Banking on Colorado Water

Emily Smithman*

INTRODUCTION

"Michael Burry is focusing all of his trading on one commodity: water"[1]

This article proposes amending the 2015 Colorado Water Plan[2] ("CWP") to make it amenable to water trading and investing. This article further contends that Colorado in a unique position to lead a national change in regulatory laws because of its history of water regulation and relatively developed water laws.[3] The CWP was enacted in response to a 2013 state executive order requiring the Colorado Water Conservation Board

* J.D. Candidate 2018, The George Washington University Law School; American University, B.A. International Studies, *cum laude*, 2013. I am grateful to my Journal Adjunct and Notes Editor, Alexandra Campbell-Ferrari, Esq. and Taylor Amato, Esq., for their input and guidance. Thank you to my parents and brother, Doug, Michelle, and Brian, for their constant support and encouragement in everything I do.

[1] The Big Short (2015).

[2] COLORADO'S WATER PLAN, 2015.

[3] *Id*.; *see also* Synopsis of Colorado Water Law, Colorado Division of Water Resources, Department of Natural Resources (2016).

("CWCB") to create a statewide water plan.[4] Although the CWP has successfully integrated Colorado's water goals, this article proposes adding a provision to the state constitution that would establish and govern a water market. The proposed provision, which is inspired by water exchanges and markets in other jurisdictions, will add value to the Plan and help close the water gap in Colorado. Water is increasingly considered a commodity, and the United States has one of the highest levels of consumption of water in the world.[5] Amending regulatory laws and creating a water market would place the United States in a position to be a leader in the global water market. To this end, this article will: argue that water is a commodity; analyze the merits of a water market; discuss the need to regulation; and, lastly, propose a provision establishing and governing a water market in Colorado.

Water laws in the United States have a rich past that has followed the path of population growth and industrialization in the country.[6] Water is used for agricultural, industrial, and personal purposes. Like the rest of American law, modern water laws have their basis in doctrines imported from European doctrines with roots in Roman law.[7] More specifically, American water law developed from English common law.[8] Today, there is a slightly different approach to water: seeing it as a tradable commodity.[9]

Many countries have created water markets that revolve around exchanges.[10] In Australia, for example, exchanges such as H2OX[11] and the National Water Exchange[12] have been formed in response to scarce water resources. Other countries like India and

[4] *See generally* COLORADO EXEC. ORDER NO. D 2013-005 (2013).
[5] Mark Fischetti, *How Much Water Do Nations Consume*, SCIENTIFIC AMERICAN (May 21, 2012), https://www.scientificamerican.com/article/graphic-science-how-much-water-nations-consume/.
[6] *See* Daina Dravnieks Apple, *Evolution of U.S. Water Policy: Toward a Unified Federal Policy*, U.S. FOREST SERVICE, https://www.fs.fed.us/research/publications/wo/wo_2001_apple_d001.pdf.
[7] *See generally* Wells A. Hutchins & Harry A. Steele, *Basic Water Rights Doctrines and Their Implications for River Basin Development*, 22 LAW AND CONTEMPORARY PROBLEMS 276-300 (1957), http://scholarship.law.duke.edu/cgi/viewcontent.cgi?article=2717&context=lcp.
[8] *See generally supra* note 7.
[9] Brad Plumer, *Mapping the global water trade*, THE WASHINGTON POST (Nov. 17, 2016), https://www.washingtonpost.com/blogs/ezra-klein/post/mapping-the-global-water-trade/2012/05/22/gIQAnRGmiU_blog.html?utm_term=.520544c092a6.
[10] *Id*.
[11] H20X, http://h2ox.com (last visited Nov. 5, 2017).
[12] National Water Exchange, https://www.waterexchange.com.au/ (last visited Nov. 5, 2017).

