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**The Coase Theorem and Western U.S.
Appropriative Water Right**

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ABSTRACT

The article analyzes the prior appropriation system in the Western United States as a compelling application of the Coase Theorem. In the overall prior appropriation system, few statutory transfers occur, but there are thriving transfer markets in the smaller-scale context of water districts. This suggests that the system at large is not at Coase Equilibrium, but that Equilibrium does prevail inside the water institutions. Institutions facilitate low transaction costs and secure property rights and catalyze an iterative process that tends toward Coase Equilibrium. The article makes policy recommendations regarding the formation of larger-scale water institutions to reduce deadweight losses by expanding the scope of Coase Equilibrium within the prior appropriation system.

1. INTRODUCTION

This article analyzes Western U.S. surface water appropriative rights as a particularly compelling application of the Coase Theorem. The article postulates two “Coase Conditions,” namely that (i) transaction costs be low¹ and (ii) property rights of parties to market exchanges be clearly defined and secure,² and defines a “Coase Equilibrium” in which the Coase Conditions hold and parties have traded their property rights to achieve an economically efficient outcome unconstrained by differences, if any, between initial property allocations and efficient property allocations.³ This article analyzes why the Coase

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1. See R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 15-16 (1960).

2. *Id.* at 8, 19.

3. See *id.* at 7-8, 15-16; Ronald N. Johnson et al., *The Definition of a Surface Water Right and Transferability*, 24 J.L. & ECON. 273, 279 (1981).

Conditions do not hold in the prior appropriation system at large, but why they have been fulfilled within irrigation districts, and consequently how Coase Equilibrium characterizes this subset of the prior appropriation system. The article makes recommendations to answer the question "How can the Coase Equilibrium, achieved at the irrigation district level, be enlarged to encompass more of the prior appropriation system?" The article's Coase-based analysis of surface water use in the American West and the resulting recommendations are valuable because they present an opportunity to reduce deadweight losses to society caused by the prior appropriation system.

II. OVERVIEW OF THE PRIOR APPROPRIATION SYSTEM

This part discusses the historical background of appropriative rights, the elements by which rights are established, and the legal grounds under which rights can be lost. Relating these legal matters to the implications of the first-in-time, first-in-right nature of the prior appropriation system, conditions of water scarcity in the American West, and the prevalence of "paper rights" on most Western rivers, it provides the necessary context for understanding the reasons for failure of the Coase Conditions and absence of Coase Equilibrium within the prior appropriation system.

A. The History of Appropriative Rights and How Appropriative Rights Are Obtained

The prior appropriation system for surface water allocation in the American West began in the 1850s when miners arrived and began to divert water from rivers and streams for use in their sluicing, slurring, and similar operations.⁴ The traditional legal elements of obtaining an

4. WILLIAM GOLDFARB, *WATER LAW* 32 (2d ed. 1988). See also A. DAN TARLOCK ET AL., *WATER RESOURCE MANAGEMENT* 66-70 (5th ed. 2002) (citing *Irwin v. Phillips*, 5 Cal. 140 (1855)); Carol M. Rose, *Energy and Efficiency in the Realignment of Common-Law Water Rights*, 19 J. LEGAL STUD. 261, 289 (1990); Terry L. Anderson & P.J. Hill, *The Evolution of Property Rights: A Study of the American West*, 18 J.L. & ECON. 163, 177-78 (1975); JOSEPH L. SAX ET AL., *LEGAL CONTROL OF WATER RESOURCES CASES AND MATERIALS* 285 (3d ed. 2000) (citing ROBERT G. DUNBAR, *FORGING NEW RIGHTS IN WESTERN WATERS* 61-63 (1983)). For a discussion describing the evolution of prior appropriation systems, see generally *id.* at 281-86. Note, however, that adoption of the prior appropriation system was not uniform throughout the mid-nineteenth-century West. Specifically, early Latter Day Saint settlements in Utah and "utopian" communities of other European and American settlers adopted forms of communal ownership of surface water resources, becoming in many ways the forerunners of the mutual water companies that are still quite significant in modern Western agricultural water use. See, e.g., *id.* at 283-84; TARLOCK ET AL., *supra*, at 70.

appropriative right are (i) the diversion (ii) of unappropriated water (iii) from a natural stream (iv) to a reasonable and beneficial use.⁵

B. Losing Water Rights

Once obtained and perfected through reasonable and beneficial use, appropriative water rights are not secure. They can be attacked on several grounds and lost for various reasons. The most significant ways in which appropriative rights can be lost include (i) waste, (ii) abandonment, (iii) forfeiture, and (iv) failure to satisfy the historical use requirement.⁶

1. Waste

A subset of the "reasonable and beneficial use" element of an appropriative right is that the use cannot be "wasteful."⁷ Waste is using water in a manner that creates egregious water loss.⁸ Water losses happen in many forms, including seepage out of unlined irrigation ditches or evaporation from irrigation canals or furrows. These losses, however, generally do not by themselves constitute legal waste under prevailing water law standards. Instead, what constitutes waste is contextual, with the leading rule being that "an appropriator cannot be compelled to divert according to the most scientific method known. He is entitled to make a reasonable use of the water according to the general custom of the locality, so long as the custom does not involve unnecessary waste."⁹ In other words, the waste requirement can be seen as placing in jeopardy only appropriative rights that are used in a markedly more wasteful manner than the rights of neighboring appropriators.

5. See LEONARD RICE & MICHAEL D. WHITE, *ENGINEERING ASPECTS OF WATER LAW* 27-28 (1987); TARLOCK ET AL., *supra* note 4, at 161-62, 177-80.

6. See generally SAX ET AL., *supra* note 4, at 128 (waste); *id.* at 208 (abandonment and forfeiture); *id.* at 236 (historical use requirement).

7. See, e.g., *id.* at 128-41; *Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist.*, 45 P.2d 972, 997 (Cal. 1935).

8. *Tulare Irrigation Dist.*, 45 P.2d at 997.

9. See generally *Tulare Irrigation Dist.*, 45 P.2d 972. In *Tulare*, the California Supreme Court found that seepage losses through unlined irrigation ditches as high as 45% were not wasteful, because losses through other local ditches ranged between 40% and 57%. This is striking proof that waste is contextually determined, and that the task, simply, is to not be markedly more wasteful than one's neighbor.

2. Abandonment and Forfeiture

Two other significant grounds on which appropriative rights can be lost are abandonment and forfeiture. Abandonment is a "common law doctrine involving the occurrence of (1) an intent to abandon and (2) an actual relinquishment or surrender of the water right."¹⁰ The appropriator's "intent to abandon must be proved by clear and convincing evidence of unequivocal acts, and mere nonuse of a water right, standing alone, is not sufficient for a per se abandonment."¹¹ While abandonment may be so difficult to prove that it is rarely relevant, forfeiture has a lower threshold for placing water rights at risk. Based on statute rather than common law, forfeiture provides that water rights may be lost if they are not applied to a beneficial use for a period of five continuous years.¹² Generally, defenses to forfeiture include (i) the statutory period may be extended upon a showing of good cause, as long as application for extension is made within the statutory period; (ii) the statutory period will not run during the period of any wrongful interference with a water right; (iii) failure to use the water right because of circumstances over which the appropriator has no control will not lead to forfeiture; and (iv) courts in some states will not find a forfeiture if use of the water right is resumed after the statutory period before any third parties make a claim on the water.¹³

3. The Historical Use Requirement

The "historical use" requirement poses another significant obstacle to secure ownership of appropriative rights. Common to most Western prior appropriation states, the historical use requirement holds that "the right to change a water right is limited to that amount of water actually used beneficially pursuant to the decree at the appropriator's place of use,"¹⁴ or, in other words, "the right to change a point of diversion, or type, place, or time of use, is limited in quantity by the

10. *Jenkins v. State Dep't of Water Res.*, 647 P.2d 1256, 1260 (Idaho 1982) (citing *Sears v. Berryman*, 623 P.2d 455, 459 (Idaho 1981)); see also RICE & WHITE, *supra* note 5, at 31.

11. *Jenkins*, 647 P.2d at 1260-61.

12. *Id.* at 1260. Five years is the statutory period in Idaho; the applicable time period may differ from state to state. For example, it is ten years in Colorado. See *Beaver Park Water, Inc. v. Victor*, 649 P.2d 300, 303 (Colo. 1982) (citing COLO. REV. STAT. § 37-92-402(11)); see also RICE & WHITE, *supra* note 5, at 31.

13. See *Jenkins*, 647 P.2d at 1261 (on defenses to forfeiture); see also *id.* (on resumption of use as a defense to forfeiture).

