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# An Interdisciplinary Economic, Legal, and Equity Analysis of, and Policy Recommendations for, United States Water Markets

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## INTRODUCTION

Water distribution is among the paramount processes of a just human society. Not only does the United Nations recognize water as a fundamental human right,<sup>1</sup> but water is also integral to economic production, cultural traditions, recreation, and life itself. Scarcer and more variable freshwater supplies heighten the stakes of mismanaging such a vital element.<sup>2</sup> In the face of these growing challenges, the United States' water management picture appears bleak: an estimated \$655 billion water infrastructure investment deficit results in water breaks, harrowing pollution and water quality

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<sup>1</sup> Off. of the High Comm'r on Hum. Rts., at 1, U.N. Doc. E/C.12/2002/11 (2003), <https://www.refworld.org/pdfid/4538838d11.pdf> U.N. Doc E/C.12/2002/11 [<https://perma.cc/PM6L-R4E5>].

<sup>2</sup> See, e.g., E360 Digest, *More Heat, More Drought: New Analyses Offer Grim Outlook for the U.S. West*, YALE ENV'T 360 (May 20, 2022), <https://e360.yale.edu/digest/more-heat-more-drought-new-analyses-offer-grim-outlook-for-the-u-s-west> [<https://perma.cc/5H82-KTMR>]; Alexis Temkin et al., *Exposure-Based Assessment and Economic Valuation of Adverse Birth Outcomes and Cancer Risk Due To Nitrate in United States Drinking Water*, 176 ENV'T. RSCH. 108442, 108442 (2019) (finding that between 2,300 and 12,594 annual cancer cases in the United States may be due to nitrate water pollution).

issues, and distrust in management structures.<sup>3</sup> Water markets<sup>4</sup> have turned into increasingly widespread and increasingly divisive alleged solutions.<sup>5</sup> This Comment harnesses an interdisciplinary legal, economic, and equity lens to attempt to holistically evaluate the opportunities and limitations facing United States water markets as a tool for efficient and equitable water use. This Article extends that analysis to articulate potential best practices for policymakers and stakeholders to consider when creating or modifying water markets.

Part I distills theoretical market requirements to contemplate a water right as a potential tradeable good, ultimately indicating several economic limitations. Part II briefly explores the colorful evolution of American water rights to situate a legal understanding of water trading capacities and obstacles. Part III adds equity and justice concerns to both this Comment and the light literature tying together such concepts. Part IV illuminates those understandings with a case study of one Western and one international water market. Drawing from those case studies, Part V identifies four suggested components comprising best practices for water markets. This Comment concludes that, although the United States' water rights landscape presents several obstacles that warrant serious pause when deciding to extend the power of water markets, water markets that (1) actively address inequitable initial market endowments, (2) protect reasonable quantities of instream water, (3) increase a tradeable right's alienability, and (4) employ equity-minded oversight mechanisms and

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<sup>3</sup> Joseph W. Kane, *Investing in Water: Comparing Utility Finances and Economic Concerns Across U.S. Cities*, BROOKINGS INST. (Dec. 14, 2016), <https://www.brookings.edu/articles/investing-in-water-comparing-utility-finances-and-economic-concerns-across-u-s-cities/> [<https://perma.cc/C55F-KWBM>].

<sup>4</sup> By a water market, this Comment uses an umbrella term to encompass the voluntary transfer of legal water rights. In contrast, when one buys bottled water or even pays one's water utility bill, one does not buy the legal water right, which is still held by the water right-holding entity.

<sup>5</sup> BARTON H. THOMPSON ET AL., *LEGAL CONTROL OF WATER RESOURCES* 305 (6th ed. 2018) (calling water markets "one of the most debated subjects in water law today"). Compare Memorandum from Christopher Hall, Executive Director of Water League, *The Beneficial Use of Water for Posterity* 16 (Sept. 20, 2023) (on file with author) ("We can no longer afford to use the market forces as our primary guide or we will bankrupt the future. The market perspective . . . will not stop short of pillaging the ecological assets and threatening . . . lives."), with THE NATURE CONSERVANCY & TEX. LIVING WATERS PROJECT, *TEXAS WATER MARKETS REVIEW: HISTORIC TRENDS AND FUTURE POTENTIAL* 21 (2023) ("[W]ater markets can play a role in helping Texas manage its water resources, specifically in times of scarcity and as a tool to help reallocate water to different users.").

programs offer key policy structures to maximize the probability of responsibly managing one of our most vital resources.

## I

### ECONOMIC BACKGROUND: THEORETICAL FIT AND LIMITATIONS TO WATER WIDGETS

Water is vital to human health, the economy, and the environment, so a community's choice of water allocation system has significant consequences. This Part highlights the main contours of water's ability (and inabilities) to act as a market good.<sup>6</sup> Section A articulates the benefits of market-driven resource management—the “why” of marketing a private good. Section B outlines the potential institutions for managing and allocating a good or service—the “how” of marketing a private good. Finally, Section C draws attention to the theoretical and practical flaws facing water markets.

#### *A. The Promise of Market-Determined Resource Allocation*

For decades, some economists have extolled that markets are the most efficient mechanism to allocate water.<sup>7</sup> Usually, the crux of those arguments involved theorized or data-driven evidence that competitive markets maximize the “utility” of a good, resulting in myriad benefits to buyers, sellers, and ecosystems alike. After all, in a

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<sup>6</sup> A market “good” simply means it can be bought and sold in a market. A favorite hypothetical “good” among economics circles is a nondescript “widget.”

<sup>7</sup> See, e.g., Ereny Hadjigeorgalis, *A Place for Water Markets: Performance and Challenges*, 31 REV. AGRIC. ECON. 50, 50–51 (2009) (“[T]he UNDHR points out that the global water crisis is not caused by a physical deficiency of water, but rather is a result of a host of institutional and political failures in water resource management . . . [while the] markets are not the panacea to the world’s water crisis, such markets have nonetheless been adopted and are proving successful in many areas, without significant impacts on equity and distribution.”); ANDREW AYRES ET AL., PUB. POL’Y INST. CA., IMPROVING CALIFORNIA’S WATER MARKET 8–9 (2021) (“[Water] transactions allow for the cost-effective reallocation of water and the development of water infrastructure, as well as improved management of hydrologic risk. Done well, they can foster cooperation in managing water-related challenges and boost resilience.”); *Id.* at 10 (“[And f]or water districts with senior water rights, revenues from trading can help fund local infrastructure that benefits both local growers and the broader community.”); Joseph W. Dellapenna, *Adapting Riparian Rights to the Twenty-First Century*, 106 W. VA. L. REV. 539, 571 (“Much of the water shortage of the arid west would disappear overnight if appropriators had to start paying a realistic price for water . . . .”); see also Charles W. Howe & Christopher Goemans, *Water Transfers and Their Impacts: Lessons from Three Colorado Water Markets*, J. AM. WATER RES. ASS’N. 1055, 1056 (2003); Richard W. Wahl, MARKETS FOR FEDERAL WATER: SUBSIDIES, PROPERTY RIGHTS, AND THE BUREAU OF RECLAMATION (1989); K. WILLIAM EASTER ET AL., MARKETS FOR WATER (1998).

competitive market, the price that a consumer is willing to pay for any good should be equal to or less than the value that the good provides to the consumer.<sup>8</sup> Macroeconomic theory expands that premise: a competitive market should maximize the net benefit to all consumers and producers.<sup>9</sup> In a perfectly competitive market, these incentives *minimize* the good's price and *maximize* the net "value" of a limited good in light of its value to consumers.<sup>10</sup>

Along with theoretically maximizing the net benefit derived from a particular good, a perfectly competitive market provides several other theoretical advantages. Such a market should avoid inefficient resource misallocation, because the quantity demanded should generally equal the quantity supplied, resulting in no shortage or surplus.<sup>11</sup> Additionally, the market could reduce harm to third parties and the environment, because rational actors would respond to fully accurate pricing.<sup>12</sup> Finally, these dynamic price and quantity adjustments would be made by consumers and sellers alike, thus eliminating agency decision-making costs inherent in government administration and regulation.<sup>13</sup>

### *B. Defining the Competitive Market Framework and Its Water Incompatibilities*

The market goal of maximizing the total net benefit derived from a limited good is laudable. But economists theorize that such a "perfectly competitive" market requires certain producer, consumer, and commodity characteristics. Those requirements include (1) a large number of firms (2) who are easily capable of entering the market (3) producing identical goods (4) consumed by a large number

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<sup>8</sup> In turn, the price that sellers are willing to accept should, in theory, be equal or greater than the average cost to produce, maintain, transport, and otherwise sell the good. Firms that tried to sell at higher prices would be outcompeted by firms with the lowest sustainable prices. Elizabeth Hoffman & Matthew L. Spitzer, *Willingness to Pay vs. Willingness to Accept: Legal and Economic Implications*, 71 WASH. U. L.Q. 59, 64 (1993).

<sup>9</sup> WILLIAM K. JAEGER, ENVIRONMENTAL ECONOMICS FOR TREE HUGGERS AND OTHER SKEPTICS 17 (2005).

<sup>10</sup> *Id.* at 25.

<sup>11</sup> *Id.* at 13, 24.

<sup>12</sup> *Id.*

<sup>13</sup> See, e.g., THE WHITE HOUSE OFF. OF MGMT. & BUDGET, 2018, 2019, AND 2020 REPORT TO CONGRESS ON THE BENEFITS AND COSTS OF FEDERAL REGULATIONS AND AGENCY COMPLIANCE WITH THE UNFUNDED MANDATES REFORM ACT (2020).

of buyers, with (5) buyers and sellers having complete information about market conditions.<sup>14</sup>

But water—the fluid stuff of waterfalls, aquifers, and babbling brooks—strains to function as a market good. The five largest incompatibilities with a perfectly competitive market appear to be (1) externalities, (2) valuation difficulties, (3) monopolistic markets, (4) imperfect information, and (5) jurisdictional complexities leading to transaction costs.