China have similar exchanges.[13] One of the guiding rules of the Australian Water Exchange, among the first, largest, and most comprehensive of its kind, is that if one party wants more water then another must get less."[14] Historically, water has been viewed as limitless and naturally sustainable, causing mismanagement and under-valuation.[15] Climate change, population growth, diversion of water to supply the environment, and increased agricultural and industrial use have increased demand.[16] In fact, Australian Federal & Eastern State Governments established the National Water Initiative 2004 (NWI) to start an "era of water reform."[17] A critical part of this was separating water and land ownership so that they could be traded separately. NWI ensures that all entitlement owners have equitable access to available water. Another exchange, H2OX, was established to create a financial exchange that would facilitate electronic trading and processing of water entitlement and allocation transactions.[18]

In the United States, water use in western states like Colorado is based on these legal doctrines that date back to Roman law.[19] In Colorado specifically, the doctrine of prior appropriation, explored in greater depth below, governs water law.[20] This article proposes creating a water market in Colorado that will fit within the existing doctrine of prior appropriation. However, one potential shortcoming of the doctrine, as shown in Colorado, is that it fails to view water as a tradable commodity. This article proposes that a water market comports with the doctrine of prior appropriation and would help

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[13] *See generally* Janis M Carey & David L. Sunding, *Emerging Markets in Water: A Comparative Institutional Analysis of the Central Valley and the Colorado-Big Thompson Projects*, 41 NATURAL RESOURCES JOURNAL 283-328 (2001).
[14] *See generally* National Water Exchange, https://www.waterexchange.com.au/ (last visited Nov. 5, 2017).
[15] *See* Abrahm Lustgarten, *A Free-Market Plan to Save the American West From Drought*, THE ATLANTIC (Oct. 8, 2016), http://www.theatlantic.com/magazine/archive/2016/03/a-plan-to-save-the-american-west-from-drought/426846/.
[16] *See Background*, H2OX (Oct. 1, 2016), http://h2ox.com/about/.
[17] National Water Exchange, https://www.waterexchange.com.au/ (last visited Nov. 5, 2017).
[18] *See Background*, H20X (Oct. 1, 2016), http://h2ox.com/about/.
[19] *Supra* note 7.
[20] Most recently, the official website of the Colorado Water Plan has confirmed that the CWP does not "do away" with the doctrine of prior appropriation because the doctrine is "fundamental to Colorado water administration and law and Colorado's Water Plan requires them to succeed." *See Frequently Asked Questions*, COLORADO'S WATER PLAN, https://www.colorado.gov/pacific/cowaterplan/frequently-asked-questions (last visited Nov. 5, 2017).

Colorado close its water gap. Ideally, this approach will help the state avoid problems arising from socially and economically inefficient water use. Establishing a market would allow water use to more accurately reflect purposes deemed socially and economically important because market participants could set prices that reflect their perceived value of water.

Several basic questions arise: who, for example, should be the market participants? This article proposes a regulatory framework that allows both individuals and industries to be participants; specifically, individuals could participate in markets for household uses while industries and businesses could participate in uses for industrial and commercial use.[21] Likewise, another question concerns how a party might invest in water: should the participants exchange water rights or the physical water itself?[22] This article proposes a market that allows both, helping the water market adapt to meet changing needs.

I. MARKET BASICS AND WATER DOCTRINES

A. The Benefits of Exchanges

Exchanges are best understood in a historical context that illustrates how and why they developed, and how they benefitted the first economies that created them. A commodity exchange allows market participants to hedge their risk by buying and selling the commodity on a regulated market.[23] Ancient agricultural societies first developed commodity exchanges.[24] In the United States, the first exchange developed in Chicago as a response to increases in trade that resulted in unregulated trading locations and unfair

[21] Separating the different types of markets around water would prevent more powerful actors from monopolizing the markets. It would also allow participants to set prices at a number that accurately reflects how they value water, as rather than allowing powerful groups to skew prices.
[22] In Australia, for example, market participants can: (1) purchase water rights; (2) invest in water-rich farmland; and (3) invest in water utilities, infrastructure, and equipment. *Supra* note 11.
[23] *See Commodity Exchange*, INVESTOPEDIA, http://www.investopedia.com/terms/c/commoditiesexchange.asp (last visited Nov. 5, 2017).
[24] *See* John Baffes, *Commodity Futures Exchanges: Historical Evolution and New Realities*, FORUM FOR AGRIC. RISK MGMT. IN DEV. (June 2011), http://www.agriskmanagementforum.org/content/commodity-futures-exchanges-historical-evolution-and-new-realities.