14. *Santa Fe Trail Ranches Prop. Owners Ass'n v. Simpson*, 990 P.2d 46, 54 (Colo. 1999).

appropriation's historic use."¹⁵ *Santa Fe Trail Ranches Owners Ass'n v. Simpson*, a leading Colorado historical use case, comments explicitly on the relationship between abandonment and the historical use requirement, holding that "inquiry into total or partial abandonment is also germane to a change of water right proceeding."¹⁶

C. "First-in-Time, First-in-Right" and Its Implications

The overall idea of the prior appropriation system is one of "first in time is first in right."¹⁷ In general, while completing the diversion perfects the appropriative right, the priority date is nonetheless established as of the date that the required documentation was filed with the proper state administrative agency (e.g., the State Water Resources Control Board in California).¹⁸ As long as the appropriator exercises "due diligence" in bringing the ditches, canals, or other infrastructure required for the diversion to completion, the priority date will "relate back" to the date of the permit application.¹⁹ Failure to meet "due diligence" requirements can cause appropriators to lose their priority dates, especially if court proceedings determine that decades passed before the appropriation was fully used.²⁰ While the "due diligence" requirement prevents speculation by holders of unutilized water,²¹ it also encourages a "race to the resource" that can lead to waste and inefficiency. As will be discussed below,²² the "due diligence" requirement often interacts closely with the "historical use" requirement to create significant transfer-induced title uncertainty for appropriative rights; this can significantly obstruct transfers, preventing attainment of Coase Equilibrium.

15. *Id.* Under Colorado law, for example, the applicant has the evidentiary burden of showing that the volume of the proposed transfer does not exceed their historical beneficial use. *Id.*

16. *Id.* at 57.

17. GOLDFARB, *supra* note 4, at 32; Johnson, *supra* note 3, at 282.

18. SAX ET AL., *supra* note 4, at 104-05.

19. *Id.*

20. See, for example, *State ex rel. Martinez v. McDermott*, 901 P.2d 745 (N.M. Ct. App. 1995), where the court reversed the assignment of a 1907 priority to an entire 84-acre plot, because only 20 acres of the land had been irrigated in the early period of the century, but the rest of the land had not begun to be farmed until 1947.

21. SAX ET AL., *supra* note 4, at 104.

22. See discussion *infra* Part III.

D. Prevailing Conditions of Water Scarcity

The American West is a water-scarce region, with rainfall in many areas west of the one hundredth meridian averaging less than sixteen inches per year (as contrasted to over 40 inches a year in most areas east of the Mississippi River).²³ Low levels of precipitation in the West lead to relatively small riparian flows. For example, the Colorado River is the second largest river in the West, but is only the twenty-fifth largest river in the Nation; the Colorado's flow is less than five percent of the flow in the Mississippi River, the Nation's largest.²⁴

First in time, first in right interacts with these ongoing conditions of water scarcity in significant ways. Rights with the earlier priority dates are "senior" to rights with subsequent priority dates, which are "junior." When the flow of the river is not enough to meet all appropriative rights, the burden of the shortage falls completely on junior appropriators. While senior appropriators are still permitted their full appropriation, diversions are cut off in inverse order of priority, so that diversions with the most recent priority dates are the first to be affected.²⁵

Applications for appropriation permits were often made at widely separate times for widely separate locations on a river system.²⁶ It was in the interest of each appropriator to claim as much water as possible (e.g., perhaps they were not sure how much their crops would actually need, and it was much better to overestimate rather than to underestimate).²⁷ The scattered nature of the permit applications meant

23. CHARLES F. WILKINSON, *CROSSING THE NEXT MERIDIAN: LAND, WATER, AND THE FUTURE OF THE WEST* 236-37 (1992) (citing WALLACE STEGNER, *BEYOND THE HUNDREDTH MERIDIAN: JOHN WESLEY POWELL AND THE SECOND OPENING OF THE WEST*, commenting on the early explorer's perception of the West's aridity and unsuitability for agriculture); see also TARLOCK ET AL., *supra* note 4, at 22, fig. 3; SAX ET AL., *supra* note 4, at 4-5; RICE & WHITE, *supra* note 5, at 5; Barton H. Thompson, Jr., *Markets for Nature*, 25 WM. & MARY ENVTL. L. & POL'Y REV. 261, 267-68 (2000). In the most recent half decade, a severe drought has prevailed in the West, and water is even more scarce than usual. See Kirk Johnson & Dean E. Murphy, *Drought Settles In, Lake Shrinks and West's Worries Grow*, N.Y. TIMES, May 2, 2004, at A1 (quoting U.S. Geological Survey reports that, for the Colorado River, the period since 1999 is the driest in the 98 years for which records are available).

24. Thompson, *supra* note 23, at 268.

25. GOLDFARB, *supra* note 4, at 33. Note the contrast with the riparian system of water rights prevalent in the Eastern United States, under which each user is allowed a reasonable amount of water, but under which each user is subject to roughly pro-rata cutbacks in times of shortage. See, e.g., TARLOCK ET AL., *supra* note 4, at 122-23; Dean Lueck, *The Rule of First Possession and the Design of the Law*, 38 J.L. & ECON. 393, 427 (1995); Rose, *supra* note 4, at 292.

26. SAX ET AL., *supra* note 4, at 108.

27. *Id.*

that the process was rarely constrained by objections of other appropriators.²⁸ Over time, most Western rivers became substantially over-appropriated, with the volume of water "officially" appropriated often far exceeding both the volume of water actually used and the volume of water physically in the river.²⁹ The unused and/or unfulfilled appropriative rights are known as "paper rights."³⁰

E. "Paper Rights" and Insecure Title to Appropriative Rights

The prevalence of "paper rights" on western rivers creates a background condition that is very important for understanding why, as a whole, the prior appropriation system fails to achieve Coase Equilibrium. In nearly every river basin, there is not enough water to go around, and there is a large class of would-be users that might stand to benefit if they could demonstrate that more senior appropriators were no longer (or never had been) entitled to their diversions. Voiding the senior rights that stand in line ahead of their rights, so to speak, would make "new" water available to the junior appropriators. Frequently, the legal doctrines of waste, forfeiture, and abandonment provide grounds for lawsuits by junior appropriators against senior appropriators. Conditions of water scarcity and the legal framework by which prior appropriation rights are established (and, more importantly, lost) combine to create conditions in which titles to senior water rights are significantly less secure than they might appear. As discussed below, this insecurity is usually enhanced when water rights are transferred.

III. STATUTORY TRANSFERS OF APPROPRIATIVE RIGHTS

Simply put, statutory transfers of water rights are not easy to accomplish.³¹ This part provides an overview of the statutory transfer process, explains how the process creates several significant obstacles to transfers, and analyzes how these restrictions prevent both fulfillment of the Coase Conditions and achievement of Coase Equilibrium.

28. *Id.* (i.e., another appropriator challenging the amount of water sought by the would-be appropriator).

29. *Id.* at 108-09.

30. *Id.* at 108.

31. See, e.g., Lawrence Berger, *An Analysis of the Doctrine That "First in Time Is First in Right,"* 64 NEB. L. REV. 349, 372-73 (1985).

A. Overview of the Statutory Transfer Process

Appropriators must make applications to state water administrative agencies or special water courts every time they wish to change the quantity, point of diversion, location of use, or seasonal time of use.³² The administrative filings are generally pro forma, but they initiate a grueling public comment evaluation, and often precipitate litigation.³³ Typically, notices of the proposed transfer are published in local newspapers, and, in some states, individual notices will also be sent to local water users, water organizations, and community officials.³⁴ Opponents of the proposed transfer can then file protests with the state listing legal grounds for why the change should not be allowed.³⁵ The next step is frequently informal negotiations, perhaps under the aegis of the state water agency; if these fail then there will be a hearing, which can last anywhere from several hours to several weeks.³⁶ If there has been a protest, the applicant-appropriator must prove at the hearing that the proposed change or transfer will not injure any other appropriator.³⁷ Almost always, there are complex interconnections between diversions of upstream appropriators and the "return flows" from these diversions that are depended upon by downstream appropriators.³⁸ Because of these interconnections, and because the applicant-appropriator bears the evidentiary burden of showing that no harm will result from the proposed change or transfer, the "no-harm" requirement for transfers can be burdensome.³⁹ If harm is shown, the transfer will be either

32. SAX ET AL., *supra* note 4, at 228.

33. *Id.* at 229.

34. See, e.g., Johnson, *supra* note 3, at 284 (discussing the New Mexico transfer process and that state's publicity requirements); SAX ET AL., *supra* note 4, at 229.

35. *Id.*

36. *Id.*

37. Barton H. Thompson, Jr., *Institutional Perspectives on Water Policy and Markets*, 81 CAL. L. REV. 671, 704 (1993).

38. Johnson, *supra* note 3, at 273; see also RICE & WHITE, *supra* note 5, at 147-51 (discussing and providing a schematic of the complexities of characterizing return flows).