First is the issue of economic externalities. Externalities are nonproducer costs that are incidental to producing or consuming a good.<sup>15</sup> In other words, an externality is the difference between the price facing consumers and the third-party-inclusive cost. Pollution is a classic example of something that causes health or environmental costs that are difficult to include in the consumer-facing cost. Unless those externalities are “internalized” by raising the price to the third-party-inclusive cost, the pollution-causing good will be overproduced.<sup>16</sup> Given the many interconnected effects that water availability or scarcity has on people, economies, and ecosystems—present and future—water’s externalities are a particularly complex concern.<sup>17</sup>

Second, both consumers and producers have difficulties with the economic and subjective moral evaluations that go into setting or paying a price for life, nonhuman life, whole ecosystems, or the various cultural significances of water.<sup>18</sup> After all, the life-giving essence of water, along with its historical conception by various cultures as a public resource accessible to domestic and other reasonable needs, muddies the very notion of monetizing water. How can one put any price tag on clean water for children? And why should we allow some people or entities to profit from providing a naturally occurring resource and fundamental human right? Additionally, behavioral consumer characteristics, such as present

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<sup>14</sup> 9.1 *Perfect Competition: A Model*, in PRINCIPLES OF ECONOMICS (2011). However, for the seminal early articulations of perfect market competition requirement, see Kenneth J. Arrow & Gerard Debreu, *Existence of an Equilibrium for a Competitive Economy*, 22 *ECONOMETRICA* 265 (1954).

<sup>15</sup> See, e.g., JAEGER, *supra* note 9, at 72.

<sup>16</sup> E. Donald Elliott & Daniel C. Esty, *The End of Environmental Externalities Manifesto: A Rights-Based Foundation for Environmental Law*, 29 *N.Y.U. ENV'T L.J.* 505, 508 (2021).

<sup>17</sup> See Billy A. Ferguson & Paul Milgrom, *Market Design for Surface Water* (Nat'l Bureau of Econ. Rsch., Working Paper No. 32010, 2023).

<sup>18</sup> See JAEGER, *supra* note 9, at 11.

bias, unrealistic optimism, limited attention, and self-control issues, all limit the prospect of utility-maximizing consumers.<sup>19</sup>

Third, water rights holders have a tendency to function as miniature monopolies.<sup>20</sup> This topic is discussed further as an equity-based concern in Part III.

The fourth issue is a significant lack of information. Water data is a complex, hole-filled network of different monitoring schemes. The U.S. Geological Survey (USGS) operates about 10,000 stream gages providing streamflow information, and state agencies and citizen science monitor hundreds of thousands of rivers and streams; yet many water users do not measure or report their water diversions.<sup>21</sup> Given the difficulties in knowing how much water is available or being used *today*, margins of error in hydrological and climate forecasts create planning uncertainties for *tomorrow*.<sup>22</sup>

Finally, jurisdictional complexities between local, state, and federal laws vastly complicate all transaction costs (both to trade water between consumers and for “firms” to enter or exit the market)—the concept that Part II explores in greater depth.

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<sup>19</sup> Cass R. Sunstein, *Behaviorally Informed Mandates? Internalities, Externalities, and Fuel Economy Rules*, 29 N.Y.U. ENV'T L.J. 493, 495 (2021).

<sup>20</sup> American Water Works, Inc., which provides water services to more than fourteen million residential, commercial, industrial, and government customers, acknowledges as much in its most recent 10-K by noting that its subsidiaries “generally do not face direct competition in their existing markets.” *About Us*, ILLINOIS AM. WATER, <https://www.amwater.com/ilaw/About-Us/>; AM. WATER WORKS INC., ANNUAL REPORT (FORM 10-K) (Feb. 16, 2022) [hereinafter American Water Works 2021].

<sup>21</sup> Water Resources Mission Area, *USGS Streamgaging Network*, U.S. GEOLOGICAL SURV. (Apr. 27, 2021), <https://www.usgs.gov/mission-areas/water-resources/science/usgs-streamgaging-network> [<https://perma.cc/5SEK-63H7>] (describing USGS’s surface water monitoring schemes and state agency collaboration). Furthermore, scholars have identified several factors, from staffing limitations to interoperability between the various water-use databases, that inhibit centralized, accurate, and timely water-use data. Marston et al., *Water-Use Data in the United States: Challenges and Future Directions*, 58 J. AM. WATER RES. ASSOC., 485, 488–89 tbls.1 & 2 (2022). For further discussion around the current lack of water use information, see also Michael Cohen, *Managing the Unmeasured – Colorado River*, PAC. INST. (2023), <https://pacinst.org/managing-the-unmeasured-colorado-river/> [<https://perma.cc/GWU8-ANUF>].

<sup>22</sup> See, e.g., IPCC, AR6, CLIMATE CHANGE 2022: IMPACTS, ADAPTATION AND VULNERABILITY: SUMMARY FOR POLICYMAKERS, at B.4.2 (2022).

## II BACKGROUND WATER LAW

Water management in the United States contends with a garbled legal history. Section A broadly surveys water's management history to illustrate rationales underlying or contrasting with modern water doctrines. Sections B and C summarize the riparian and prior appropriation doctrines' evolutions and current capacities for water markets, respectively. This summary helps to holistically frame today's legal framework of rights, systems, and stakeholders.

### *A. Water Management: Ancient Systems*

It is an understatement that water management has taken many forms across different times and places in human history. Relevant to this Comment, Indigenous and First Nations peoples have inhabited the continent now widely known as North America for thousands of years, employing numerous landscape-specific techniques to acquire, keep, use, and conserve water.<sup>23</sup> Unfortunately, a great deal of knowledge about these practices has been lost due to colonial displacement and sustained physical and cultural violence.

In the arid southwest, where water “formed the underlying basis of all human activity, and its abundance or scarcity is of the utmost importance,” run-off collection systems have existed since at least 800 A.D.<sup>24</sup> Later Spanish colonization ultimately fused Spanish water law and acequia practices with indigenous water management to create a new water system.<sup>25</sup> In the resulting acequias system, water is understood in deeply communal and reciprocal terms.<sup>26</sup> That

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<sup>23</sup> For example, indigenous communities along the North American East Coast and Pacific Northwest have engaged in oyster management and harvesting techniques for thousands of years. Leslie Reeder-Meyers et al., *Indigenous Oyster Fisheries Persisted for Millennia and Should Inform Future Management*, NATURE COMM'NS (May 3, 2022), <https://www.nature.com/articles/s41467-022-29818-z> [<https://perma.cc/3SQN-7QZX>].

<sup>24</sup> *History: The Politics of Water*, N.M. MUSEUM ART, <https://online.nmartmuseum.org/nmhistory/people-places-and-politics/water/history-water.html> [<https://perma.cc/6SUL-P442>].

<sup>25</sup> The acequia system owes its basic features to the “ingenuity” of medieval Muslim irrigation practices, and can be seen in communities stretching from Central and South Asia to the Iberian Peninsula. The very word itself, “acequia,” is derived from the Arabic word al-sāqiya, which translates to “irrigation channel.” N.M. STATE UNIV., ACEQUIAS OF THE SOUTHWESTERN UNITED STATES: ELEMENTS OF RESILIENCE IN A COUPLED NATURAL AND HUMAN SYSTEM 1 (Adrienne Rosenberg et al. eds., 2020) [hereinafter ACEQUIAS OF THE SOUTHWESTERN U.S.].

<sup>26</sup> In this way, scholars are now studying and understanding acequias as dynamically coupled natural and human systems (CNH). *Id.* at 4.



understanding manifests as a carefully leveled main canal that feeds a network of finely calibrated, gravity-controlled canals distributing water within a particular watershed to meet various health, agricultural, and societal needs.<sup>27</sup> *Parciantes*—landowners with water rights—pay annual dues and contribute their labor in regular canal cleaning. They annually elect a ditch boss (the *majordomo*) and a three-person commission overseeing water conflict resolution.<sup>28</sup> Water is traditionally not stored beyond its natural availability.<sup>29</sup> Water users’ compliance with traditional rules and social customs is key to this water management system.<sup>30</sup> In these ways, acequias are a powerful model of resilient, community-building, place-based, and ecosystem-responsive systems of water management that have endured in arid climates.<sup>31</sup>

On the other side of the world, the ancient Romans thought of and treated water in manners both more individualized and more subject to centralized control. Roman water law originally considered water and air as within the *res communes*, i.e., communal property that anyone could use in its natural state.<sup>32</sup> But in a process analogous to the *fera naturae* treatment of wild animals, an individual who performed an act of capture to acquire water would then be free to consume that resource.<sup>33</sup> Roman water law also began to link water to land property rights: the *ad coleum* doctrine allowed a landowner to claim all resources (including water) below or above the bounds of their land.<sup>34</sup> But while individual capture was possible, the central state held sovereign responsibility for building infrastructure to convey water to urban centers where urban users could consume the water for free.

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<sup>27</sup> *Id.* at 1.

<sup>28</sup> *Id.* at 6.

<sup>29</sup> *Id.* at 16.

<sup>30</sup> For example, three of the ten key elements in acequias culture and management are *mutualismo* (mutualism), *confianza* (trust), and *respeto* (respect). *Id.* at 6.

<sup>31</sup> A \$1.4 million National Sciences Foundation (NSF) grant to study acequias systems examines the “central hypothesis . . . that acequias create and maintain the relationships between humans and nature that will allow for resilience in the face of climate change and increasing population growth.” *Id.* at 3.

<sup>32</sup> ANTHONY D. TARLOCK & JASON A. ROBISON, *LAW OF WATER RIGHTS AND RESOURCES* § 3:3 (2023 ed.).

<sup>33</sup> *Id.*

<sup>34</sup> *Id.*

*B. Riparian Law:  
American Evolution and Present Water Trading Framework*

The British colonies and their successor, the United States, continued along in their Roman roots by coupling “riparian”<sup>35</sup> private land ownership with water rights. Therefore, riparian property ownership included the right to use the adjacent water.<sup>36</sup> The landowner’s water right was limited, however. A landowner could use and consume water for domestic purposes<sup>37</sup> but had to preserve the water’s “natural flow” without diminution in water quantity, flow, or quality.<sup>38</sup> This natural flow doctrine, which maximized all riparian landowners’ access to water flow, catered well to a socioeconomic context where rivers’ primary functions were for navigation and water mills.<sup>39</sup> Yet, by the late 1800s, the natural flow doctrine bowed to increasingly consumptive water demands, and courts eventually permitted landowners to use, alter, and otherwise consume water in ways that were “reasonable” relative to the other riparian users.<sup>40</sup> Ad hoc adjudication determined reasonable versus unreasonable water

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<sup>35</sup> “Riparian” land is land that includes the bed of a watercourse or lake, or borders such a water feature. *See Land, Riparian Land*, BLACK’S L. DICTIONARY (11th ed. 2019).