market activity.[25] In 1880, Chicago saw a significant increase in almost all industries: gains of 23.5% in cash value of marketed produce, gains of nearly almost 16% in money received for goods sold at wholesale, and a 15% increase in the value of material that manufacturers produced.[26] This growth was attributable to the Chicago exchanges, and without them the growth might not have been regulated in a way that maximized its benefit to the community. Other well-documented benefits of commodity exchanges include improved price discovery, linking smallholder farmers to markets, reducing transaction costs, and increasing export earnings.[27]

B. United States Water Law: Two Types of Water, Two Doctrines

Historically, there have been two primary water law doctrines in the United States: the riparian doctrine and the appropriation doctrine, also called the doctrine of prior appropriation.[28] However, neither doctrine is well-suited to solve novel problems resulting from increasing use of groundwater. Furthermore, neither doctrine is suited to address the challenges posed by increasing dependence on water and simultaneous water scarcity resulting from rising demand and climate change. This article argues that neither the riparian nor prior appropriation doctrines are sustainable in the long-run because neither gives enough weight to societal externalities. For this reason, this article proposes a solution that integrates the externalities resulting from population growth and climate change, including groundwater depletion and overall water scarcity. Before addressing these arguments, however, background information on types of water and both systems will be helpful.

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[25] *See* HISTORY OF THE BOARD OF TRADE OF THE CITY OF CHICAGO 597-98 (Charles Henry Taylor, ed. 2008).
[26] Prices were higher, on average, than in 1879 because of "the tremendous spasm of commercial activity and speculative excitement." The price of bread rose by almost 12%. Produce circles, where grain was traded, were also very active; the volume of receipts and shipments was larger, with the largest increase in corn. Corn receipts in 1879 were equal to nearly all receipts for all kinds of grain in the biggest year preceding 1878. Livestock traffic exceeded all former records. *Supra* note 24.
[27] *See generally* Shahidur Rashid, *Commodity Exchanges and Market Development: What Have We Learned*, INT'L FOOD POLICY RESEARCH INST., http://ageconsearch.tind.io//bitstream/212488/2/Rashid-Agricultural%20Commodity%20Exchanges%20and%20Market%20Development-893.pdf.
[28] *Supra* note 2.

Historically, United States water law recognizes a legal distinction between surface and non-surface water.[29] The distinction between surface and non-surface water has two implications for the establishment of a water market: first, the type of water dictates the method of extraction, and second, the accompanying regulatory laws are and should be distinct to mirror the physical and geological differences between water types. Surface water is water in a natural stream that flows in a single direction and has a definite source.[30] Groundwater is used when surface water sources are scarce or inaccessible, and in the United States about half the total population and almost all of the rural population relies on groundwater sources for its drinking water.[31] Groundwater also provides about half of all agricultural needs in the United States.[32] Groundwater depletion, occurring in many parts of the United States, is commonly understood as a long-term decline in water levels caused by sustained groundwater pumping.[33] The primary two doctrines governing surface water in the United States are the riparian doctrine and appropriation doctrines.[34] Use of the riparian doctrine dates back to *Tyler v. Wilkinson* in 1827, which established that each riparian area had a right to a reasonable use of water.[35]

Surface water, sometimes called diffused surface water, originates from rain or melting snow and flows over the surface before concentrating in watercourses or sinking into the ground.[36] The applicable law is murky, with some scholars noting that the increased use of surface waters for uses such as irrigation will likely lead to an increase in litigation.[37] Law applicable to diffused surface waters tends to focus more on removing