39. See, e.g., Thompson, *supra* note 37, at 704; SAX ET AL., *supra* note 4, at 230. An example of a return flow situation would be if there is an upstream appropriator who diverts 10 cubic feet per second (cfs) to irrigate their field, with 5 cfs of this diversion flowing back into the river, where it is then diverted again by an appropriator situated immediately downstream. If the upstream appropriator plans to fallow half their acreage and transfer half of their water right to an out-of-basin user such as a city, then if the same diversion-return flow ratio applies, after the transfer only 2.5 cfs of return flow would be available to the downstream appropriator. The downstream appropriator could protest and block this hypothetical transfer, which could be approved subject to the condition that all of the land is fallowed, and 5 cfs is transferred out-of-basin, which will leave the necessary 5 cfs of flow available to the downstream appropriator. For an analysis of problems caused

blocked outright, or, more frequently, approved subject to modifications so that return flow appropriators will not be harmed.⁴⁰ After the hearing, the state agency or water court will issue a ruling on the transfer application, which may be appealed.⁴¹

B. Ways in Which the Statutory Transfer Process Obstructs Transfers

The statutory transfer process discussed above obstructs transfers in several specific ways. Some of the most important obstructions are (i) the time and expense entailed in the statutory transfer process, (ii) the "chilling effect" of the process and consequent self-screening of potential transfers by would-be transferors, (iii) the de-facto tax on transfers represented by the process, and (iv) additional burdens related to the historical use requirement that are triggered by transfers.⁴²

1. Time and Cost

The transfer application process can be as brief as one to two months. On average, however, processing time ranges from six to eighteen months.⁴³ More controversial transfers can take several years.⁴⁴ Transfers may cost only a few hundred dollars if they are in the "lucky half" that is not protested, but, if protests do occur, costs escalate rapidly and can approach \$50,000.⁴⁵

2. Possible Self-Screening

Because of the no-harm precondition⁴⁶ for approval of transfers and the expense and length of the transfer process, applicant-appropriators face incentives to carefully evaluate potential transfers before filing a statutory transfer application. It appears that they act on these incentives. For example, one study of transfer applications in six western states between 1975 and 1984 found that fewer than half elicited

by defining water rights in diversion rather than consumption terms, see Johnson, *supra* note 3, at 279.

40. Thompson, *supra* note 37, at 704; SAX ET AL., *supra* note 4, at 230; RICE & WHITE, *supra* note 5, at 156-57.

41. SAX ET AL., *supra* note 4, at 229.

42. See generally Thompson, *supra* note 37.

43. *Id.* at 705.

44. *Id.*

45. *Id.* at 704-05; see also Anthony Scott & Georgina Coustalin, *The Evolution of Water Rights*, 35 NAT. RESOURCES J. 821, 973 (1995) (commenting generally on the expense of the transfer process).

46. See *supra* note 37 and related discussion.

protests, and less than ten percent were denied by the applicable state agency or court.⁴⁷

3. *De-Facto Tax on Transfers*

Notwithstanding this empirical data, it would be a mistake to conclude that the burdens of the statutory transfer process do not have a significant impact on the transferability of appropriative water rights.⁴⁸ For example, a study of transfers in Colorado and New Mexico estimated that the statutory transfer process added \$300 per acre-foot (20%) to the \$1500 per acre-foot cost of water purchases.⁴⁹ The cost of the statutory process is relatively invariant with the volume of the proposed transfer. Small and medium-volume transfers, therefore, are disproportionately deterred, because fixed administrative and dispute-resolution costs are spread over a smaller volume of water.⁵⁰ Due to the high time and monetary costs of the statutory transfer process, transfers are not only formally blocked following application but also informally deterred by the process's very existence.⁵¹

4. *Obstructions Related to the Historical Use Requirement*

The historical use requirement, like abandonment, waste, and forfeiture, is a threat to the security of water rights. While each of the latter three legal doctrines potentially poses risks to unlucky appropriators at any time, the historical use requirement poses significant risks only when transfers are proposed. *Santa Fe* is explicit regarding the antagonistic relationship between transfers and the historical use requirement:

the fundamental purpose of a change proceeding is to ensure that the true right—that which has ripened by

47. LAWRENCE J. MACDONNELL, *THE WATER TRANSFER PROCESS AS A MANAGEMENT OPTION FOR MEETING CHANGING WATER DEMANDS* 47-48 (1990).

48. See, e.g., Thompson, *supra* note 37, at 707 (noting that "the sheer hydrologic uncertainty involved in determining whether a transfer will affect downstream appropriators will inevitably produce sizeable administrative costs").

49. *Id.* at 705.

50. *Id.*

51. See Stephen J. Choi, *Do the Merits Matter Less in Securities Class Actions?* (Mar. 2004) (unpublished manuscript presented to the Stanford Law School Spring 2004 Law & Economics Seminar), available at <http://ssrn.com/abstract=558285> (last visited Feb. 27, 2005), and Robert D. Cooter & Daniel L. Rubinfeld, *Economic Analysis of Legal Disputes and Their Resolution*, 27 J. ECON. LITERATURE 1067 (1989), as examples of the law and economics literature discussing how increased dispute resolution and/or litigation costs decrease the volume of claims that will be brought before administrative agencies and/or courts for resolution.

beneficial use over time—is the one that will prevail in its changed form....“The public policy of this state is to keep the public water resource available to those who can and will use it beneficially, as opposed to those who wish to speculate in its value and price....”⁵²

By its very nature, a dispute turning on historical use will be fact-intensive, often requiring determination of patterns of planting and diversion from several decades in the past.⁵³ Historical records are frequently insufficient for this task,⁵⁴ and the controversy may devolve into an expensive and uncertain “battle of the experts.” This is another reason that the historical use requirement adds to the expense of the legal and administrative aspects of the transfer process.⁵⁵

C. Interactions Between Legal and Pragmatic Obstacles to Transfers

The legal environment that potential applicant-appropriators often confront can deter them from seeking to implement transfers of appropriative rights. The application process can be lengthy, particularly if the transfer is protested.⁵⁶ Furthermore, to gain approval of the transfer, the applicant-appropriator must meet the evidentiary burden of showing that the transfer will not harm any other appropriators.⁵⁷ Finally, the applicant-appropriator must also meet the evidentiary burden of showing that the volume of the proposed transfer will not exceed their historical beneficial use.⁵⁸

The various pragmatic obstacles to transfers associated with or caused by these legal requirements can also be substantial. First, the application process can be quite expensive, especially if a protest is filed and litigation ensues.⁵⁹ Second, because approval of transfers can sometimes be rescinded if unexpected harm occurs after approval is granted, transfers have an undesirable lack of finality; transferees do not

52. Santa Fe Trail Ranches Prop. Owners Ass'n v. Simpson, 990 P.2d 46, 55 (Colo. 1999) (quoting Chatfield E. Well Co. v. Chatfield E. Prop. Owners Ass'n, 956 P.2d 1260, 1270 (Colo. 1998)).

53. RICE & WHITE, *supra* note 5, at 74.

54. SAX ET AL., *supra* note 4, at 268–70 (commenting on Wyoming as a case study of the frequent discrepancies between state water rights records and real-world patterns of water use).

55. SAX ET AL., *supra* note 4, at 236.

56. Thompson, *supra* note 37, at 705.

57. See *supra* note 37 and related discussion.

58. See *supra* Part II.B.3 (regarding the historical use requirement).

59. SAX ET AL., *supra* note 4, at 229 (noting that statutory transfer proceedings can cost up to \$50,000).

know if transferred water will continue to be available, even after a transfer has secured initial approval.⁶⁰ Third, and most importantly, initiating the statutory transfer process lessens the de facto security of an appropriator's water right.⁶¹

1. Legal obstacles to transfers

Conceptually, waste, abandonment and forfeiture are always potential concerns for appropriators. Waste, however, is measured by the community norm standard, under which water is not wasted so long as an appropriator does not egregiously depart from the practices of nearby appropriators.⁶² Therefore, in a practical sense, waste is not a very significant source of title insecurity for appropriative rights. The situation changes markedly, however, when a transfer application is filed with an administrative agency. Public notice provisions, typically incorporated into the transfer process,⁶³ give local appropriators the impression that an applicant has "extra" water available. The question naturally arises—why? Other appropriators may claim that the applicant has recently taken steps to curtail water waste or, more to the point,

60. SAX ET AL., *supra* note 4, at 229; see also Steven N.S. Cheung, *The Structure of a Contract and the Theory of a Non-Exclusive Resource*, 13 J.L. & ECON. 49, 67 (1970). Evaluating his analysis of the economics of a fishery, Cheung commented that "transfer of property rights among individual owners through contracting in the marketplace requires that the rights be exclusive...without some enforced or policed exclusivity to a right of action, the right to contract so as to exchange is absent." *Id.* at 67. Cheung went on to observe that the "absence of exclusivity in property may be due to the absence of recognition by legal institutions of that exclusivity." *Id.* Cheung would surely have considered his comments applicable to transfers in the prior appropriation system. The doctrines of waste, forfeiture, abandonment, and the historical use requirement all combine to partially (but not fully) and unpredictably undercut the exclusivity of water rights, in that what an appropriator believes is theirs to transfer may not actually be theirs, if aspects of their appropriative right are successfully challenged during the transfer application process. The failure of exclusivity in water rights is partial rather than total, which may be why transfers are only partially (but not completely) blocked.

61. See Johnson et al., *supra* note 3, at 288. Johnson et al. focused their analysis on New Mexico transfers and downplayed the significance of "obstacles to the efficient transfer of water," instead emphasizing that "[i]t is not the appropriative system that is at fault but rather the manner in which rights are defined within that concept." *Id.* As a partial solution, Johnson et al. urged that water rights be defined with respect to consumption rather than diversion. *Id.* In other words, of the two Coase Conditions that fail in the prior appropriation system at large, it is insecurity of property rights rather than high transaction costs that is the more important variable in the failure to reach Coase Equilibrium. See Scott & Coustalin, *supra* note 45, at 964 (discussing lack of exclusivity as the reason for insufficient definition of appropriative water rights).