<sup>36</sup> *See, e.g.,* TARLOCK & ROBISON, *supra* note 32, § 1:1; *see also* Merritt v. Parker, 1 N.J.L. 526 (N.J. 1795) (where the New Jersey Supreme Court provides perhaps first articulates the riparian doctrine in the United States); Tyler v. Wilkinson, 24 F. Cas. 472, 474 (C.C.D.R.I. 1827) (Justice Story, sitting as a circuit court judge, wrote: “In virtue of this [riparian land] ownership[, the landowner] has a right to the use of the water flowing over it in its natural current . . . [H]e has no property in the water itself; but a simple use of it, while it passes along.”).

<sup>37</sup> “Domestic purposes” includes drinking, bathing, and raising a small quantity of livestock or produce. THOMPSON ET AL., *supra* note 5, at 32.

<sup>38</sup> *See* Merritt v. Parker, 1 N.J.L. at 530 (“[W]hen a man purchases a piece of land through which a natural water course flows, he has a right to make use of it, in its natural state, but not to stop or divert it. . . . This principle . . . is so firmly settled as a doctrine of the law, that it should never be abandoned or departed from.”). *But see* AMY KELLEY, WATERS AND WATER RIGHTS § 7.02(c) (3d ed. 2023) (pointing out that the practical realities and domestic exceptions were considerable: “[the natural flow doctrine] has never actually been the law.”).

<sup>39</sup> KELLEY, *supra* note 38, § 7.02.

<sup>40</sup> *See, e.g.,* SANDRA B. ZELLMER & ADELL L. AMOS, WATER LAW IN A NUTSHELL 3 (6th ed. 2021). However, it should be noted that even one of the first articulations of the “natural flow” doctrine was based upon notions of reasonableness. In 1827, Justice Story explained that “[w]hen I speak of this common [water] right, I do not mean to be understood . . . that there can be no diminution whatsoever, and no obstruction or impediment whatsoever, by a riparian proprietor, in the use of the water as it flows; for that would be to deny any valuable use of it. There may be, and there must be allowed of that, which is common to all, a reasonable use. The true test of the principle and extent of the use is, whether it is to the injury of the other proprietors or not.” Tyler v. Wilkinson, 24 F. Cas. at 474.

use.<sup>41</sup> By the 1980s, however, increasing water conflict led a majority of riparian state legislatures to move away from a purely common law scheme into “regulated riparianism” schemes that gave state agencies the proactive role of evaluating and granting permits for reasonable water uses.<sup>42</sup>

Today, several features generally characterize riparian states’ water rights. First, water is considered a state-held common resource.<sup>43</sup> Second, the appurtenancy doctrine means that any water rights are generally tied to riparian properties,<sup>44</sup> and those riparian landowners are often limited to using water within the bounds of their riparian parcel.<sup>45</sup> Third, prospective water users must apply for water rights permits from the controlling state agency.<sup>46</sup> State legislation directs state agencies to consider factors relating to reasonableness or other considerations when deciding whether to accept or deny those water permits.<sup>47</sup> Most permits have a time expiration—generally no greater than twenty years for nonmunicipal users or fifty years for municipal users.<sup>48</sup> Groundwater in riparian states often is legally understood and regulated distinctly from the riparian system.<sup>49</sup> The distinction between surface and groundwater has been lessening in the interest of ecological well-being and hydrological soundness.<sup>50</sup> Transferring a water right involves several layers of scrutiny: the state agency

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<sup>41</sup> See RESTATEMENT (SECOND) OF TORTS § 850A (Am. L. Inst. 1979).

<sup>42</sup> See KELLEY, *supra* note 38, § 9.03.

<sup>43</sup> See, e.g., AM. SOC’Y OF CIV. ENG’RS, THE REGULATED RIPARIAN MODEL WATER CODE § 1R-1-01 (2004) (“The waters of the State are a natural resource owned by the State in trust for the public and subject to the State’s sovereign power . . . in order to protect the public health, safety, and welfare . . .”).

<sup>44</sup> AMANDA WATERS & ERICA SPITZIG, WATER RIGHTS AND ENVIRONMENTAL REGULATION: A LAWYER’S GUIDE 4 (2018).

<sup>45</sup> See Joseph W. Dellapenna, *The Law of Water Allocation in the Southeastern States at the Opening of the Twenty-First Century*, 25 UALR L. REV. 9, 17 (2002).

<sup>46</sup> THOMPSON ET AL., *supra* note 5, at 140.

<sup>47</sup> Such conditions and factors commonly include protecting minimum water flows; monitoring water diversion; and recording the nature, amount, and location of the water use. KELLEY, *supra* note 38, § 9.03. Additionally, the Regulated Riparian Model Water Code requires that any water permits harmonize with comprehensive water allocation plan or drought management strategies, and consider the public interest. AM. SOC’Y OF CIV. ENG’RS, *supra* note 43, §§ 6R-3-01 to 6R-3-02.

<sup>48</sup> See KELLEY, *supra* note 38, § 9.03; AM. SOC’Y OF CIV. ENG’RS, *supra* note 43, § 7R-1-02.

<sup>49</sup> See TARLOCK & ROBISON, *supra* note 32, § 4:29; THOMPSON ET AL., *supra* note 5, at 445.

<sup>50</sup> Christine A. Klein, *Groundwater Exceptionalism: The Disconnect Between Law and Science*, 71 EMORY L.J. 487, 551–54 (2022).

generally must review any right transfer (often considering impacts on the ecology, current and future water users, and the public interest of third parties), subject to both potential judicial scrutiny and, in regulated riparian states, larger-scale agency-based water resource planning.<sup>51</sup> Therefore, riparianism offers an interesting balance between the state water board's oversight capabilities for future planning with fairly minimal bureaucratic burdens on water users.

Riparian states have unique experiences with—and obstacles to—water market viability. Due to generally ample surface and groundwater supplies, the pressure on water trading is low in eastern riparian states. As mentioned above, classic common law riparianism and regulated riparianism hinder the efficiency of any potential water trading due to (1) uncertainty of the water right based on other users, (2) the appurtenancy doctrine limiting off-of-parcel water use, (3) water permits attaching to a specific use, (4) tradable permit exceptions for large groups, and (5) agency preference for grandfathered uses.<sup>52</sup> Each factor detracts from the traits of a perfectly competitive market good. Furthermore, classic riparianism raises a major equitable concern: it rewards private landownership and generally prefers agrarian rights.<sup>53</sup>

The nature and degree of those systemic limitations to the alienability of riparian water rights help explain the difficulty in analyzing riparian water trading. However, water trading and flexibility still occur. Scholars can deduce the value of riparian water rights via price analyses of riparian and water permit-attached properties, indicating that riparian water rights are being traded via real property transactions.<sup>54</sup> Additionally, some eastern water basins have employed reverse auctions where farmers sell their rights to the buying water agency, providing another tool to incentivize efficient

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<sup>51</sup> See THOMPSON ET AL., *supra* note 5, at 34; AM. SOC'Y OF CIV. ENG'RS, *supra* note 43, § 1R-1-11, § 6R-3-01, § 6R-3-06.

<sup>52</sup> See Olivia Choe, *Appurtenancy Reconceptualized: Managing Water in an Era of Scarcity*, 67 YALE L.J. 1909, 1911–12 (2004) (ultimately making the system appear “piecemeal,” incoherent, and protective of inefficient uses”); Dellapenna, *supra* note 7, at 559–61.

<sup>53</sup> Lynda L. Butler, *Allocating Consumptive Water Rights in a Riparian Jurisdiction: Defining the Relationship Between Public and Private Interests*, 47 U. PITT. L. REV. 95, 107 (1985).

<sup>54</sup> ORG. FOR ECON. CO-OPERATION & DEV., AGRICULTURAL WATER PRICING: UNITED STATES 22 (Dennis Wichelns ed. 2010).

water allocation while supplying market data to gauge eastern water rights values.<sup>55</sup>

### *C. Prior Appropriation's History and Legal Water Right Regime*

Unlike the eastern United States, the western United States' drastically different climatic conditions incubated a divergent water framework upon Anglo-American settlement. During the 1800s, federal and territorial governments struggled to allocate land among private owners quickly enough to meet mass demand—and, therefore, to grant legal land-tied riparian water rights.<sup>56</sup> Nevertheless, miners continued to commandeer enormous quantities of water to blast away rock as part of the mining process.<sup>57</sup> They employed a quick, bright-line rule of “first in time, first in right” to resolve mineral claims. Thus the “prior” in prior appropriation refers to the seniority of resource users. Western Anglo-American settlers extended that conflict-resolution scheme to create a hierarchy of time-based water rights.<sup>58</sup> Although the territorial governments, by law, ought to have applied previous common law practices,<sup>59</sup> the goal of maximizing economic growth likely influenced lawmakers and judges to codify the miners' water rights processes into the “prior appropriation” water doctrine.<sup>60</sup> The system rewarded those who quickly put water to economically minded activities. This rationale formed another unique

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<sup>55</sup> *Id.*

<sup>56</sup> TARLOCK & ROBISON, *supra* note 32, § 5:1-4.

<sup>57</sup> *See, e.g.,* ELLEN HANAK ET AL., *MANAGING CALIFORNIA'S WATER: FROM CONFLICT TO RECONCILIATION* 23–25 (2011).

<sup>58</sup> TARLOCK & ROBISON, *supra* note 32, § 5:1; ZELLMER & AMOS, *supra* note 40, at 4–5.

<sup>59</sup> *See, e.g.,* Cal. Stat. 219 (1850) (“The Common Law of England, so far as it is not repugnant to or inconsistent with the Constitution of the United States, or the Constitution or laws of the State of California, shall be the rule of decision in all the Courts of this State.”).