[29] *Supra* note 2.
[30] *Supra* note 2.
[31] *Groundwater Depletion*, THE USGS WATER SCI. SCH. (Mar. 6, 2017), https://water.usgs.gov/edu/gwdepletion.html.
[32] *Id*.
[33] *Id*.
[34] *Supra* note 2.
[35] Tyler v. Wilkinson, 24 F. Cas. 472, 476 (1827).
[36] *Supra* note 2.
[37] *See generally* Frank E. Maloney and Sheldon J. Plager, *Diffused Surface Water: Scourge or Bounty?,* 8 NAT. RES. J. 72 (1968), http://www.repository.law.indiana.edu/cgi/viewcontent.cgi?article=2157&context=facpub.

the water and less on which parties, if any, may have rights to the water.[38] Likewise, there is legal uncertainty concerning what rights, if any, belong to an owner of land that contains stream into which water could flow if unimpeded.[39] As more land is included in managed watersheds, this area of water law may become more important.[40] Diffused surface waters are important, first, because of their potential unpredictability as climate change affects weather, and second, because debris carried in surface waters may impact the cleanliness of other sources of groundwater.[41] Too much diffused surface water can tax drainage systems or decrease the ability of soil to absorb water.[42] Resulting flooding could interfere with agricultural operations, cause damage from erosion or silting, or make land unsuitable for infrastructural improvements.[43] The definition of surface water is the same under both general water law and Colorado law, and includes water in a natural stream that flows in a single direction and has a definite source, and in Colorado includes tributary waters.[44] Although the two primary doctrines governing surface water in the United States are the riparian and appropriation doctrines, the appropriation doctrine has historically been followed in Colorado.[45]

Beyond surface water, there are ground waters, specifically definite underground streams, underflow or surface streams, and percolating waters.[46] Definite underground streams are governed by either the riparian or appropriation doctrines or by both jointly.[47] Underflow or surface streams, which consists of water, gravel, or sand that is swept along with a surface stream, are legally part of the same waterway as the surface stream.[48] The rights that attach to underflow are the same as those that attach to the accompanying

[38] *Supra* note 2.
[39] *Supra* note 2.
[40] *Supra* note 2.
[41] *Supra* note 2.
[42] *Supra* note 2.
[43] *See generally* Frank E. Maloney and Sheldon J. Plager, *Diffused Surface Water: Scourge or Bounty?,* 8 NAT. RES. J. 72 (1968), http://www.repository.law.indiana.edu/cgi/viewcontent.cgi?article=2157&context=facpub.
[44] *Supra* note 2.
[45] *Supra* note 2.
[46] *Supra* note 2.
[47] *Supra* note 2.
[48] *Supra* note 2.

surface stream.[49] Legally, underflow would fall into the same category as a surface stream because it is connected to a surface stream by definition.[50]

In the United States, riparian law is composed mostly of judicial decisions, but appropriation law is a combination of statutes, court decisions, and constitutional provisions.[51] Both doctrines date back to Roman times and made their way to the Americas with early Spanish settlers.[52] Generally, eastern states in the United States follow the riparian doctrine while their western counterparts may follow the appropriation doctrine or a combination of both.[53]

Riparian rights can be understood as a natural progression from the doctrine of prior appropriation—essentially first come, first served[54]—because the law of riparian rights reflects societal changes like population growth that were not present when the system of prior appropriation was established.[55] Riparian rights mean that the owner of land adjacent to a stream has certain rights in the flow of the stream and may divert water for domestic use.[56] For irrigation or commercial purposes, the riparian owner's use must be reasonable with respect to the requirements of other users.[57] Some states may allow a limited use of water on non-riparian land, especially if this use does not harm riparian owners in any way.[58]

Both doctrines provide support for the market proposed in this article.[59] The water market system proposed here is a natural outgrowth of the riparian doctrine because it has a strong basis in reasonable use, but is also firmly grounded in the doctrine of prior appropriation's focus only on fairness between parties in relation to who was allowed to