62. See *Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist.*, 45 P.2d 972, 1010 (Cal. 1935).

63. See, e.g., SAX ET AL., *supra* note 4, at 229.

claim that the water was never actually put to any beneficial use.⁶⁴ If so, then the applicant must clear the hurdles of abandonment and forfeiture. The transfer may still, however, run afoul of the “no-harm” requirement if it would negatively impact existing appropriative rights (*i.e.*, by changing a pattern of return flows to which other appropriators have become accustomed). In sum, then, the legal doctrines by which appropriative rights may be lost present greater obstacles to transfer than they do to possession of the rights.

2. Pragmatic Obstacles to Transfers

Ex ante, an applicant can reasonably anticipate that the transfer application may entail considerable time and expense and may not succeed. Recall, also, the incentives created by prevailing conditions of water scarcity and the existence of a large class of “thirsty” holders of “paper rights.” These would-be water users are standing next in line and can get the water they need, if only they can knock the senior appropriator out of his place in line ahead of them. Fundamentally, many would-be transferors understand that, if they opt not to transfer, their rights are reasonably secure, but if they choose to transfer their water, rather than use it according to customary patterns, they are asking for trouble. The evidentiary burdens of proving waste, abandonment, forfeiture, or a historical use violation create a structure that typically protects appropriators who do not transfer their water. The legal structure is not only biased against transfers⁶⁵—it also jeopardizes the security of appropriative rights retained by appropriators who do attempt transfers. Furthermore, transfers place the applicant’s entire appropriation, rather than just the portion proposed for transfer, at risk of being lost.⁶⁶ The risk that a proposed transfer may be blocked, wasting the time and expense involved, deters transfers, but the risk of losing retained rights may be an even more significant deterrent. When the stakes are so high, maintaining the status quo and opting not to pursue transfers is the safer option.⁶⁷

64. This would violate the historical use requirement. See discussion Part II.B.3, *supra*.

65. See, e.g., *Santa Fe Trail Ranches Prop. Owners Ass’n v. Simpson*, 990 P.2d 46 (Colo. 1999).

66. See, e.g., *State ex rel. Martinez v. McDermott*, 901 P.2d 745, 750-51 (N.M. Ct. App. 1995).

67. See *SAX ET AL.*, *supra* note 4, at 236, for a good discussion of a hypothetical transfer problem integrating the several anti-transfer incentives discussed above.

3. *Low Number of Statutory Transfers: An Empirical Effect of These Obstacles*

Because of the interaction between the legal and pragmatic obstacles to statutory transfers,⁶⁸ few transfers are initiated or approved (consequently, existing patterns of surface water use are preserved). This is more than a theoretical result of the prior appropriation system—it is an empirically observed outcome. Studies indicate that transfers are rare:⁶⁹ in the 1970s and 1980s, formal transfers averaged less than five per year in Arizona, California, and Wyoming; about sixty per year in New Mexico; over 100 per year in Colorado; and over 300 per year in Utah.⁷⁰

D. Obstacles to Transfer and the Absence of Coase Equilibrium

Analyzing the legal and pragmatic obstacles to statutory transfers demonstrates that, in the prior appropriation system as a whole, the Coase Conditions do not hold, because transaction costs are high and title to water rights is insecure. Contrasting aspects of the prior appropriation system with the conditions prevailing in Robert Ellickson's famous study of cattle trespass in Shasta County provides a better understanding of why the Coase Conditions fail.⁷¹

1. *Ellickson's Shasta County Study and the Coase Conditions*

Ellickson's study found that a group of Shasta County, California, landowners, farmers, and cattle ranchers had reached Coase Equilibrium, because their patterns of grazing and cultivating remained constant.⁷² This constant persisted even as background legal rules relating to trespass changed back and forth from "open" to "closed" range.⁷³ In the Shasta County study, the Coase Conditions were met. First, transaction costs were low, in great part because of community-wide norms, close community ties, and the residents' propensity to use

68. See discussion Part III.C.2, *supra*.

69. See Rodney T. Smith, *Water Transfers, Irrigation Districts, and the Compensation Problem*, 8 J. POL'Y ANALYSIS & MGMT. 446, 447 (1989).

70. Note, however, that, even in Utah, the state with the greatest number of statutory transfers, only one to two percent of the water supply changed hands each year. See SAX ET AL., *supra* note 4, at 226 (citing MACDONNELL, *supra* note 47); see also Thompson, *supra* note 37, at 703-08 and accompanying footnotes.

71. Robert C. Ellickson, *Of Coase and Cattle: Dispute Resolution Among Neighbors in Shasta County*, 38 STAN. L. REV. 623, 628 (1986).

72. *Id.* at 686.

73. *Id.*

nonlegal methods of dispute resolution.⁷⁴ Second, property rights to the resources in question were clear and secure. It was obvious who owned the trespassing cattle and the land that was being trespassed upon.⁷⁵ Also, in the Shasta County study, there was not a large class of potential litigants who would be allowed to trespass or obtain damages for trespass, once other ranchers or farmers who "stood ahead of them in line" were displaced. This condition lowered incentives to sue and contributed to fulfillment of the second Coase Condition—the security of property rights (whether formally or informally, as norms).

2. *The Prior Appropriation System and the Coase Conditions*

Juxtaposing Ellickson's findings against the prevailing conditions in the prior appropriation system produces a stark contrast. With respect to appropriative water rights, the Coase Conditions are not fulfilled. First, transaction costs are not low, let alone near zero. To the contrary, they are high enough to be a significant deterrent to all but those applying to transfer very large volumes of water. Second, property rights in water resources are insecure in some rather significant ways (e.g., waste, abandonment, forfeiture, and the historical use requirement). Because the Coase Conditions are not fulfilled, it is reasonable to conclude that the prior appropriation system as a whole is not at Coase Equilibrium, and that this lack of Coase Equilibrium causes economic inefficiency.⁷⁶ Empirical data on the very low numbers of transfers supports this conclusion.

Concededly, it is true that failure of the Coase Conditions and the resultant lack of Coase Equilibrium do not by themselves prove that transaction costs and insecure property rights are leading to economically inefficient outcomes. Another theoretical possibility, which can be called "Perfect Initial Allocations," posits that the initial allocation of property rights was so appropriate that no corrective transfers are necessary, and that, notwithstanding changed conditions since the initial distribution of property rights, the "initial perfect allocations" continue

74. *Id.* at 672-73 (community norms), 676-77 (self-help and relational sanctions, particularly gossip), 680-81 (aversion to litigation).

75. Note, however, that Ellickson called into question whether the purely "legal" rules of trespass were very relevant to the outcomes he observed. *See id.* at 685-86. There were clear alternatives to legal rules, however, in the form of deep-seated local trespass norms. *Id.* at 686. Consequently, the "right thing to do" (a substitute for who, precisely, owns what) was usually clear to Shasta County residents. This permitted the second Coase Condition to hold.

76. Cheung, *supra* note 60, at 68 (cautioning that, "without transfer, the highest-valued option may not be realized"); *see also* Berger, *supra* note 31, at 373.

to be optimal.⁷⁷ As demonstrated,⁷⁸ this alternative explanation for the small quantity of transfers (and the concomitant assertion that resulting deadweight losses are avoided) is incorrect.

IV. ABSENCE OF COASE EQUILIBRIUM CAUSES DEADWEIGHT LOSSES

An analysis of the prevailing pattern of Western water use indicates that there is a dramatic mismatch between water users who place the highest marginal value on their water (typically, cities) and appropriators who hold the most senior rights from more reliable sources (typically, farmers). The reasons for this pattern of water use are largely historical. For the most part, miners, ranchers, first-stage farmers, and latter-stage farmers obtaining water under long-term subsidized contracts with the Federal Bureau of Reclamation⁷⁹ preceded the rapid, and then near-explosive, post-World War II western urbanization.⁸⁰ Today, the mines are largely played out, and the ranching is often marginal. Farming is still a big business, but the marginal value of water in agriculture is markedly less than the marginal value of water for new residential developments and industrial activities.⁸¹ Under the prior appropriation system, however, the higher-valuing urban and industrial users of water are the newest arrivals, and therefore have the least secure claims on the resource.

Even this brief historical view of the prevailing patterns of Western water use indicates that the "Perfect Initial Allocations" hypothesis is incorrect. In reality, the lack of transfers cannot be explained away by an assertion that no transfers need to occur. To the contrary, there is a strong, widespread consensus that transfers, especially "ag-urban" trades between farmers and cities, could create

77. Cf. Coase, *supra* note 1, at 19 (suggesting a theoretical possibility of the existence of a perfect initial allocation in which no value-enhancing transfers are necessary, and in which the absence of transfers would not be proof of deadweight losses). *But see* L.M. HARTMAN & DON SEASTONE, WATER TRANSFERS: ECONOMIC EFFICIENCY AND ALTERNATIVE INSTITUTIONS 13 (1970) (remarking that "present [statutory] transfer procedures do not lead to an efficient allocation of water resources except fortuitously").

78. See discussion Part IV, *infra*.

79. Jim Carlton, *Is Water Too Cheap? As Contract Renewals Loom, Environmentalists, Tax Group Call for Farmers to Pay More*, WALL ST. J., Mar. 17, 2004, at B1.