<sup>60</sup> *See* *Irwin v. Phillips*, 5 Cal. 140, 1855 WL 691 (1855) (the first California case applying the doctrine of prior appropriation); COLO. CONST. art. XVI § 6 (“Priority of appropriation shall give the better right as between those using the water for the same purpose.”); Granting the right of way to ditch and canal owners over the public lands, and for other purposes, Chapter 262, 39 Congress, Public Law 39-262. 14 Stat. 251 (1866) (recognizing “[t]hat whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing, or other purposes, have vested . . . and the same are recognized and acknowledged by the local customs . . . the possessors and owners of such vested rights shall be maintained and protected in the same”); *Cal. Or. Power Co. v. Beaver Portland Cement Co.*, 295 U.S. 142 (1935) (recognizing prior appropriation water rights).

feature of prior appropriation: demanding the nonstop economic use of that water lest the right-holder lose their water right.<sup>61</sup>

As such, today's prior appropriation doctrine—found in nineteen states<sup>62</sup>—offers a unique (and, with variation among the states, a heterogenous) conceptualization of water rights. The doctrine's core identity rewards those who put water to beneficial use first.<sup>63</sup> In contrast with the Acequia and the Roman systems, the appropriative doctrine individualizes the water right in a time hierarchy to incentivize fast, economically beneficial water use. Thus, without any inherent conservation mechanisms, even in times of adequate water supply “prior appropriation effectively sets up the present as having seniority over the future.”<sup>64</sup> This ethos offers a harsh rule during water shortages, since the senior appropriator's entire water right is satisfied before the next junior user receives a drop. In contrast to the riparian system, which was historically a benefit-balancing right to communal property, an appropriative right is more akin to a true private property interest in the water itself.<sup>65</sup> That said, it is noteworthy that some jurisdictions employ an antispeculative principle. The principle prevents water holders from buying a water right with the intention of using or selling it later; instead, the water must be put to shorter-term use.

However, the practical differences between the two predominant United States legal water rights frameworks blur upon closer inspection. Like regulated riparian states, many appropriative states declare public water ownership.<sup>66</sup> Prospective appropriative water users apply for a new or transferred water permit from the controlling

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<sup>61</sup> ZELLMER & AMOS, *supra* note 40, at 5. Although relinquishing a water right by not using it generally does not require any intent to not use, some states, instead, strip a water right due to abandonment, which requires intent to abandon. *See East Twin Lakes Ditches & Water Works, Inc. v. Board of Cnty. Comm'rs*, 76 P.3d 918 (2003) (“[A]bandonment requires the concurrence of two elements: a sustained period of non-use and an intent to abandon. The objector must prove abandonment by a preponderance of the evidence.”) (citations omitted).

<sup>62</sup> The nine “Colorado Doctrine states” that recognize only appropriative water rights include Alaska, Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. An additional ten states recognize both appropriative and, in varying degrees, riparian rights. *See, e.g., THOMPSON ET AL., supra* note 5, at 203.

<sup>63</sup> ZELLMER & AMOS, *supra* note 40, at 5.

<sup>64</sup> Memorandum from Christopher Hall, Executive Director of Water League, *The Beneficial Use of Water for Posterity* 7 (Sept. 20, 2023) (on file with author).

<sup>65</sup> Dellapenna, *supra* note 45, at 19.

<sup>66</sup> *See, e.g., CO. CONST. art. XVI § 5* (“The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state . . .”).

state agency, which generally must consider various factors when deciding whether to grant a water permit.<sup>67</sup> Case law or new statutes in many prior appropriation states require consideration of the public interest in evaluating new permit applications (and, to a lesser extent, water transfers).<sup>68</sup> Also, like riparian states, appropriative states developed their water laws before hydrologists better understood the connections between groundwater and surface water, so the water law of prior appropriation states also exhibits “groundwater exceptionalism.”<sup>69</sup>

The private property nature of an appropriative right and the arid West’s increased water pressures have resulted in several water market capabilities in prior appropriation states. First, to clearly state the general rule: appropriative water rights are transferable property rights.<sup>70</sup> In turn, there are several types of “markets” to enable water transfers throughout the West, including water banks,<sup>71</sup> bulletin board markets,<sup>72</sup> options markets,<sup>73</sup> and water trusts.<sup>74</sup> Several states have

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<sup>67</sup> THOMPSON ET AL., *supra* note 5, at 216–17, 230–31 (explaining the five classic required elements of unappropriated water, a natural stream, diversion, application to a beneficial use, and alignment with the public interest).

<sup>68</sup> See, e.g., *E. Bay Mun. Util. Dist. v. Dep’t of Pub. Works*, 35 P.2d 1027 (Cal. 1934); *Collins Bros. Corp. v. Dunn*, 759 P.2d 891 (Idaho 1988); *Shokal v. Dunn*, 707 P.2d 441 (Idaho 1985); *Young & Norton v. Hinderlider*, 110 P. 1045 (N.M. 1910).

<sup>69</sup> Klein, *supra* note 50, at 502, 506.

<sup>70</sup> TARLOCK & ROBISON, *supra* note 32, § 5:74.

<sup>71</sup> A water bank is a central institution that acts as a clearinghouse for users. . . . Water is sold at cost with a margin added to cover the operating costs of the bank, which are typically borne by the buyer. Water banks may be temporary or permanent institutions.

Hadjigeorgalis, *supra* note 7, at 52. As one historic example, the Idaho state legislature created its first water bank in 1979, which codified the informal rental pool in existence in eastern Idaho since the 1930s. IDAHO CODE §§ 42-1761 to 42-1766 (1979).

<sup>72</sup> Bulletin Board Markets are often called water banks but price is not set by a central institution. Bulletin board markets allow buyers and sellers to post offers and requests for water or water rights at a centrally located bulletin board, typically through the irrigation district central offices, or through an electronic platform.

Hadjigeorgalis, *supra* note 7, at 52.

<sup>73</sup> Options trade occur in so-called derivative markets:

In an options trade, a water user purchases an option to buy a specified volume of water at a pre-arranged price. The buyer may exercise the option by purchasing the agreed volume by the expiration date or let the option expire, thereby forfeiting the option deposit to the seller. Options are attractive because they allow sellers to retain ownership of the permanent water right while permitting buyers to reduce their risk during droughts by securing access to future water supplies early in the season.

*Id.* at 52, 54.

enacted statutes to promote temporary water transfers among private, federal, and state parties.<sup>75</sup>

However, scholars note several structural issues with trading water rights in prior appropriation jurisdictions. First, prescriptive, abandoned, forfeited, or otherwise unmeasured water rights create gaps in the official record and, therefore, incomplete hydrological information.<sup>76</sup> Second, several localities have statutorily restricted sales out of their jurisdictions.<sup>77</sup> Despite those and other limitations to free alienability, some western farmers participate in water markets to obtain irrigation water during ongoing droughts or to sell or lease their water rights to deep-pocketed urban water users.<sup>78</sup> As in riparian states, groundwater rights regimes in prior appropriation states may be entirely within the absolute ownership of a landowner, may be subject to reasonable use or otherwise integrative rights, or may be part of stubbornly persistent dual systems that segregate surface and groundwater.<sup>79</sup> However, several western states permit the transfer of groundwater in banks, markets, or other mechanisms.<sup>80</sup> In these ways, while water transfers appear to be more readily available in the prior appropriation scheme, the small yet increasing number and volume of water trades indicates the effect of those several limiting regulatory factors.

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<sup>74</sup> In a state water trust, the trust may purchase or lease water rights to remain in-stream flows serving ecological beneficial uses. Oregon, Washington, and Montana have had relative success with their trusts and have conserved more than 160 cfs, 84 cfs, and 63 cfs, respectively. *Id.* at 55.

<sup>75</sup> TARLOCK & ROBISON, *supra* note 32, § 5:89.

<sup>76</sup> See Dellapenna, *supra* note 7, at 569.

<sup>77</sup> See, e.g., Gary D. Libecap, The West Needs Water Markets, HOOVER INST. (Feb. 7, 2018), <https://www.hoover.org/research/west-needs-water-markets> [<https://perma.cc/QV7M-AR5T>] (“In California, 11 counties block the export of water.”); CAL. WATER CODE § 1217 (West 1984); TEX. WATER CODE § 11.084 (West 1997) (stating that the Texas Natural Resource Conservation Commission must approve all permanent sales of a water right. The exception is when all other parameters—including purpose of use, place of use, and amount used—stay the same, in which case a simple certified filing suffices); Colo. River Water Conservation. Dist. v. Mun. Subdistrict, N. Colo. Water Conservancy Dist., 610 P.2d 81, 84–85 (Colo. 1979).

<sup>78</sup> See ORG. FOR ECON. CO-OPERATION & DEV., *supra* note 54, at 18; THE NATURE CONSERVANCY & TEX. LIVING WATERS PROJECT, TEXAS WATER MARKETS REVIEW: HISTORIC TRENDS AND FUTURE POTENTIAL (2023).

<sup>79</sup> TARLOCK & ROBISON, *supra* note 32, § 4:29. Note, however, that there are interesting hybrid models. For example, Arizona, which has a dual system of prior appropriation surface water rights and separately regulated groundwater, still applies reasonable use to groundwater management. *Id.* § 4:7.

<sup>80</sup> See, e.g., AYRES ET AL., *supra* note 7.



The legal evolution of American water rights highlights unique cultural settings, historical developments, economic pressure, and doctrinal inconsistencies about who is entitled to what water. This understanding grounds a discussion of the complex modern water regulatory milieu with which water trading entities must contend.

### III INCORPORATING AN EQUITY LENS

The legal literature is underdeveloped in the sociopolitical intersection of water market policy. This Part aims to bridge this gap by providing fodder for more circumspect multistakeholder discourses, policy evaluations, and further scholarly inquiry. In recognizing the reality that water managers and policymakers often are, by nature and necessity, driven to increase their constituents' general welfare and address their concerns about disparate impacts on ecosystems and marginalized communities, this Part draws attention to four topics of concern regarding equity.

This Part explores (A) the disparate access to and price trends within current water markets; (B) costs and harms to rural water right-selling communities; (C) costs and harms to water right purchasers; and, finally, (D) questioning what intangible costs accrue by increasing water's trade velocity.