[49] *Supra* note 2.
[50] *Supra* note 2.
[51] *Supra* note 2.
[52] *Supra* note 2.
[53] *Supra* note 2.
[54] *Supra* note 2.
[55] *Supra* note 2.
[56] *Supra* note 2.
[57] *Tyler*, 24 F. Cas. at 476; *see also* Hutchins & Steele, *supra* note 7.
[58] *Supra* note 2.
[59] Ideally, this would allow a model of the proposed solution to be used in states that follow the riparian doctrine.

use water. A year after *Tyler* established reasonableness as the primary regulator of water use, James Kent cited the case in his first edition of *Commentaries on American Law*.[60] He stated that "[a]ll that the law requires of the party, by or over whose land a stream passes, is, that he should use the water in a reasonable manner, and so as not to destroy, or render useless, or materially diminish, or affect the application of the water by the proprietors below on the stream."[61] Kent's *Commentaries* eventually became an American component of *Blackstone* and passed into more than a dozen treatises. The riparian doctrine was slowly understood as part of property law.[62] It was reestablished in *Webb v. Portland Manufacturing Co.* and then became commonplace in courts in the eastern United States.[63] Whereas the doctrine of prior appropriation had arguably focused only on fairness between parties concerning who could use specific water, the riparian system also considered reasonableness of use in determining who could use water. The ability of a water market to allocate water rights efficiency means that a market also distributes water based on the "reasonableness" of use, via a market determination, and thus accomplishes the aim of the riparian doctrine. For this reason, a water market could arguably be introduced in states that follow the riparian doctrine.

Finally, under the appropriation doctrine, chronology of use determines property rights; under the riparian doctrine, this same property right is determined by where the water is located.[64] The property right is not to the physical water itself, but rather to the right to use it. An owner has absolute control and rights to water under the doctrine of prior appropriations, but under the riparian doctrine an owner must also be considerate of neighboring users. In the water market proposed here, water users would necessarily be considerate of their neighbors because they would be equal actors (regulated by the same bodies and laws) in the marketplace. For this reason, the market idea could also be introduced in states following the riparian doctrine.

[60] T.E. Lauer, *The Common Law Background of the Riparian Doctrine,* 28 Mo. L. Rev. 60, 61 (1963).
[61] *Id.*
[62] *Id.*
[63] *Id.*
[64] *Supra* note 2.

Jurisdiction over water allocation and quality falls to the CWCB. [65] The institutions governing Colorado water law are interstate compacts and equitable apportionment decrees; Colorado water law; and local control.[66] The CWP takes all three into account and is premised on each of them, so discussing the CWP singularly is an accurate representation of the state's current water laws.[67] The CWP, and therefore the current water laws, is widely regarded successful because it meets its goals.[68] However, this article argues that the CWP's goals will be better met if the state codifies a provision establishing and governing a water market.

C. Colorado Water Law: Past to Present

Colorado water has a rich history of being critical to development, from the early irrigation practices of indigenous people in Four Corners region between 1100 and 1300 AD to the Gold Rush of the 1850s and the modern storage and trans-mountain diversion projects.[69] Colorado is semi-arid and receives less than 15 inches of rainfall each year on average.[70] Because of this, early water allocations were forced to take intermittent water scarcity into consideration.[71] Thus, Colorado began with laws that are aware of water scarcity and provides a more advanced picture of what future laws should look like. In Colorado, water laws sprung up around the idea that whoever was on the land first owned a right to use its water.[72] The system of prior appropriation is still the leading regulatory doctrine governing the state's expansive water laws, which include federal and state agency regulations, relevant court decisions, and utility practice.[73] In contrast to the English and riparian doctrines, as well as Australia's zero sum approach—where adding

[65] COLORADO WATER CONSERVATION BOARD: ABOUT US, http://cwcb.state.co.us/about-us/about-the-cwcb/Pages/main.aspx (last visited Nov. 10, 2017).
[66] COLORADO WATER LAW & OUR BASINS, COLORADO WATER PLAN, (2015).
[67] *Id*.
[68] *Id*.
[69] JOSEPH GRANTHAM, COLO. DIV. OF WATER RES., EARLY DEVELOPMENT OF COLORADO WATER LAW, SYNOPSIS OF COLORADO WATER LAW (2016).
[70] *Id.* at 5.
[71] *Id*.
[72] *Id*.
[73] *Id*.