80. See, e.g., Thompson, *supra* note 37, at 701-02.

81. See, e.g., Carlton, *supra* note 79 (noting that San Jose, California, pays \$80/acre foot for its municipal water, but that farmers using water provided by the Bureau of Reclamation's Central Valley Project pay only \$10/acre foot).

significant economic value.⁸² It is fair to conclude, however, that the failure of the Coase Conditions caused by high transaction costs and insecure property rights prevents a profusion of transfers that would otherwise occur. The deadweight losses that result could be avoided if unrestrained transfers were permitted to generate an “equilibrium in which the marginal value of the water [was] equal across all users.”⁸³ Although a greater volume of transfers could prevent many, or even most, of these deadweight losses, the losses will continue so long as the Coase Conditions fail, preventing Coase Equilibrium in the prior appropriation system at large.

V. COASE EQUILIBRIUM WITHIN IRRIGATION DISTRICTS

The failure of the Coase Conditions and the absence of Coase Equilibrium within the prior appropriation system are marked by an interesting and significant exception – irrigation districts.

82. See, e.g., Smith, *supra* note 69, at 446–47; Thompson, *supra* note 37, at 676, 701–02; SAX ET AL., *supra* note 4, at 224–25 (noting that reducing Arizona agricultural water use by five percent could permit a population increase of 1.5 million, or 50 percent of the state’s 1985 population, and that reducing irrigation-related consumptive use in Colorado by five percent would nearly double the amount of water available for municipal and industrial uses); DUNBAR, *supra* note 4, at 211–17; Lawrence J. MacDonnell, *Transferring Water Uses in the West*, 43 OKLA. L. REV. 119 (1990); TARLOCK ET AL., *supra* note 4, at 225; WILKINSON, *supra* note 23, at 285; Charles W. Howe et al., *The Performance of Appropriative Water Rights Systems in the Western United States During Drought*, 22 NAT. RESOURCES J. 379, 385 (1982); Zach Willey & Tom Graff, *Federal Water Policy in the United States – An Agenda for Economic and Environmental Reform*, 13 COLUM. J. ENVTL. L. 325, 328 (1988) (indicating that year 2000 consumptive uses of fresh water in the United States were projected to be 95.1 billion gallons per day (bgd) in the agricultural sector, but only 24.2 bgd in the commercial, manufacturing, and domestic sectors combined, meaning, for instance, that a five percent reduction in the amount of agricultural consumption would permit a 19.6% increase in the amount of water available for “urban” needs).

83. Lueck, *supra* note 25, at 429. Lueck correctly noted (i) that the return flow from each diversion is a public good; (ii) that transferors will impose externalities on other appropriators if a transferor is allowed to transfer more than the fraction of their appropriation that is consumptively used; and (iii) that when water rights are “defined only over diversion, the stream value will not be maximized through unrestricted trading if return flows differ among users.” *Id.* at 429–30 (citing Johnson, *supra* note 3). The public-good nature of return flows is probably the economic rationale underlying the “no-harm” requirement imposed on transfers, as well as the justification for placing the burden of proving “no-harm” on the applicant-appropriator, ensuring that they do not appropriate the public good to themselves. See, e.g., Howe, *supra* note 82, at 379 (citing HARTMAN, *supra* note 77); see also Part III, *supra*.

A. The Importance of Irrigation Districts

Irrigation districts and other water institutions play a very significant role in the delivery of Western agricultural and urban water—providing water for between 35 percent and 50 percent of the irrigated acreage and about 90 percent of domestic users.⁸⁴ Water institutions can be “retail” or “wholesale.”⁸⁵ “Retail” water for agriculture is typically provided by mutual water companies or quasi-governmental water (or irrigation) districts.⁸⁶ Just as individual users can be members of a retail district, several retail districts are often members of the larger wholesaling districts, creating a “nested” array of water institutions.⁸⁷

B. Modification of Water Rights to Achieve Uniform Intra-District Rights

Inside a typical water district, appropriative rights are altered from their traditional form. Sometimes, individual water users served by a district continue to own their water rights, but more often, the district is the legal owner of the rights and the users are the equitable owners.⁸⁸ Usually, the water district is permitted to divert the water for beneficial use anywhere within the boundaries of the district.⁸⁹ Defining the water rights held by the district at this level of generality provides enhanced flexibility, because submission of transfer applications (with attendant costs and procedural obstacles) is not required when water is transferred from one intra-district use to another.⁹⁰

Although the typical district holds water rights with varying priorities, within the district, members’ water allotments are uniformly defined.⁹¹ District members may hold or obtain varying quantities of water allotments, usually depending on the amount of acreage they own

84. Thompson, *supra* note 37, at 686.

85. *Id.* at 687.

86. *Id.*

87. *Id.*; cf. Olivia S. Choe, Note, *Appurtenancy Reconceptualized: Managing Water in an Era of Scarcity*, 113 YALE L.J. 1909, 1943–49 (2004) (discussing “nested enterprises” in the Eastern United States in comparison to the “umbrella model” of water institutions in the Western United States.).

88. Thompson, *supra* note 37, at 695; see also Howe, *supra* note 82, at 386 (describing an arrangement in Colorado under which the Federal Bureau of Reclamation sells water from its Colorado-Big Thompson project to the Northern Colorado Water Conservancy District and District members can sell water entitlements within the District’s service area without resort to statutory transfer processes).

89. Thompson, *supra* note 37, at 695.

90. *Id.*

91. *Id.* at 710.

within the district, but each intra-district allotment is interchangeable and fungible.⁹² Intra-district allotments can be allocated either through intra-district transfers, or through pricing mechanisms where each season users buy units from the district according to their anticipated needs.⁹³

C. Large Volumes of Intra-District Transfers

There are significant obstacles to statutory transfers within the prior appropriation system at large⁹⁴ and, consequently, relatively few statutory transfers. Within irrigation districts, however, there are an incredible number of transfers and volume of water transferred.⁹⁵ A typical prior appropriation state has dozens or even hundreds of irrigation districts,⁹⁶ and within each of these districts, in turn, there may be hundreds of transfers.⁹⁷ Indeed, within California's Westlands Water District during one year in the early 1990s, there were nearly 4500 transfers.⁹⁸ Although complete data is not available, it appears that transfers involving irrigation districts (institutional transfers) affect a much larger fraction of total surface water flows than statutory transfers.⁹⁹ Within districts, these institutional transfers undoubtedly ameliorate the otherwise-harsh consequences of the all-or-nothing water availability that would otherwise prevail in an over-appropriated, water-scarce prior appropriation system. Institutional transfers also avoid the inflexibility of an enforced pro-rata intra-district sharing rule that districts might have to enforce in dry years.¹⁰⁰ In years both dry and wet, some crops or other water uses will produce higher marginal benefits than others. Intra-district transfers, at least on a local scale, accommodate

92. *Id.*

93. *Id.* at 710-13.

94. See discussion *supra* Part III.

95. Thompson, *supra* note 37, at 713-14 (noting that "small-scale studies suggest that institutional transfers far outnumber the few statutory transfers that occur each year in the average state").

96. California, for example, has 230 public water districts. *Id.*

97. *Id.* (citing studies tallying over 1000 transfers, totaling over 16,000 acre-feet, in just six Colorado water districts, and between 290 and 629 transfers each season between four Utah districts).

98. *Id.*

99. *Id.* at 714 (noting studies indicating that annual statutory transfers totaled one percent of New Mexico water rights and 1.5% of Utah water rights, but that annual institutional transfers totaled 5.6% of Colorado districts' supplies, 29% of Utah districts' supplies, and 7.6% of the supply available to California's Arvin-Edison Water Storage District).

100. *Id.* at 696.

this reality. The system equilibrates the marginal valuations of water by users and minimizes deadweight losses.¹⁰¹

D. Districts Fulfill the Coase Conditions and Reach Coase Equilibrium

The thousands of institutional transfers occurring each year within prior appropriation states is evidence that, at least in water districts, the Coase Equilibrium prevails. According to theory, Equilibrium would not be possible unless the Coase Conditions were fulfilled. Analysis of institutional transfers confirms this hypothesis.

1. Lower Transaction Costs

Transaction costs are much lower for intra-district transfers than they are for statutory transfers¹⁰² (which tends to fulfill the first Coase Condition). It is easy to see why this is the case. In the first instance, to the extent districts allocate water through pricing mechanisms, these naturally operate at a remarkably low cost.¹⁰³ In the second instance, to the extent districts allocate water through intra-district transfers, these also operate at much lower cost than the statutory transfer system.¹⁰⁴ Institutional transfers have lower costs than statutory transfers for two primary reasons. First, because the district continues to hold legal title to the appropriative rights both before and after transfer of the water allotment, no statutory transfer is necessary, saving time and expense.¹⁰⁵ Second, districts have fewer difficulties in measuring return flow. Within institutions, runoff usually flows into common ditches or an underlying aquifer. Therefore, both before and after an institutional transfer, return flows are accessible to the institution, so transfers do not jeopardize the water supply of other users within the institution.¹⁰⁶

2. Reduced Transfer-Related Title Insecurity

As for the second Coase Condition, institutional transfers cause less title insecurity than statutory transfers. Institutional transferors face a lower risk that they will lose part or all of their appropriative right on grounds of waste, forfeiture, abandonment, or the historical use

101. *Id.*

102. *Id.* at 710 (noting the "search" and "pricing" cost reductions enabled by uniform intra-district allotments and the "clearinghouse" activities of districts).