#### *A. Disparate Access to Water Markets*

As mentioned in Part I, water markets do not yet exemplify a perfectly competitive market where supply and demand, price, and quantity are in equilibria. Several disparities in access to and costs faced within the water markets contribute to that imperfect market.

First, the specter of monopolistic market incentives looms large as a market distortion with real equity impacts.<sup>81</sup> The economies of scale involved in water conveyance and data collection may favor increasingly large water right-holding entities—both public and

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<sup>81</sup> See ZELLMER & AMOS, *supra* note 40, at 463–64; JAEGER, *supra* note 9, at 18; UNITED NATIONS DEV. PROGRAMME (UNDP), HUMAN DEVELOPMENT REPORT 2006: BEYOND SCARCITY: POWER, POVERTY AND THE GLOBAL WATER CRISIS 17 (Kevin Watkins et al. eds., 2006) [hereinafter BEYOND SCARCITY] (contemplating the risk that one wealthy buyer could eventually control all relevant water rights: “The danger is that the Mulholland model will resurface in a new guise, with power, rather than a concern for poverty and human development, dictating outcomes.”).

private.<sup>82</sup> This raises the interesting specter of how antitrust, antimonopoly controls, perhaps modeled after antimonopoly laws, could be employed in water districts or state regulations to help ensure more equitable distributions within specific water markets.

Second, higher transaction costs result in larger average transaction sizes, hinting that smaller-scale sellers and buyers must abstain from market participation and lose out on potential net utility gains.

Third, further discussion is needed on the issue of who is entitled to participate in the water market based on an initial endowment of water rights. Federal and state water rights were often granted for free, resulting in considerable rent collection by the various right-holding entities—especially now that many water systems are fully allocated (i.e., state or federal bodies cannot create any additional water rights). Many groups and individuals did not have political or economic access to claim water rights at key historical moments. Those inequities continue to compound and effect resource allocation outcomes.<sup>83</sup> In this vein of initial market endowments, there must be more scholarship on the intersecting correlations between ethnicity, gender, purchasing power, land ownership, and current access to clean water. This scholarship could consider the effects to in-stream environmental uses, since different users may be more or less likely to leave water for in-stream benefits, to donate water rights to water trusts, or to engage in reverse auctions.

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<sup>82</sup> See U.S. GOV'T. ACCT. OFF., PRIVATE WATER UTILITIES: ACTIONS NEEDED TO ENHANCE OWNERSHIP DATA 9–10, 12–13 (2021); Jhih-Shyang Shih et al., *Economies of Scale in Community Water Systems*, J. AM. WATER WORKS ASS'N, 2006, abstract. *Contra* H. Youn Kim & Robert M. Clark, *Economies of Scale and Scope in Water Supply*, 18 REG'L SCI. URB. ECON. 479, 479 (1988) (“There are no significant economies of scale in the utility’s overall operation. . . . Furthermore, water utilities have no perceptible tendency to behave as a natural monopoly.”).

<sup>83</sup> R. H. Coase, *The Problem of Social Cost*, 3 J. L. & ECON. 1, 15–16 (1960) (“Once the costs of carrying out market transactions are taken into account it is clear that . . . [i]n these conditions the initial delimitation of legal rights does have an effect on the efficiency with which the economic system operates.”); Stephanie Jacques, *Award-Winning Undergraduate Paper: The Endowment Effect and the Coase Theorem*, 74 AM. J. AGRIC. ECON. 1316, 1316 (1992) (“Recent empirical tests done . . . tend to show that people usually value gains and losses in terms of changes from some reference point. . . . This phenomenon . . . is usually referred to as the endowment effect: the fact that people will usually ask for much more compensation for the loss of an object or the right of carrying on an activity than they would be willing to pay to acquire it.”).

### *B. Costs and Harms to Rural Water-Selling Communities*

Water markets disparately harm water rights sellers and their communities in nuanced ways. As a preliminary matter, urban and industrial water rights buyers tend to purchase either the most secure or the cheapest water rights, which are often agricultural.<sup>84</sup> While temporary lease deals and permanent water transfers result in immediate cash value flow into the selling community, several harms also accrue.

First are the direct and indirect costs to the water-selling community. Selling a water right previously used for agriculture directly reduces a region's agricultural income, taxes, and employment.<sup>85</sup> Additionally, the water-selling community faces secondary, indirect economic losses.<sup>86</sup> These direct and indirect costs have been analyzed in various water-selling areas.<sup>87</sup> Those studies indicate that the selling community eventually mitigates these costs by shifting resources and capital to other employment and economic activities.<sup>88</sup>

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<sup>84</sup> See BEYOND SCARCITY, *supra* note 81, at 33; WESTWATER RESEARCH, 2017 WATER MARKET OUTLOOK 5 fig.4 (2017) (illustrating that across the entire western United States, seventy-nine percent of 2015's water trade *supply* came from the agricultural sector); Howe & Goemans, *supra* note 7, at 1060 (surveying several Colorado water basin markets, "[n]early all" of the observed transfers were from agricultural to urban users).

<sup>85</sup> Howe & Goemans, *supra* note 7, at 1062–63.

<sup>86</sup> Indirect costs accrue to those whose economic affairs had involved the agricultural economic activity. An example of an indirect economic loss is a barbershop, whose clientele had been farmworkers, losing business.

<sup>87</sup> For example, in the South Platte region of northeastern Colorado, community-wide direct and indirect costs amounted to twenty-two dollars per acre foot sold. Community-wide employment losses were approximately 1.8 jobs per thousand acre foot sold. Finally, about nine dollars per transferred acre foot was lost from local tax revenue. However, the regional losses on a per capita basis were nearly negligible. Howe & Goemans, *supra* note 7, at 1062.

<sup>88</sup> Interestingly, it seems that this adaptational shift is slower from agricultural areas, which one scholar explains may be due to the ingrained cultural aspect of the profession, farmers' average older age, and more economically isolated locations. See *generally id.* Additionally,

more severe economic and social impacts are likely in specialized, marginal agricultural regions like the Arkansas: the direct and indirect losses . . . are likely to be significantly higher than those in a prosperous basin, while the losses on a per capita basis are much greater and are likely to persist over a longer time span.

*Id.* at 1064. In this way, different rural communities have differing resources and therefore differing capacities to adapt after selling water rights. *Id.* at 1062–63.

A second harm to the selling community reveals itself by defining the selling community more broadly than its human inhabitants. Scholars have noted various environmental effects of “fallowing” (stopping the irrigation of) agricultural land, including an increase in invasive plants, soil erosion, and reduced nature-based touristic appeal.<sup>89</sup>

Third, although an efficient and competitive market should ensure that the net gains outweigh the net costs for the entire region,<sup>90</sup> poorer and rural populations should warrant special protection and analytical scrutiny. The United Nation’s Development Program forcefully warned that

[w]ater rights are critical for human security in agricultural areas. The . . . erosion of entitlements to water can undermine livelihoods, increase vulnerability and intensify poverty . . . . [W]ater rights matter to the poor for an obvious reason: poor people lack the financial resources and political voice to protect their interests outside a rules-based system. Water rights count for little if, in implementation, they skew advantages to those with power.<sup>91</sup>

In light of such concerns, it is important to study creative policies that attempt to address this equity concern.<sup>92</sup>

### *C. Costs and Harms to Water Purchasers*

Just as water sellers face various incidental effects and costs, so do the water right buyers and other water consumers.<sup>93</sup> Drinking water is

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<sup>89</sup> This phenomenon, coined into the term “buy and dry,” “refers to the situation where the buyer essentially abandons the land after the water rights are transferred without restoring the land to a stable and productive state.” Mark Squillace, *Water Transfers for a Changing Climate*, 53 NAT. RES. J. 55, 62 & n.30 (2013).

<sup>90</sup> And this is borne out by some evidence. For example, in Colorado, municipalities purchased water rights at prices that “substantially exceeded” the direct and indirect economic losses incurred by the resulting irrigation acreage reduction. Howe & Goemans, *supra* note 7, at 1055.

<sup>91</sup> BEYOND SCARCITY, *supra* note 81, at 17 (ultimately concluding that water markets offer a “questionable” solution to water allocation issues presented by increasing water pressures and conflicts).

<sup>92</sup> See, e.g., Howe & Goemans, *supra* note 7, at 1064 (noting that Utah, Wyoming, and Idaho currently consider the secondary economic effects to the basin of origin when considering a water right transfer). Additionally, water transfer granting entities could condition transfers from basins where there are likely to be significant costs upon supplemental market assistance, requiring an additional transfer fee paid by the buyer that will support basin-of-origin social services, and/or execute the water transfer over the course of several years so as to disperse negative effects and provide more time for the selling community’s economic adaptation. *Id.*

<sup>93</sup> ZELLMER & AMOS, *supra* note 40, at 457 (explaining that water consumers and water right holders are not always the same). As mentioned at the beginning of this

essential to human life; this demand is highly inelastic and inflexible, so demand will remain relatively constant despite how high the price might climb.<sup>94</sup> The resulting concern is that profit-maximizing water suppliers—often monopolies—might exploit such inelastic demand with higher costs. However, water providers are generally required, by statute, to sell water for no greater a price than is required to pay for conveyance and water treatment costs,<sup>95</sup> and private water providers are subject to rate-setting oversight by public utility commission entities. That being said, no check always works perfectly, and some studies indicate that customers of private water providers do face higher prices.<sup>96</sup> Creative tools exist to counteract these phenomena, including tiered water pricing<sup>97</sup> and income-based ratepayer assistance programs.<sup>98</sup>

#### *D. Adding Value While Losing the Invaluable?*

Water markets implicate a more nebulous yet no less important societal concern stemming from the essential nature of water.

Different cultures and state constitutions conceptualize water as a publicly held common good, and trading a “common” good leads to

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Comment, although the federal government gave states semisovereign control over their water management, and states generally grant water rights upon a simple filing fee and no water purchase price, the entities who hold those state-given water rights can then sell the right only to consume the water commodity while retaining the water right. *Id.*

<sup>94</sup> See, e.g., David Zetland, *The Role of Prices in Managing Water Scarcity*, 12 WATER SEC., 1, 4 (2021).