new uses requires reduction in existing uses—the motto in Colorado has always been "first in time, first in right."[74]

More recently, the CWP has synthesized and revolutionized the state's water laws by creating measurable goals for future water use in the state. Facing a future of drought, wildfires, flooding, climate change, and unprecedented population growth, Coloradans realized that their water laws were outdated and would not sustain the water needed for future growth.[75] The CWP is the result of a series of roundtable discussions with local governments, water providers and other stakeholders, and the general public, and sets forth a series of actions and policies for Coloradan public officials and the citizens.[76] As a regional and national leader in water laws, it also provides a concise and useful summary of the direction of water law in the United States[77]

Currently, a series of acts and the Colorado Constitution govern the state's water laws. Surface waters are governed by the doctrine of prior appropriation and specifically by Article XVI of the Colorado Constitution,[78] and by the Water Right Determination and Administration Act of 1969 ("1969 Act").[79] Surface waters include all natural stream water and all tributary groundwater that is hydrologically connected to a surface stream.[80] In Colorado, all groundwater is presumed to be tributary unless it is defined otherwise by law or unless facts prove it to be otherwise.[81] Other groundwater, the second legal category, is governed by a modified prior appropriation approach.[82] This category includes groundwater that neither law nor fact has found to be significantly hydrologically connected to a surface stream.[83] This water is allocated as correlative rights that are usually based on overlying land ownership.[84] The Colorado Ground

[74] *Id*.
[75] INTRODUCTION: COLLABORATING ON COLORADO'S WATER FUTURE, COLORADO WATER PLAN (2015).
[76] *Id*.
[77] *Id*.
[78] COLO. CONST. art. XVI, § 5-6.
[79] COLO. REV. STAT. §§ 37-92-101 to -606 (1969).
[80] *Id.*
[81] *Id*.
[82] *Id*.
[83] *Id*.
[84] *Id*.

Commission has the ability to determine and alter boundaries of designated groundwater basins and their subdivisions by geographic description, and these boundaries are subject to statutory limitations.[85]

II. COLORADO SHOULD ADOPT A PROVISION ESTABLISHING AND GOVERNING A WATER MARKET

This article argues that the Colorado Water Plan will better meet its goal of closing the water gap if the state adopts a provision establishing and governing a water market. Additionally, it argues that the United States should create water laws that are conducive to this view. This would allow the United States to meet changing global needs and be able to engage in a growing international water market.[86] The world's largest water users are the United States, China, and India, putting the United States in a unique position to shape the future of global water laws. [87] This article proposes an amendment to the CWP, focusing on regulatory laws that would establish and govern a water market and exchange. It is inspired by the Australian regulatory schemes but tailored to fit the economic needs and climate of Colorado, as water laws in each state and country should be.

The proposed water market allows for a futures exchange but also sets up a more basic regulated spots market.[88] There is some debate on whether commodity exchanges can exist without futures transactions, but the proposed solution avoids this linguistic debate by introducing both spots and futures on a regulated market.[89] This way, the

[85] COLORADO WATER PLAN 2-5 (2015).
[86] This means that water will be traded in its purest form, similar to agricultural commodities.
[87] Brad Plumer, *Mapping the global water trade*, THE WASHINGTON POST (Nov. 17, 2016) https://www.washingtonpost.com/blogs/ezra-klein/post/mapping-the-global-water-trade/2012/05/22/gIQAnRGmiU_blog.html?utm_term=.520544c092a6.
[88] Exchanges typically involve more complicated transactions called futures, in which delivery of the traded commodity—here, water—occurs at a later date; in a spot transaction, delivery is immediate. Futures contracts create a separate financial contract on top of the original contract involving physical delivery of the commodity. They allow market participants to hedge their risk and benefit the economy this way. *See What Are Commodity Markets and Futures Contracts*, EUROPEAN UNION: TRADE AND FINANCE, http://www.tradeandfinance.eu/en/posts/futures-en/chapter-2-what-are-the-commodity-markets-and-futures-contracts/ (last visited Nov. 10, 2017).
[89] *Id*.