103. *See, e.g.*, WALTER NICHOLSON, MICROECONOMIC THEORY: BASIC PRINCIPLES AND EXTENSIONS 513-14 (7th ed. 1998).

104. Thompson, *supra* note 37, at 712.

105. *Id.*

106. *Id.* at 713.

requirement. There are several reasons why this is the case. First, institutional transferors are not required to notify other district members of a proposed transfer.¹⁰⁷ As a result, fewer people are aware of the transfer; thus, the potential class of plaintiffs who might protest the transfer is smaller. Second, there is likely a solidarity and community of interest among the farmers within an irrigation district that might not exist among an entire group of appropriators on a river. Irrigation districts serve a limited area, so transferors and transferees are one's friends and neighbors rather than perceived "outsiders." This situation within a water district resembles the situation analyzed in Shasta County by Professor Ellickson.¹⁰⁸ Even if relations between water district members are not entirely cordial, the typical community within a water district nonetheless calls to mind the "relationship preservation" work of Professor Macaulay, Professor Charny, and others of the "Wisconsin School."¹⁰⁹ Within a water district, there may be hundreds of transfers on average each year, and the district member who today believes one of his fellow members is profiting from the transfer of "wasted" water may tomorrow become party to a transfer himself. In this context of repeated interaction, simple game theory predicts that cooperation, rather than conflict, is the utility-maximizing equilibrium, and empirical observation confirms this hypothesis.¹¹⁰

Third, within the typical water district, the transferee party generally faces the greatest water scarcity (otherwise, they would have been outbid by another district member).¹¹¹ Because they are able to buy the water they need within district boundaries, their incentive to seek water supplies through a more challenging statutory transfer is reduced. The situation contrasts with a traditional statutory transfer from a senior rights holder to a somewhat junior rights holder, in which the transferee may not be the party facing the greatest water scarcity or the party willing to pay the highest price for the water. In a statutory transfer situation, there may be "paper rights" holders waiting in the wings

107. *Id.*

108. *See supra* note 71 and related discussion.

109. *See, e.g.,* CHARLES L. KNAPP ET AL., PROBLEMS IN CONTRACT LAW: CASES AND MATERIALS 255 (4th ed. 1999) (citing Stewart Macaulay, *Non-Contractual Relations in Business: A Preliminary Study*, 28 AM. SOC. REV. 55 (1963); David Charny, *Nonlegal Sanctions in Commercial Relationships*, 104 HARV. L. REV. 373 (1990)).

110. *See supra* note 97 and accompanying discussion (showing a large quantity of cooperative transfers rather than confrontational litigation).

111. Note that the "clearinghouse" role of water institutions permits them to come much closer to matching willing sellers and willing buyers at a single equilibrium price than would be possible in a statutory transfer alternative, where private-party deals might happen at a range of prices, and some would-be water users might not succeed in making their consumer preferences known.

whose only opportunity to obtain water in a first-in-time, first-in-right system is to exploit the transfer, challenging the transferor's appropriative rights on grounds of waste, abandonment, forfeiture, or the historical use requirement. In contrast, challenges to institutional transfers within a water district do not bring "new" water into the closed system. This reduces incentives to challenge institutional transfers.

E. Economic Analysis of How Institutional Transfers Reduce Title Insecurity

An incentive model for litigation created by Professors Cooter and Rubinfeld helps explain why incentives to contest institutional transfers are much less than incentives to contest statutory transfers.¹¹² Cooter and Rubinfeld model potential litigants' decisions to bring suit as a function of the cost of filing the claim, bringing the claim through trial, and the expected benefits to be obtained.¹¹³ When the expected benefits decline, and the costs of bringing and litigating claims increase, the result will be less litigation.¹¹⁴ This insight from the Cooter-Rubinfeld model is the starting point for a line of reasoning indicating that institutional transfers are much more conducive than statutory transfers to fulfillment of the second Coase Condition and attainment of Coase Equilibrium.

1. Statutory Transfers: Lower Early-Stage Litigation Costs for Plaintiffs

The obstacles to even filing a claim against institutional transfers exceed those facing statutory transfers. First, statutory transferors are required to provide notice of proposed transfers; institutional transferors are not.¹¹⁵ This reduces the costs to potential plaintiffs, because a statutory transferor must bear the cost of making the plaintiffs aware of the transfer, and therefore of the possibility of a claim. In contrast, institutional transfers do not have notice provision requirements, so the potential plaintiff must bear the costs of determining whether events have occurred that may hurt their interests. Second, institutional transfers do not involve the legal transfer of water rights because title continues to be held by water districts. Therefore, with respect to institutional transfers, individual water users and would-be plaintiffs may lack standing to sue, as they are (technically) not the appropriators.

112. Robert D. Cooter & Daniel L. Rubinfeld, *Economic Analysis of Legal Disputes and Their Resolution*, 27 J. ECON. LITERATURE 1067 (1989).

113. *Id.* at 1089.

114. *Id.*

115. See *supra* notes 34, 107, and accompanying discussion.

2. Statutory Transfers: Lower Later-Stage Litigation Costs

Beyond the cost of filing claims, the cost to plaintiffs of litigating claims against statutory transfers is likely less than against institutional transfers. For statutory transfers, transferors bear the burden of measuring return flows and demonstrating that the proposed transfer will not harm other appropriators.¹¹⁶ Plaintiffs need only challenge the evidence offered by transferors,¹¹⁷ and this can reasonably be expected to cost less than constructing a case of their own. For institutional transfers, the burdens are reversed and plaintiffs do not have the same relative cost advantage. Foreseeably, this will increase plaintiffs' litigation costs for challenging institutional transfers relative to their costs for challenging statutory transfers.

3. Relationships Between Transfer Size, Litigation Costs, and Litigation Incentives

Whether institutional or statutory, litigation costs incurred in challenging a transfer are probably relatively invariant with the size of the proposed transfer.¹¹⁸ This is important because of the interaction between transfer costs, transferors' decisions to transfer, and third parties' decisions whether to challenge transfers. When transfer costs are lower, they can be spread over transfers of smaller volumes of water without making the smaller transfers cost-prohibitive. More transfers will occur, and, on the margin, transferors will pursue smaller-sized transfers. As transfer costs fall, average transfer size can be expected to decline, and the numbers of relatively small transfers can be expected to increase.

The size of the transfer being challenged represents the potential payoff for prospective challengers of the transfer.¹¹⁹ Litigation costs facing would-be challengers, however, are relatively fixed without respect to the size of the challenged transfer. Therefore, as transfer volume declines, it is less likely that protests offer anticipated benefits in

116. See *supra* note 37 and accompanying discussion.

117. See *supra* note 35 and accompanying discussion.

118. This may not be the case with larger transfers, which tend to relate to larger tracts of land. In such a case, it may be more expensive to characterize and quantify return flows.

119. If the challenge succeeds and the transferor loses their entire appropriative right, as in *State ex rel. Martinez v. McDermott*, 901 P.2d 745 (N.M. Ct. App. 1995), and if the challenger is the first "paper right" in line to benefit from the "new" water lost by the transferor, the payoff is direct. If the challenge succeeds and the transfer is reduced in scope to ensure that more return flows will be available to other appropriators, the payoff is indirect.

excess of projected costs. Consequently, fewer lawsuits will be brought, and the likelihood that a given transfer will be challenged declines.

With respect to institutional transfers, however, a "virtuous cycle" develops in which lower transaction costs result in an increased number of small transfers.¹²⁰ Smaller-sized transfers offer lower expected payoffs from litigation, which reduces the fraction of the transfers that are challenged. Accordingly, transaction costs shrink and the "virtuous cycle" continues. A similar "vicious cycle" runs in reverse for statutory transfers, creating a feedback loop in which higher transfer costs lead to increasing average transfer size, raising average expected litigation payoffs, causing challenges to a greater share of transfers, which increases transfer costs, continuing the undesirable cycle.

F. Aspects of Coase Equilibrium in Statutory and Institutional Transfers

The difference between the "virtuous" institutional transfer cycle and the "vicious" statutory transfer cycle may reflect an underlying truth of the Coase Theorem: property rights systems may have bimodal stable equilibria. In other words, a system at Coase Equilibrium in which the Coase Conditions hold may tend towards an even stronger equilibrium. Transaction costs decrease and property rights are more secure, as cheaper transfers lead to a greater number of transfers and smaller average transfer size, making transfers less vulnerable to litigation. In contrast, a system at anti-Equilibrium in which the Conditions do not hold may move ever farther from Equilibrium. Property rights are less secure because expensive transfers lead to a smaller number of larger-volume transfers, making the average transfer more vulnerable to litigation and increasing transaction costs. Furthermore, a system with middling transaction costs and middlingly secure property rights may not stay that way for long. Events will probably tip the system toward one of the bimodal equilibria, from which it can be dislodged only with the greatest difficulty.