<sup>95</sup> However, in practice, both private and public water organizations—including for-profit entities and the U.S. Bureau of Reclamation—charge for the operating and maintenance plus some portion of the project’s total cost. See THOMPSON ET AL., *supra* note 5, at 843–44; American Water Works 2021, *supra* note 20.

<sup>96</sup> See X. Zhang et al., *Water Pricing and Affordability in the US: Public vs. Private Ownership*, 24 WATER POL. 500, 502 (2022).

<sup>97</sup> For example, the current rate scheme for Southern California districts is that the first 8,500 gallons are charged at roughly fifty cents per 100 gallons, while purchases beyond 30,000 gallons are charged at eighty-five cents per 100 gallons—nearly double. *Schedule No. SOU-1: Southern Division Tariff Area General Metered Services*, CALIFORNIA-AMERICAN WATER CO. (effective Mar. 4, 2022), [https://authoring-dotems-prod.awapps.com/caaw/resources/PDF/Custom-Service-Billing/Rates-AL/Southern-Division/Southern%20Rate%20Schedule.pdf?language\\_id=1](https://authoring-dotems-prod.awapps.com/caaw/resources/PDF/Custom-Service-Billing/Rates-AL/Southern-Division/Southern%20Rate%20Schedule.pdf?language_id=1) [https://perma.cc/CT4K-N34K]. Ultimately, such tiers should lessen the cost burden for lower-income households, while incentivizing water conservation for water-wasteful households.

<sup>98</sup> The California Public Utility Commission so zealously used its rate payer assistance program that it ordered American Water Works, Inc., to adjust its ratepayer structure. Three years later, the ensuing litigation is currently pending California Supreme Court review. AM. WATER WORKS INC., QUARTERLY REPORT (FORM 10-Q) 13 (Mar. 25, 2022).

significant consequences. Some scholars posit that “[m]arkets [c]rowd [o]ut [m]orals,” since cost-based decisions diminish the need for other forms of social norms.<sup>99</sup> After all, when a community decides to create a particular market, it has picked one resource allocation institution at the expense of other nonmarket decision-making institutions.<sup>100</sup> Trading previously untraded water rights (and, therefore, assigning a market price to a previously unpriced resource) normalizes the conception of water as a tradeable commodity.

Those effects—reducing other water-based social norms and thinking of it as a tradable commodity—ought to be critically examined. Some balk at the idea of potential speculation and profiteering off a good essential to human life.<sup>101</sup> In other words, questions remain about whether a market *should* allocate water. To what degree can markets use complete information and adequately incorporate the “value” of complex ecosystem-wide impacts of diversion dependent on water quantity, time of year, and diversion point? Do communities lose more in terms of connection to and respect for place-based water than what is “gained” when economic utility is maximized? These questions and more remain.

Accompanying those broader philosophical questions, the possibility of undervaluing water poses yet another issue. Undervaluation is a bad outcome both from an economic perspective (since such undervaluation is a market failure and creates an ultimate “deadweight loss”<sup>102</sup> to the entire economy) and from a moral perspective (since such undervaluation is exploitative). Additionally, some theorize that “we corrupt a good . . . whenever we treat it according to a lower norm than is appropriate.”<sup>103</sup> This will present an ongoing concern for any water market.

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<sup>99</sup> MICHAEL SANDEL, WHAT MONEY CAN’T BUY: THE MORAL LIMITS OF MARKETS 93–97 (2012).

<sup>100</sup> For example, ten moral codes are integral to the acequias system of the American Southwest, which acts in a regulatory capacity upon the actors, their decision-making process, and their ultimate actions. *See infra* notes 27 and 30 and accompanying text.

<sup>101</sup> As one illustration, the creation of the first water futures trading index on a stock exchange in 2021 quickly triggered proposed federal legislation to ban water futures trading. Future of Water Act of 2022, H.R. 7182, 117th Cong. (2d Sess. 2022).

<sup>102</sup> Which may be defined as the “inefficiency,” or net cost to the larger economy. Gary S. Becker & Casey B. Mulligan, *Deadweight Costs and the Size of Government*, 46 J.L. & ECON. 293, 299–300 (2003). In other words, deadweight loss is the decrease of a tax or cost on the aggregate welfare. Theodore P. Seto, *Modeling the Welfare Effects of Advertising: Preference-Shifting Deadweight Loss*, 75 TAX L. REV. 55, 56 (2021).

<sup>103</sup> SANDEL, *supra* note 99, at 46.

#### IV CASE STUDIES

Dynamic socioeconomic needs and hydrological conditions require efficient and equitable water allocation mechanisms to adapt to future needs. Since so many water systems are fully allocated, and the era of bold governmental supply-augmenting projects is in its twilight, one could reason that future needs must be met by reallocating existing rights through water markets.<sup>104</sup> But not all markets function equally well.<sup>105</sup> In America, “many . . . successful” water market systems are found in two types of legal constructions: special purpose water districts<sup>106</sup> and mutual ditch<sup>107</sup> companies.<sup>108</sup> This Part further narrows the lens to examine two specific water markets: the Central Valley Project’s Kern County groundwater bank and the Murray-Darling Basin (MDB) in Australia. The Sections briefly distill each market’s physical identity, policy features, and potential success indicators. It is from these analyses that Part V synthesizes the crucial policy characteristics for further review by policymakers and other water stakeholders looking to either modify or create a water trading entity.

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<sup>104</sup> TARLOCK & ROBISON, *supra* note 32, § 5:1. Economists not only point to the necessity but also the potential benefits of water markets. *See infra* Section I.

<sup>105</sup> JAEGER, *supra* note 9, at 42.

<sup>106</sup> As a descriptive nondescriptor: “It is difficult to simplify descriptions of [Special Purpose Water] districts, other than to say that they are quasi-governmental agencies organized in accordance with detailed legislation adopted in the various states.” Squillace, *supra* note 89, at 65; *see also* JOHN LESHY, SPECIAL WATER DISTRICTS—THE HISTORICAL BACKGROUND 23 (James Corbridge ed. 1983) (explaining that “[t]hey are, in fact, rather like snowflakes, each with its own unique form. Many of these typically lengthy statutes apply to only one or a handful of districts, and only a few lawyers and district managers may be familiar with their provisions.”).

<sup>107</sup> Mutual ditch companies are “usually in the form of a non-profit corporation organized for the exclusive benefit of the users in a particular area who became its stockholders” with the goal of “provid[ing] a vehicle for organizing the distribution of water so that the individual water users were relieved of the burden of managing the ditch.” *See* JOHN H. DAVIDSON, WATERS AND WATER RIGHTS § 26.02 (Robert E. Beck ed., 1991).

<sup>108</sup> Squillace, *supra* note 89, at 64–65.

*A. Kern County, California:  
Groundwater and Surface Water Integrated Water Banking*

California is America's most active water market state, when measuring either total volume or total value of water traded.<sup>109</sup> With vast aquifer systems, the state has developed some of the world's most sophisticated underground water storage capabilities.<sup>110</sup> This subsection examines one example of a prior appropriation-based water transfer system integrated with groundwater rights, all while cognizant of ecological, social, and economic interests.

*1. Physical Features*

Kern County is in the southern San Joaquin Valley, north of San Francisco, California. Kern County's complex, 20,000 acre-wide system of aquifers, extraction wells, and wetlands stores water for local users and regional uses from San Francisco to Southern California.<sup>111</sup> Such regional destinations are possible due to the state's large water transportation infrastructure, including the California Aqueduct.<sup>112</sup>

*2. Key Policy Features*

As important pretext, the California State Legislature made the unusual decision that water storage could be beneficial/legal in its prior appropriation legal system,<sup>113</sup> sowing the seeds for water storage to provide one solution to disparate temporal water supply and demand.

The Kern Water Bank (KWB) began forming in 1988 as a public and then primarily private venture,<sup>114</sup> but today is operated by the Kern Water Bank Authority, which is considered a public agency that,

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<sup>109</sup> Specifically, in 2015 California accounted for \$560 million out of \$800 million in traded value (roughly seventy percent) within the western states, as well as 793,000 acre-feet out of a nationwide 1.8 million acre-feet volume (roughly forty-four percent). WESTWATER RESEARCH, *supra* note 84, 4 fig.3 (2017).

<sup>110</sup> AYRES ET AL., *supra* note 7.

<sup>111</sup> *Id.*; Michael Kiparsky et al., *Groundwater Recharge for a Regional Water Bank: Kern Water Bank, Kern County, California*, CASE STUD. ENV'T, 1, 1 (2021).

<sup>112</sup> CAL. DEP'T WATER RES., THE 1991 DROUGHT WATER BANK 6 (Lloyd S. Dixon et al. eds., 1993).

<sup>113</sup> This is not the norm for other American states but has been true in California since its 1991 drought water bank. *See* discussion *infra* Section II.C.

<sup>114</sup> Cent. Delta Water Agency v. Dep't of Water Res., 69 Cal. App. 5th 170, 183 Cal. Rptr. 3d 212 (2021), as modified on denial of reh'g (Oct. 21, 2021).



in substance, is a fascinating public-private joint venture.<sup>115</sup> The KWB functions as a true bank: its twenty-nine long-term contractors may store, withdraw, and even trade water rights among themselves to ultimately serve agricultural, municipal, and industrial purposes.<sup>116</sup> The guidelines and regulations for those water transfers are self-promulgated and “clear” for water users.<sup>117</sup> But, there are additional oversight mechanisms. The Kern Bank Monitoring Committee oversees water banking to prevent adverse management consequences;<sup>118</sup> additionally, local landowners have voting shares to regulate the KWB.<sup>119</sup> Next, the Bank and the California Department of Water Resources, which was the original sole owner of the project, jointly operate several aspects of data collection and management.<sup>120</sup> As yet another protective measure, the KWB has two recovery operations plans to minimize adverse effects on surrounding communities and landowners.<sup>121</sup>

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<sup>115</sup> The Kern Water Bank Authority is a joint powers authority—a specific type of organization entity allowed by California law. Six public and private entities are member partners who jointly own and sit on the KWB board. The financial backing has also been mixed, since twenty-million dollars in private loans and a five-million-dollar Proposition 204 loan furnished the seed funding. Additional funding was acquired through a \$3.4 million Proposition 13 grant to KWB member agencies. Regarding its core structure, it is also noteworthy that the Kern Water Bank Authority does not accrue profits itself, but passes operational costs, as well as any potential surplus, to its members. Michael Kiparsky et al., *supra* note 111, at 3, 7–8.