market can develop organically and at a natural pace. Ideally, futures will be included in the market because of their ability to allow participants to hedge their risk and thereby maximize use of the traded commodity.[90] However, creating a market of any kind, regardless of the type of transaction included, is arguably the most important aspect of the proposed solution because it recognizes water as a tradable commodity with inherent economic value. This is important in Colorado because the state's economy, including entertainment and tourism, depends on water.[91]

A totally unregulated free market approach to water can be dangerous societally, environmentally, and financially. Some level of regulation is necessary. Given the realities of climate change and population growth, it is extremely likely that water will increasingly be labeled as a commodity.[92] Because of this, Colorado should add a provision to its state constitution that will establish a basic water market.

The current laws, which are condensed in the CWP and codified in the state constitution, are an outgrowth of the traditional appropriation doctrine and reflect modern concerns. However, they fail to foresee and plan for water being treated as a tradable commodity. Regulatory laws establishing a basic water market and exchange would be a fitting addition to the already-comprehensive Colorado Water Plan because they would help close the remaining supply-demand gap more successfully than other solutions. The proposed provision is well-grounded in established water law because it incorporates aspects of both the riparian and appropriations doctrine while being mindful of how each might interplay with the new concept of water as a commodity.

III. THE PROPOSED PROVISION WOULD HELP ACHIEVE THE GOAL OF THE COLORADO WATER PLAN BY HELPING TO CLOSE THE WATER GAP

The CWP lays a thorough foundation in that it incorporates an inclusive governance structure that implements integrated water resources management

[90] *Id*.
[91] COLORADO WATER PLAN (2015).
[92] Patti Domm, *Why trading water futures could be in our future*, CNBC (Oct. 11, 2016), http://www.cnbc.com/2014/07/02/why-trading-water-futures-could-be-in-our-future.html.

("IWRM"), including decentralized management and the use of river basin organizations.[93] Since IWRM implementation is often geared towards economic efficiency, emphasis should be placed on equity and environmental sustainability through the adoption of measures to strengthen social, administrative, and political accountability.[94] This is already achieved through the CWP's comprehensive focus on all aspects of water management, but would be further achieved through the development of a water market in Colorado. Specifically, a market would address the remaining gap by recognizing anyone who uses water as a stakeholder capable of trading both water rights and physical water. In 2010, the gap was calculated using future water needs and identifying projects and methods that water providers indicated they planned to implement to serve future customers.[95] While the Plan reduces this gap, it notes that many of the proposed projects and methods are insufficiently developed.[96]

In addition to IWRM, infrastructure maintenance, and allowing water trading, regulatory laws should include provisions for planning and preparedness for coordinated responses to natural hazards. Natural hazards like floodplains are likely to increase with climate change.[97] Floodplain management, early warning systems, and increased public awareness of risk improve the resilience of communities, and mixing structural and non-structural approaches to floodplain management is especially cost-effective.[98] For this reason, the provision is an added amendment to the existing Colorado Water Plan, rather than a new law that overrides it. The Plan places Colorado in a unique position in the United States to be a role model for other states because it synthesizes Colorado's uniquely rich and complex water laws while preparing them for future challenges. To this end, the provision should also predict and be able to maintain commodity exchanges for

[93] COLORADO WATER PLAN (2015).
[94] THE UNITED NATIONS WORLD WATER DEVELOPMENT REPORT 2015: WATER FOR A SUSTAINABLE WORLD, UN WATER 6 (2015).
[95] COLORADO WATER PLAN (2015).
[96] COLORADO WATER PLAN APPENDIX H: SUMMARY OF ACTIONS IN COLORADO WATER PLAN H-3 (2015).
[97] THE UNITED NATIONS WORLD WATER DEVELOPMENT REPORT 2015: WATER FOR A SUSTAINABLE WORLD, UN WATER 6 (2015).
[98] *Id*.

water. At the state level, this would likely require laws involving cooperation with the CFTC and/or FERC.