VI. EXPANDING COASE EQUILIBRIUM WITHIN THE PRIOR APPROPRIATION SYSTEM

The foregoing analysis of the prior appropriation system at large and irrigation districts has several implications. Due to historical patterns of settlement in the American West, rapid population growth,

120. See discussion *supra* Part V.C.

and prevailing water scarcity, the current situation is not one of "Perfect Initial Allocations." On the contrary, the marginal value of water is not equal across various uses and to all users, with significant deadweight losses being the predictable result. Transfers could create significant value, but they are quite constrained in the prior appropriation system at large. Statutory transfers are constrained because of the failure of the Coase Conditions, in that (i) transfer costs in time and money are high and (ii) statutory transfers make title to appropriative water rights less secure, as transferors' rights can be challenged on grounds of waste, fraud, abandonment, and the historical use requirement. In contrast, institutional transfers are flourishing.¹²¹ Water institutions appear to have attributes that are favorable to fulfillment of the Coase Conditions and achievement of Coase Equilibrium. If the successes of water institutions at the irrigation district level can be replicated under the aegis of larger-scale water institutions, a much larger fraction of the prior appropriation system might be brought towards Coase Equilibrium, reducing deadweight losses and creating economic value. In other words, the prior appropriation system at large is relatively inflexible, but institutions demonstrate significant flexibility. Linking existing institutions and/or creating new, larger institutions can provide the flexibility necessary to increase efficiency in water use in the American West, *without requiring wholesale revision of the prior appropriation system* (which is unlikely from the standpoint of political feasibility, and may also be undesirable).¹²²

A. Imagining Successful Larger-Scale Water Institutions

A larger-scale water institution might create significant value by facilitating Coase Equilibrium between (i) low-valuing, high-priority, supply-secure users (farmers) and (ii) high-valuing, low-priority, supply-

121. For example, transfers in the context of irrigation districts, mutual water companies, and other similar water institutions.

122. Howe, *supra* note 82, at 388; *see also* SAX ET AL., *supra* note 4, at 316 (discussing constitutional protection for existing water rights under the Fifth Amendment's takings clause); Franco-American Charolaise Ltd. v. Okla. Water Res. Bd., 855 P.2d 568, 577 (Okla. 1990); Hage v. United States, 35 Fed. Cl. 147, 172 (1996) ("[W]ater rights are not 'lesser' or 'diminished' property rights unprotected by the Fifth Amendment. Water rights, like other property rights, are entitled to the full protection of the Constitution."). *But see* SAX ET AL., *supra* note 4, at 333 (noting that the courts have been "very deferential to governmental water regulation," notwithstanding frequent takings challenges by appropriators affected by the regulations). On how weakening the security of appropriative rights might harm development of emerging water markets, *see* Barton H. Thompson, Jr., *Takings and Water Rights*, in WATER LAW: TRENDS, POLICIES, AND PRACTICE 43, 43-44 (Kathleen Carr & James Crammond eds., 1995) (cited in SAX ET AL., *supra* note 4, at 334).

insecure users (cities).¹²³ The larger-scale institution (the District) would allow more "ag-urban" trades to occur. Large "ag-urban" trades are a live issue in the current prior appropriation system. For example, a 1998 agreement between the behemoth Imperial Irrigation District (IID) and the San Diego County Water Authority (SDCWA) provided for the conservation and sale by IID of up to 200,000 acre-feet per year for urban, industrial, and residential uses in the SDCWA service area.¹²⁴

Large "ag-urban" trades are often subject to extensive disputes and litigation. In the case of the IID-SDCWA transfer, the Metropolitan Water District of Southern California (MWDSC), a junior appropriator to the IID, asserted that IID was trying to sell water that it had been wasting; MWDSC claimed that IID was therefore not entitled to the water.¹²⁵ The controversy was projected to reach a negotiated resolution in which junior appropriators would agree to accept the transfer and not sue IID for waste during the proposed lease period.¹²⁶

1. How the District Might Fulfill the Coase Conditions

The District might be able to facilitate "ag-urban" trades in the following ways. First, it would lower transaction costs, making "ag-urban" trades common. The District would serve as an information broker and clearinghouse,¹²⁷ just as water institutions do at the irrigation district level. Furthermore, legal title to appropriative rights would be held by the District, with the "ag" rights and the "urban" rights converted to allotments held by each side to the transfer (paralleling current practice at the irrigation district level). This system would prevent the need for repeated use of the statutory transfer process. Processing trades faster by avoiding the statutory transfer system would lower transaction costs and move conditions within the District towards fulfillment of the first Coase Condition.

Second, the District would alleviate transfer-induced title uncertainty. Because the District would hold legal title to a fixed amount

123. See, e.g., Scott & Coustalin, *supra* note 45, at 971-76 (envisioning the future role of a hypothetical larger water institution they call a "river corporation"). Scott and Coustalin's primary focus for the "river corporation" was on governance and regulation of the riparian resource, but a secondary focus included the facilitation of transfers among a wider range of appropriators on a river. *Id.* at 973-74. They noted that the "river corporation" was an "institutional innovation" of current irrigation districts and other water institutions. *Id.* at 972.

124. SAX ET AL., *supra* note 4, at 150.

125. *Id.*

126. *Id.*

127. See Scott & Coustalin, *supra* note 45, at 974 (noting that the "river corporation" could, among other roles, act as a clearinghouse for short-term transfers).

of appropriative rights; suing institutional transferors for waste, abandonment, forfeiture, or failure of the historical use requirement would not make "new" water available to district members. Capping the supply of water available to potential litigants in this manner would reduce the litigation incentives that are present in a statutory transfer. Also, as long as no non-transferee "paper rights" holders (such as MWDSC) are let into the District, the universe of potential litigants who would wish to challenge the institutional transfers would be reduced.¹²⁸ In addition, avoiding the statutory transfer process would start a "virtuous cycle" of lower transfer costs and smaller transfers.¹²⁹ After spreading relatively fixed litigation costs over progressively smaller volumes of water (and anticipated benefits from litigation), fewer transfers would be worthwhile to contest through administrative action or litigation. As these factors interacted to reduce litigation, title insecurity would decrease and, progressively, the second Coase Condition would become more fulfilled.

2. *Intangible Aspects of the District and Fulfillment of the Coase Conditions*

In several intangible ways, the District might reduce title uncertainty, litigation, and the number and severity of challenges to water transfers. A water institution benefits both farmers and cities, protecting them from litigation and providing a more reliable water supply, or a way to turn unneeded water into extra revenue. Through joint association, members may come to view one another as partners, rather than adversaries in the ongoing contest for diminishing water resources. This potential for the District to change the "sociology" of interaction between cities and farmers is reflected in the observation of Shasta County cattleman Chuck Searle, cited by Professor Ellickson: "I think the whole thing is good neighbors. If you don't have good neighbors, you can forget the whole thing."¹³⁰ Through the District, farmers and cities would watch each other benefit from increased transfers. Ultimately, they might come to view each other as "good neighbors" with whom they want to cooperate, rather than adversaries whom they want to sue.¹³¹

128. In comparison, transferee "paper rights" holders (such as SDCWA) would be proponents, rather than challengers, of the transfers because they are parties to the transfers.

129. See discussion *supra* Part V.

130. Ellickson, *supra* note 71, at 624.

131. See OLIVER E. WILLIAMSON, *THE MECHANISMS OF GOVERNANCE* 151-52 (1996), for a discussion, rooted in transaction cost economics, of reputation effect mechanisms that dramatically increase possibilities for trust and cooperation when commercial interactions

B. Potential Pitfalls to Avoid in Designing Larger-Scale Water Institutions

It is important to ensure that the cohesiveness of irrigation district-scale water institutions is not lost in the larger-scale District. Smaller water institutions are cohesive in large part because, even if a given district member does not profit from a particular institutional transfer, the odds are high that they will be party to one in the future. The equilibrium solution is to agree to others' transfers, to increase the chances that one's own future transfers will not be contested. When transfers become less frequent and larger, however, as is common for "ag-urban" transfers, new "rent-seeking" problems arise, as irrigation district members dispute who will enjoy the financial gains from the transfers.¹³² These rent-seeking disputes dissipate the gains that would otherwise accrue from transfers, and perhaps even keep them from occurring.¹³³ This result could be avoided through implementation of a clear plan for how transfers will be processed within the District and who will obtain the gains from the transfers.

become repeat games rather than isolated, "one-shot" events. See also Scott & Coustalin, *supra* note 45, at 973-74 (discussing how the "river corporation" could both avoid and mediate transfer-related disputes, thereby increasing comity among appropriators on the river).