<sup>116</sup> *See id.* at 1, 6. In fact, the Bank is one of “very few examples of [managed aquifer recharge] that functions institutionally as a groundwater version of a financial bank. Most other examples of [managed aquifer recharge] that are dubbed ‘groundwater banking’ operate as piggy banks, in which a single entity stores water for later use.” *Id.* at 9.

<sup>117</sup> The Bank operates per the founding partner’s Memorandum of Understanding Regarding Operation and Monitoring of the Kern Water Bank Groundwater Banking Program. *Id.* at 8.

<sup>118</sup> *See id.*

<sup>119</sup> *Id.* at 7.

<sup>120</sup> *Id.* at 6. (“[The Department of Water Resources] and [the Kern County Water Authority] each track the amount of water diverted . . . and regularly reconcile these numbers . . .”).

<sup>121</sup> The Long Term Project Recovery Operations Plan outlines a “responsibility to monitor and report groundwater conditions, create a groundwater model to evaluate the impacts of project operations, and mitigate any negative impacts when necessary.” *Id.* at 8. Additionally, the “Joint Project Recovery Operations Plan Regarding Pioneer Project, Rosedale-Rio Bravo Water Storage District, and Kern Water Bank Authority Projects” is an agreement between several interested parties. *Id.*

### *3. Ecologic, Hydrologic, Economic, or Social Impacts and Success Indicators*

Sustainability of both environmental footprint and operational longevity are important considerations for any organization. Abiding by and developing a set of clear rules, the Bank has functioned for over twenty years. On the ecological side, the Bank's large surface and groundwater reserves provide habitat for and are sensitive to the interests of several endangered species.<sup>122</sup> Additionally, the Bank (1) created a Natural Community Conservation Plan under California's Natural Community Conservation Plan Act to further support endangered species and (2) operates a conservation mitigation bank.<sup>123</sup>

Scholarship about quantified economic or social effects are somewhat scarce. Some observers note that the Bank "provid[es] its members a highly valued reserve of stored water for times of shortage and add[s] significant regional flexibility in water management," which would seem to bolster a utility-maximizing outlook.<sup>124</sup> However, others point out the "essential" "power dynamics" at play between the handful of controlling water constituent entities—notably including one billionaire family that owns a combined majority share of the KWB—and the "disempowered communities" around the KWB.<sup>125</sup> Further, twenty years of lawsuits concerning the environmental review performed during the initial transfer of the KWB from public to private hands eventually held that the California Department of Water Resources' environmental impact report was deficient and necessitated new environmental review.<sup>126</sup> Thus, the evidence of the KWB's overall equitable impact is, at best, complicated.

#### *B. The Darling of Australia: Murray-Darling Basin Water Management*

Australia "has emerged as a particularly innovative force in water marketing, devising a number of hybrid water markets that

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<sup>122</sup> *Id.* at 1.

<sup>123</sup> *Id.* at 4.

<sup>124</sup> *Id.* at 9.

<sup>125</sup> Chloe Sorvino, *Amid Drought, Billionaires Control a Critical California Water Bank*, FORBES (Sep. 20, 2021), <https://www.forbes.com/sites/chloesorvino/2021/09/20/amid-drought-billionaires-control-a-critical-california-water-bank/?sh=1fbb2dbd2e7a>.

<sup>126</sup> *Central Delta Water Agency v. Dep't of Water Res.*, 284 Cal. Rptr. 3d 212, 223 (2021), as modified on denial of reh'g (Oct. 21, 2021).

combine. . . [market] mechanisms.”<sup>127</sup> It bears remarking that Australia’s climate is similarly arid as the American Southwest and that Australian water law also descended from British common law riparianism. Akin to the history of the United States’ prior appropriation and regulated riparianism legal doctrines, Australia innovated “statutory entitlements” to water in the late 1800s so that the government could grant nontransferable, property-right-like title (separate from land title) to water.<sup>128</sup> Statutory entitlements evolved into rights granted by state governments, subject to federal oversight.<sup>129</sup> Given that context, this Section dives further into the physical, legal, and other characteristics of the Murray-Darling Basin Initiative, which is lauded as “[p]erhaps one of the most widely cited models of good practice in integrated water resources management.”<sup>130</sup>

### *1. Physical Features*

The Murray-Darling Basin is Australia’s largest river system, spanning twenty rivers, fourteen percent of Australia’s landmass, and several groundwater systems across five Australian states.<sup>131</sup> More than 2.3 million Australians and more than forty First Nations inhabit the Basin.<sup>132</sup> In the 1900s, the Basin became Australia’s most important agricultural area, producing rice, cotton, wheat, and cattle.<sup>133</sup> A severe drought from 1895 to 1902 heralded a major

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<sup>127</sup> Hadjigeorgalis, *supra* note 7, at 52.

<sup>128</sup> Lindsey Alford, *The Law, the Rules and Mechanisms to Consider When Dealing in the Property Right of Water: Comparing the Regulation of an Emerging Water Market in Queensland with New South Wales, Victoria and South Australia*, 2007 APLJ LEXIS 5, at 3–4.

<sup>129</sup> In 2004, all Australian states and territories, as well as the Australian Government, agreed to the National Water Initiative. A National Water Commission aims to “drive water reform and future-proof” Australian water management. *National Water Policy*, AUSTRALIAN GOVERNMENT, <https://www.dceew.gov.au/water/policy/policy> [<https://perma.cc/JC3T-B9WE>].

<sup>130</sup> BEYOND SCARCITY, *supra* note 81, at 154.

<sup>131</sup> See, e.g., *id.*; *Basin Plan*, MURRAY-DARLING BASIN AUTH. (Oct. 31, 2023), <https://www.mdba.gov.au/water-management/basin-plan> [<https://perma.cc/E9V6-LERE>].

<sup>132</sup> *Basin Plan*, *supra* note 131.

<sup>133</sup> Today the Basin comprises two-thirds of Australia’s irrigated lands and produces twenty-two billion dollars in agricultural revenues, which is roughly forty percent of the entire country’s agricultural revenue. *Id.*; BEYOND SCARCITY, *supra* note 81, at 140.

interstate water management agreement.<sup>134</sup> Nevertheless, by the 1970s, long-term water overconsumption had increased the remaining water's salt content, resulting in wildlife loss and ecosystem damage.<sup>135</sup>

## 2. Key Policy Features

Responding to deteriorating ecological conditions, the Water Act of 2007 created legal authority and detailed guidance for managing the Basin.<sup>136</sup> The Murray-Darling Basin Authority (MDBA) manages the Murray-Darling Basin with other state and federal entities.<sup>137</sup> The MDBA formulates and compares the system's water availability with the quantity required to maintain the system's ecological integrity to arrive at an annual cap on allocated water.<sup>138</sup> Within the allocated cap, the MDBA sets each partner state's annual water extraction rates; the states are then responsible for subdividing their allotment among water rights holders and developing local water management plans<sup>139</sup> that comply with the Murray-Darling Basin Plan.<sup>140</sup> Additionally, the MDBA maintains a legislatively prescribed relationship with four other Murray-Darling Basin Committees and Councils, each of which has specific purposes, roles, and membership.<sup>141</sup> Furthermore, the

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<sup>134</sup> *Basin Plan Timeline and History*, MURRAY-DARLING BASIN AUTH. (Nov. 17, 2023), <https://www.mdba.gov.au/water-management/basin-plan/basin-plan-history-and-timeline> [<https://perma.cc/M85J-RFB3>].

<sup>135</sup> *Id.*

<sup>136</sup> *Water Act 2007* (Act No. 137/2007) (Austl.).

<sup>137</sup> *Water Management*, MURRAY-DARLING BASIN AUTH. (June 27, 2023), <https://www.mdba.gov.au/water-management> [<https://perma.cc/K3LJ-TNRT>].

<sup>138</sup> BEYOND SCARCITY, *supra* note 81, at 154.

<sup>139</sup> Which are, in turn, subject to federal Australian government approval. *Governance of Water Management in the Murray-Darling Basin*, MURRAY-DARLING BASIN AUTH. (June 23, 2023), <https://www.mdba.gov.au/about-us/governance-and-committees/governance-water-management-murray-darling-basin> [<https://perma.cc/GLC8-5FRS>].

<sup>140</sup> *See, e.g., id.*

<sup>141</sup> For example, there is a Basin Community Committee, whose members are "selected based on their expertise or interest in water use, water management, Indigenous and local government matters." *Basin Community Committee*, MURRAY-DARLING BASIN AUTH. (July 28, 2023), <https://www.mdba.gov.au/about-us/governance-and-committees/basin-community-committee> [<https://perma.cc/3ULZ-W4Y6>]. As another example, there is an Advisory Committee on Social, Economic and Environmental Sciences (ACSEES) that works "to ensure the Basin Plan is confidently implemented with the support of robust science and knowledge." *Advisory Committee on Social, Economic and Environmental Sciences*, MURRAY-DARLING BASIN AUTH. (Nov. 21, 2023), <https://www.mdba.gov.au/about-us/governance-and-committees/advisory-committee-social-economic-and-environmental-sciences> [<https://perma.cc/76KZ-W73F>]. A concise infographic of the various decision-makers' powers and interacting relationships may be found at *Basin*

MDBA solicits and generates high public participation.<sup>142</sup> A fascinating constellation of cooperative agreements among various sovereign, semisovereign, basin-specific, and community entities therefore govern the MDB.

