are several limitations in the analysis that open up avenues for further research. I discuss one conceptual limitation, and then three limitations related to the data used.

Conceptual Limitation: The Inadequacy of Prices as a Proxy for Rents

The starting point for the analysis is that changes in prices represent an adequate proxy for changes in rents. According to the standard Demsetzian account, the price of a resource that shifts to private property should be expected to rise before the decision to change because (1) price increases prompt increases in rents, and (2) increases in rents drive the creation of private property.

However, it is possible to question the use of price as a proxy for rents. As discussed previously,³⁴⁹ price is only one of the factors that determine rents, with an array of costs among the other considerations. As a result, private property still might emerge, even if relative prices are not rising, because the magnitude of the rents expected under private property still might be increasing (due to changes in costs, for example).

Thus the introduction of tradable rights in several fish, even while their prices were not rising, is not necessarily inconsistent with the hypothesis that higher levels of expected rents induce changes in property rights. Tradable rights still may be emerging in response to rents if these rights would allow holders to reduce the cost of harvesting fish, and to thereby receive higher rents. Indeed, the offshore catcher processors that pursued tradable rights in the Alaska pollock fishery in the face of falling prices seem to have done so largely to

³⁴⁹ See *supra* Part I.B.1.

reduce their harvesting costs, presumably to increase their profitability.³⁵⁰

The best test of the Demsetz hypothesis would rely directly on information about rents. In the absence of information about rents, price represents only an imperfect proxy.

Data Limitations

Three limitations on the data used in this analysis should be noted. Two of these concern the prices calculated for the tradable rights fisheries.

First, since only eleven species have shifted to tradable rights, I have only a limited number of data points about the trends in the prices of tradable rights fisheries before they shift. Moreover, as explained above, I have not used data for one of these species, wreckfish, on the advice of NMFS.

Second, the average annual prices calculated for tradable rights species are only estimates of the prices harvesters received in these fisheries before the change in property arrangements took place. Moreover, it is unclear to what extent these estimates correspond with the prices harvesters received. The volume and value information used to calculate the prices of the tradable rights fisheries often includes data about the value and the volume of components of fisheries that did not adopt tradable rights. On the flip side, the underlying information used to calculate fish prices also does not include data about components of these fisheries that shifted. These mismatches result primarily from the peculiarities of the coverage of the existing tradable rights schemes, the limited ability to tailor searches in NMFS's online databases, and data confidentiality rules that prevent NMFS from releasing volume and ex-vessel value information in certain instances.³⁵¹

A third limitation concerns the median of the ten comparator used as a point of comparison for assessing the significance of the changes in the prices of the tradable rights fisheries before they switched. Ideally, the prices of the tradable rights fish before they switched could be compared to the prices of the universe of fish, or at

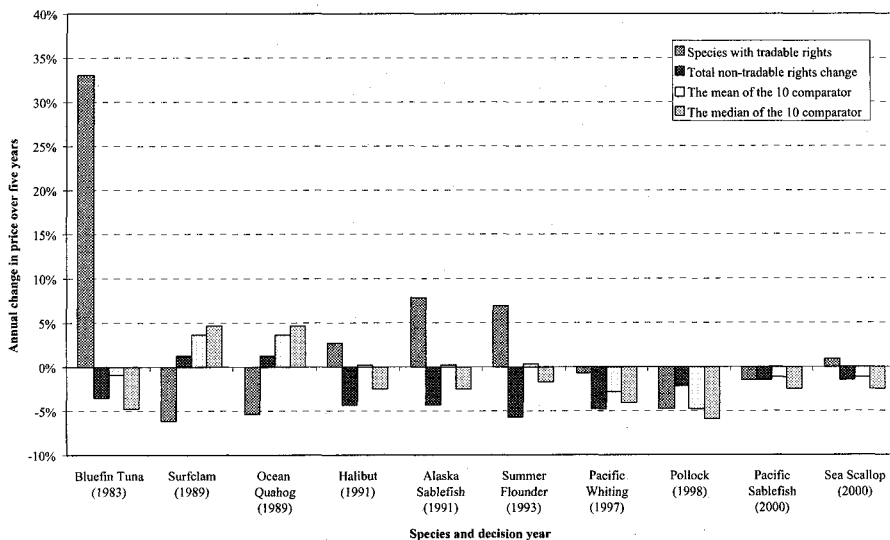
³⁵⁰ See Criddle & Macinko, *supra* note 284, at 463 ("Between 1994 and 1998, half of the catcher processors operating in the [Bering Sea Aleutian Islands] underwent bankruptcy or forced sale of their vessel holdings."); *supra* notes 283–84 and accompanying text (discussing history of introduction of pollock harvesting cooperatives).

³⁵¹ See Katrina Miriam Wyman, Coverage of Federally Established Tradable Rights Programs in Federal Waters (Aug. 25, 2004) (unpublished manuscript, on file with the *New York University Law Review*) (qualitatively comparing coverage of existing tradable rights programs and landings data in NMFS's online databases that provided basis for calculating prices per pound).

least those fish caught mainly in federal waters. However, as mentioned above, time and resource constraints prevented separately downloading information and calculating estimates of the prices of the many species that had not switched to tradable rights as of 2002.

One partial defense of the use of the median of the ten is that the upshot of the analysis is similar regardless of which of the three comparators is used. Consider the following two bar graphs. These are expanded versions of the two graphs presented in the Article, including the three comparators, rather than only the median of the ten. The first bar graph covers the five-year period before the decision to introduce tradable rights. It illustrates that, in this period, the prices of only five out of the ten species (fifty percent) for which data are provided were increasing faster than the prices of the median of ten comparator, as well as the two others. The second bar graph indicates that in the ten years before the decision to shift to tradable rights, the prices of only five of the eight tradable rights species (approximately sixty-three percent) were increasing faster than the prices of the median of ten, as well as the other two comparators.

CHANGE IN PRICE IN FIVE YEARS BEFORE DECISION TO SWITCH



CHANGE IN PRICE IN TEN YEARS BEFORE DECISION TO SWITCH