132. See, e.g., SAX, *supra* note 4, at 150 (discussing the MWDSC-IID controversy cited above at note 124).

133. Thompson, *supra* note 37, at 732; Richard L. Bowen et al., *Rent Seeking, Wealth Transfers and Water Rights: The Hawaii Case*, 31 NAT. RESOURCES. J. 429, 432, 445-46 (1991) (discussing rent-seeking issues arising in Hawaii water transfers and political wrangling between landowners, urban residents, real estate developers, and public interest groups over the financial windfall from hypothetical ag-urban trades between sugar producers and growing urban areas); see also Stewart E. Sterk, *Neighbors in American Land Law*, 87 COLUM. L. REV. 55, 72-73 (1987) (commenting that "transaction costs frequently do impede efficient bargains" and that "instances in which strategic bargaining does inhibit efficient results are legion"). For a discussion of why internal organization (by analogy, possibly, a water institution) is superior to "market modes of contracting" (by analogy, possibly, the statutory transfer process) "in circumstances where opportunism and small-numbers conditions are joined," see OLIVER E. WILLIAMSON, *MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS* 26-29 (1975). There is an opportunism problem in the prior appropriation system as a whole because there are small-numbers conditions: empirically there is not a "rivalry among large numbers of bidders" to buy or sell water that will "render opportunistic inclinations ineffectual." *Id.* Williamson notes "transactional dilemmas" associated with the opportunism facilitated by small-numbers conditions such as increased bargaining costs and indirect costs (presumably, such as litigation). *Id.* Williamson's insights certainly apply to the prior appropriation system and are another way of describing failure of the Coase Conditions: when opportunism is unconstrained, transaction costs will rise and property rights will become less secure. In contrast, within water districts, there is a much more competitive market to buy and sell water, which reduces the small-numbers problem and constrains opportunism.

1. The Tender Offer Model

Rodney Smith, a leading thinker about water transfers and markets, proposes a tender offer model for water transfers as a solution to rent-seeking by irrigation district members.¹³⁴ Under this model or one similar to it, the transferee (city) requests to buy a certain amount of water from transferors (farmers) at a certain price.¹³⁵ If would-be transferors oversubscribe the tender offer, then water is bought pro-rata from each farmer that tenders.¹³⁶ If transferors undersubscribe the offer, then the city makes a new tender at a higher price, until the city obtains the full amount of water it needs.¹³⁷ Alternatively, irrigation districts (that would be members of the larger District) can act as intermediaries in the tender offer for their individual farmer-members.¹³⁸ To that end, they notify members of the transfer opportunity, manage and quantify return flows, and reduce the number of transferors with whom the city must transact.¹³⁹

The tender offer system has several merits. If a city wishes to do a once-off transaction without using a tender offer approach, then would-be transferors who cannot participate will be denied liquidity and might not perceive a readily available future opportunity to transfer (as they commonly have in an irrigation district). Litigation might be a relatively attractive option for these frustrated would-be transferors. In contrast, if more transferors benefit financially from the transfer, then the pool of potentially disgruntled claimants is smaller.¹⁴⁰

Furthermore, a common concern related to large "ag-urban" trades is that the transfers may hurt the "area of origin" of the

134. See generally Smith, *supra* note 69.

135. *Id.*

136. *Id.*

137. *Id.*

138. *Id.*

139. *Id.*

140. See, e.g., Bowen et al., *supra* note 133, at 447. Bowen et al. discuss an "auction solution" to the rent-seeking problems of hypothetical ag-urban trades in Hawaii, in which the state government would auction water rights to the highest bidders. The efficiency in allocation would be similar to that achieved by the tender offer model, but under Bowen's proposal, the rents would accrue to the state rather than to private appropriators as proposed by Smith. Both the auction and the tender offer would facilitate fulfillment of the Coase Conditions by lowering transaction costs and more clearly delineating property rights. The different financial impacts on the public and private sectors under each proposal provide a clear demonstration of how initial resource allocations determine revenue flows but not patterns of resource utilization when systems are at Coase Equilibrium; see also Sterk, *supra* note 133, at 73 (implying that efficient bargains are more likely to be made in competitive markets than in bilateral-monopoly situations in which transaction costs are higher).

transferred water, and that farming communities and rural areas may see their economies decline as land is fallowed, while a small number of farmer-transferors accrue the gains to themselves, without compensating their neighbors for the negative externalities.¹⁴¹ The tender offer approach, however, permits the economic efficiency of large "ag-urban" trades while minimizing the dislocations to farmers and rural areas caused by systemic change in the marginal value of water within different economic sectors. The tender offer approach reduces dislocations from "ag-urban" trades because several water districts sell a small percentage of their water, rather than a few districts selling a much larger fraction of their water. The same amount of agricultural land is left to fallow, but over a much larger area. Redeployment of economic resources is spread out over space and time, minimizing politically unpopular and poignant third-party effects. Reducing third-party effects is pragmatic as well as humanitarian, because the rural and farming lobby is politically powerful. The tender offer model spreads the financial benefits of water transfers more broadly throughout this lobby, reducing the intensity of their political mobilization against transfers. This lowers transaction costs and makes the project more feasible.¹⁴²

2. *The District and Transition Issues*

Ideally, the larger District, designed to expand Coase Equilibrium within the prior appropriation system, joins a large city or coalition of cities and several irrigation districts. Its members have access to a common water supply and delivery infrastructure typical to Bureau of Reclamation projects. The city-transferee members of the District would work with the farmer-transferors to determine how much water could conceivably be transferred from each of the irrigation districts, net of return flows. A single large statutory transfer application for this amount of water would be made. Litigation might result, but protests should be significantly reduced if the District is carefully designed so that junior, supply-insecure appropriators anticipate financial benefits

141. See, e.g., SAX ET AL., *supra* note 4, at 196, 246. Criticism of third-party effects of water transfers may be misplaced. Ag-urban trades are symptomatic of larger structural changes in the Western U.S. economy, as water resources become more highly valued in urban and industrial uses than in agricultural ones. Other U.S. economic sectors such as manufacturing have undergone profound structural changes in recent decades, often at very high costs to communities, workers, and other third parties. Nonetheless, there has not been a strong effort to prevent these changes; it may make little economic sense to take a different course with Western water. See *id.* at 248-49; Thompson, *supra* note 37, at 734. Nonetheless, as long as the same efficiencies can be achieved, from a social welfare standpoint it is desirable to minimize dislocations.

142. See Thompson, *supra* note 37, at 733-35.

and senior, supply-secure appropriators anticipate liquidity opportunities from selling their unneeded water through a tender-offer process.¹⁴³ Once the District processes this single large statutory transfer, a water “line of credit” is in place. Then, the District may begin to facilitate a large volume of short, medium, and long-term trades for small, medium, and large volumes of water using a tender offer model.¹⁴⁴ As transaction costs are reduced and property rights become more secure, the Coase Conditions are fulfilled and a Coase Equilibrium would emerge, just as it has in smaller-scale water institutions.¹⁴⁵

Applying institutional transfer procedures in the District would preserve and expand price-based signals for resource allocation in the water market, allowing flexible responses to seasonal fluctuations in water availability and agricultural prices, and longer-term responses to growing urban populations.¹⁴⁶ The District reduces third-party effects on farmers and communities in the transferor areas as much as possible for farmers, while increasing flexibility for cities.

VII. CONCLUSIONS

In the tradition of Professor Ellickson’s study of Shasta County cattle trespass, this Article analyzes the prior appropriation system in the Western United States as a compelling application of the Coase Theorem. The paucity of statutory transfers in the system at large juxtaposed against the profusion of institutional transfers within water districts suggests that the overall system is not at Coase Equilibrium. The Coase Equilibrium does prevail, however, in the smaller-scale institutional context. Institutions facilitate fulfillment of the two Coase Conditions that are required for Coase Equilibrium: low transaction costs and secure

143. In contrast, recent “ag-urban” transfers such as the IID-SDCWA transaction left junior appropriators such as MWDSC “out in the cold,” with large incentives to sue.

144. *See, e.g.,* Howe, *supra* note 82, at 388 (calling for establishment of a “state or interstate agency” much like the District proposed in this Article that would “make a market” in water rights by providing pricing information, brokering transfers, and making whole third parties—presumably other appropriators—whose interests were harmed by transfers).

145. *See* discussion *supra* Part V.

146. One foreseeable issue with increasing the freedom with which water now used within irrigation districts can be marketed to cities (who will pay a higher price for it) is that many current transferee farmers within the irrigation districts wish to maintain artificially low prices for water by keeping demand for the water limited to in-district uses. Hopefully, the tender offer model will reduce this problem, because all farmers (even those who now use institutional markets to buy water that is cheaper than its real value on an open market) would stand to benefit from selling water through the District to urban transferees. *See, e.g.,* Thompson, *supra* note 37, at 736-37.

property rights. Institutions catalyze a “virtuous cycle” in which lower transaction costs (the first Coase Condition) increase the number and reduce the average size of transfers. This, in turn, reduces opportunities and incentives for litigation, making appropriative rights more secure (the second Coase Condition) and lowering transaction costs. Consequently, more transfers become possible in an iterative process that tends toward Coase Equilibrium. Policies encouraging application of small-scale institutional transfer models on a larger scale and facilitating the formation of larger-scale water institutions will expand Coase Equilibrium within the prior appropriation system. Bringing cities and irrigation districts together into larger “supra-institutions” can lower transaction costs and, if done correctly, reduce the pool of potential litigants against transfers, making appropriative rights more secure.

With respect to Western U.S. surface water use, the Coase Theorem’s operation and consequences are just as clear as they were in Ellickson’s Shasta County study. As the West’s population and economic activity continues to expand, however, the stakes are much higher. There has never been a better time to apply Coase’s central insights to the U.S. prior appropriation system—expanding the successes of the existing institutional framework to a larger level, reducing deadweight losses caused by legacies of Western history, and increasing efficiency in the allocation of the West’s most coveted natural resource.