The MDB's water market is noteworthy for several legal features. The individual states set policies governing water transfers<sup>143</sup> and can subdivide their watercourse section into various trading zones.<sup>144</sup> Further, for the past twenty years, users have traded water rights between three states.<sup>145</sup> The overarching Basin Plan, per the Water Act of 2007, aims to “reduce restrictions on trade, improve transparency and access to information, [and] improve market confidence through a more effective water market.”<sup>146</sup> Within that overarching plan, water users can permanently sell or temporarily lease their water rights.<sup>147</sup> But, as a key difference from the United States' prior appropriation doctrine, the water holder need not use the entire allotment to avoid forfeiture. Instead, their water right may even “carryover” into the next year.<sup>148</sup> Market participation is nevertheless high: roughly two-billion dollars in value transfers hands every year.<sup>149</sup> Additionally, the MDBA espouses a “cornerstone” basin management methodology of “adaptive management.”<sup>150</sup> And,

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*Officials Committee*, MURRAY-DARLING BASIN AUTH. (Nov. 27, 2023), <https://www.mdba.gov.au/about-us/governance-and-committees/basin-officials-committee> [<https://perma.cc/Z93T-7FJS>].

<sup>142</sup> BEYOND SCARCITY, *supra* note 81, at 154–55.

<sup>143</sup> *Basin State Water Trading Rules*, MURRAY-DARLING BASIN AUTH. (July 19, 2023), <https://www.mdba.gov.au/water-use/water-markets/water-trade/basin-state-water-trading-rules> [<https://perma.cc/N9GH-G6D9>].

<sup>144</sup> *See, e.g., Interstate Water Trade*, MURRAY-DARLING BASIN AUTHORITY, <https://www.mdba.gov.au/water-use/water-markets/interstate-water-trade> [<https://perma.cc/WZ4G-TTYW>].

<sup>145</sup> *Id.*

<sup>146</sup> *Water Trading Rules of the Basin Plan*, MURRAY-DARLING BASIN AUTH. (June 27, 2023), <https://www.mdba.gov.au/water-use/water-markets/water-trade/water-trading-rules-basin-plan> [<https://perma.cc/J4JD-EVEP>].

<sup>147</sup> *Water Markets*, MURRAY-DARLING BASIN AUTH. (June 16, 2023), <https://www.mdba.gov.au/water-use/water-markets> [<https://perma.cc/S2H2-78D6>].

<sup>148</sup> *How Allocations Work*, MURRAY-DARLING BASIN AUTH. (Sept. 11, 2023), <https://www.mdba.gov.au/water-use/allocations/how-allocations-work> [<https://perma.cc/9ZHW-DYL6>].

<sup>149</sup> *Water Markets*, *supra* note 147.

<sup>150</sup> *Key Elements of the Basin Plan*, MURRAY-DARLING BASIN AUTH. (June 27, 2023), <https://www.mdba.gov.au/water-management/basin-plan/key-elements-basin-plan> [<https://perma.cc/46NW-3FVE>] (adaptive management entails “trailing techniques, monitoring,

finally, the Australian Competition and Consumer Commission monitors and enforces competition, market rules, and even some water prices.<sup>151</sup>

### *3. Ecologic, Hydrologic, Economic, or Social Impacts and Success Indicators*

The Murray-Darling Basin's water market is laudably flexible and efficient, yet still struggles to address equity concerns. The annual cap on water quantity to use or trade, subservient to overarching ecological protections, increases adaptability across the MDB market to minimize ecological harm. Annual evaluations appear to balance adequate time to gather relevant information with creating certainty for economic interests. Additionally, dedicating more resources to researching water conditions increases market information, thereby improving the accuracy of water pricing. While a governance structure that leverages public input and multistakeholder adaptive management appears to maximize water users' understanding of, trust in, and utilization of the market apparatus, severe drought continues to strain the very limits of the system.

The MDBA has dedicated political and financial capital to address equity concerns. For example, pilot studies have allocated "Cultural Diversions" to First Nations tribes—helping reallocate the water endowments and recognizing additional water uses that may constitute legally recognized permits.<sup>152</sup> However, despite those efforts, Aboriginal peoples in Australia continue to have disparately low quantities of water rights.<sup>153</sup>

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and making changes as needed. Water managers must be flexible and dynamic to achieve the best possible outcomes. This is the modern way of managing natural resources.”)

<sup>151</sup> *Water Trade*, MURRAY-DARLING BASIN AUTH. (Sept. 13, 2023), <https://www.mdba.gov.au/water-use/water-markets/water-trade> [<https://perma.cc/2CLH-ZSGZ>].

<sup>152</sup> *Water for First Nations*, MURRAY-DARLING BASIN AUTH. (Aug. 7, 2023), <https://www.mdba.gov.au/water-use/water-first-nations> [<https://perma.cc/BH85-QGMT>].

<sup>153</sup> Lana D. Hartwig et al., *Recognition of Barkandji Water Rights in Australian Settler-Colonial Water Regimes*, RES. 7, 2 (2018) (noting that “as of 2012, Aboriginal peoples held less than 0.01 per cent of Australia’s water diversions and . . . recent government efforts to improve Aboriginal water access have had negligible effect on increasing Aboriginal-held water allocations”).

V

SUGGESTED EFFICIENCY AND EQUITY MAXIMIZING MARKET  
STRUCTURE FEATURES

The above interdisciplinary analysis indicates four key characteristics that policymakers can continue to employ to fashion community-benefitting water markets. However, the following suggested best practices come with a caveat. Although this Part's recommendations are more focused on water markets' legal underpinnings, broader and more transformative water justice notions should inform water allocation goals.<sup>154</sup> Further, equity concerns are unique between and even within each locality. Additionally, equity concerns and community values are dynamic and will shift over time. With that caveat in mind, four areas emerge from the case studies as notable best practices for efficient and equitable water markets.

*A. Rethinking Initial Market Endowments*

The initial endowment of rights ends up creating significant real-world impacts. Although neither case study above has significantly transformed the realities of marginalization and opportunity hampering, scholars agree that part of their success so far has been due to endowing water stakeholders with *participatory* rights. In other words, both markets have invested in building relationships between right holders and the market itself. Thus, both markets harness their users' knowledge and capacity by disseminating information and involving stakeholders in policy decisions.

*B. Responsible, Forward-Looking Instream Protection*

Water agencies and other relevant entities should evaluate, designate, and protect reasonable minimum instream flows. The

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<sup>154</sup> For example, the Oregon Water Futures Coordination Team gathered input from more than 200 Oregonians to articulate six "water justice priorities" guided, in turn, by six "water justice principles" "that all water policy should embody": (1) "Driven by Community Priorities, Expertise & Needs of the Most Impacted"; (2) "Protects the Environment, Improves Health, and Creates Economic Inclusion"; (3) "Puts Money and Power into the Hands of the Frontline Communities"; (4) "Does Not Recreate Broken Systems"; (5) "Builds Social Infrastructure, Not Just Construction"; and (6) "Invests in Projects That Match a Vision of the Future: Multi-Generational, Multi-Benefit, and Just." LYNNY BROWN ET AL., THE OR. WATER FUTURES COORDINATION TEAM, OREGON WATER JUSTICE FRAMEWORK: COMMUNITY-DRIVEN PRINCIPLES AND PRIORITIES TO ADVANCE WATER JUSTICE, 6–7 (2022).

economic survey of various externality-inducing factors in Part I warns that water's environmental, recreational, and cultural uses are likely undervalued. As such, legislatures should direct, and agencies should regulate, that water-right-giving entities must protect a reasonable amount of instream water.<sup>155</sup> That reasonable instream quantity should be legally required to abide by any state or interstate water quality or drought mitigation frameworks, consider a broadly articulated public interest, and cautiously err towards instream conservation. After all, as the MDBA shows, a water market cannot be successful if it is hydrologically unsustainable.

### *C. Increasing Trade Ease*

The water quantity a governing entity deems tradeable should be, well, tradeable. Both the Australian and Californian markets feature quite well-defined and alienable water rights. State water agencies could increase market-legible information by always clearly specifying the quantity of water diverted and the quantity of water consumed in water permits. Additionally, high transaction costs—such as time-consuming and lengthy right transfer application processes and water right transfer fees—restrict water alienability and disfavor smaller buyers or sellers. However, those more alienable water rights still could exist within limited market jurisdictions, such as intra-watershed trading, or the “trading zones” that MBD states can demarcate.

### *D. Multilayered Market Oversight Mechanisms*

Finally, the case studies illustrate some of the creative pricing regulations that have substantial equity impacts. In fact, both systems incorporate equity-minded assistance and oversight to shield the more vulnerable from harsh results. The MDB employs a tiered water pricing assistance scheme for its users and leverages an Australian Competition and Consumer Commission. Additionally, the Basin has recently begun to manage water resources not only after calculating minimum ecological needs but also after calculating critical human

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<sup>155</sup> Already, California, Montana, Texas, Nevada, and, to an extent, Utah have deployed a legal mechanism allowing private entities to apply for new or transferred instream water flows for environmental use. This can be a useful response tool if the state over allocates the tradeable water rights in a system. LEON F. SZEPTYCKI ET AL., ENVIRONMENTAL WATER RIGHTS TRANSFERS: A REVIEW OF STATE LAWS 13 (2015).



water needs.<sup>156</sup> Such equity-minded features should address a particular watershed's social and economic inequities to be maximally impactful.

#### CONCLUSION

Although the United States' total water consumption has decreased since its 1980s peak, urban growth coupled with changing hydrological patterns place new pressures on water systems. Some contend that water markets could be a viable response to increasingly contentious water issues. Parts I, II, and III, however, summarized several obstacles to a perfectly competitive, utility-maximizing water market—ranging from economic concerns (e.g., the lack of full information and the various market externalities not reflected in private costs) to the legal mechanisms (e.g., trading limitations that result in high transaction costs). Given those obstacles and the two case studies, Part V synthesized four general policy tools to help structure efficient and equity-minded markets: considering initial endowment inequities, permitting only a reasonable water quantity to be tradeable, increasing alienability, and proactively regulating potential harms resulting from a competitive water market.

Yet this Comment is a small drop in the bucket. Academics and stakeholders alike must continue to rigorously analyze the complex and dynamic social, environmental, and economic consequences of the newest trends in water market implementation. Water deserves no less than such a thoughtful allocation framework.

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<sup>156</sup> *Water Critical for Human Needs*, MURRAY-DARLING BASIN AUTH. (July 17, 2023), <https://www.mdba.gov.au/water-use/allocations/water-critical-human-needs> [<https://perma.cc/6E34-ZTTH>].