This article does not propose adding an amendment directly to the CWP, but rather amending the state constitution, passing a state executive order, or proposing a new project at the local level. There are ways to integrate a market into Colorado's water plans, but the CWP is the result of countless meetings and should arguably be respected as a finalized product. Many state agencies are involved in water law, including: the Colorado Department of Public Health and Environment, the Colorado Water Resources and Power Development Authority, the Colorado Department of Agriculture, and the Colorado Energy Office.[99] For this reason, an executive order asking agencies to work out the mechanics of a market might be the most efficient method increase efficiency, favoring agency discretion and expertise. This article proposes an amendment to the State constitution, which may be a more complicated process but will help to illuminate how market laws might be implemented. Although the specific solution outlined here is an amendment to the constitution, it is important to note than an executive order may be more viable.

A. Water is a Commodity

Merriam-Webster defines a commodity as "an economic good … a product of agriculture or mining; an article of commerce especially when delivered for shipment … a mass-produced unspecialized product" or "something useful or valued."[100] The CFTC provides that: "[a] commodity, as defined in the Commodity Exchange Act, includes the agricultural commodities . . . and all other goods and articles . . . and interests in which contracts for future delivery are presently or in the future dealt in . . . [a] physical commodity such as an agricultural product or a natural resource as opposed to a financial

[99] *Supra* note 2 at 2.
[100] *Commodity*, MERRIAM-WEBSTER'S COLLEGIATE DICT. (10th ed. 1999).

instrument such as a currency or interest rate."[101] A critical characteristic of a commodity is that it is the same, regardless of its producer: no matter where it comes from, it should be interchangeable with the same commodity from a different producer. In this vein, agricultural products such as apples or wheat are commodities, but constructed goods such as tables or chairs are not.[102]

Water can be traded and is fundamentally the same no matter its source. Water can therefore be considered a commodity. Thus, water laws should reflect the commodification of water for the benefit of the general public, water utilities, and businesses with a financial interest in the water market. Water laws should do this by setting up and regulating a water marketplace.

In addition to fitting the economic definition of a commodity, water will be increasingly considered a commodity because it will become scarcer. Deane Dray, a Citigroup analyst who leads global water-sector research, stated that "[i]t's intuitively appealing to talk about water as a traded asset. If you look at projections over the next 25 years, you'll see that global water supply and demand imbalances are on track to get worse. The majority of the world population is living in water-scarce and water-stressed regions of the world."[103] Further, climate change and population growth will make drinking water scarce in the future.[104] This scarcity makes water increasingly tradable, as scarcity would with any other commodity, and creates investment opportunities.[105] Recently, there has been an increase in the demand for investments attempting to profit from the need for fresh, clean water.[106]

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[101] CFTC GLOSSARY, http://www.cftc.gov/ConsumerProtection/EducationCenter/CFTCGlossary/index.htm#C (last visited Nov 10, 2017).
[102] *Commodity*, INVESTOPEDIA.COM, http://www.investopedia.com/terms/c/commodity.asp (last visited Nov. 17, 2016).
[103] Patti Domm, *Why trading water futures could be in our future*, CNBC, http://www.cnbc.com/2014/07/02/why-trading-water-futures-could-be-in-our-future.html (last visited Oct. 11, 2016).
[104] *Id.*
[105] *Id*.
[106] James E. McWhinney, *Water: The Ultimate Commodity*, INVESTOPEDIA, http://www.investopedia.com/articles/06/water.asp (last visited Jan. 20, 2017).

B. How Would a Market Reduce or Fill the Remaining Gap?

Importantly, there are practical reasons for endorsing a market approach to close the remaining supply-demand gap. The CWCB already exists as an overseeing agency, water markets are successfully fighting water scarcity elsewhere, and strong collaboration between agencies and stakeholders in Colorado ensures that a robust cash market with plenty of actors could develop successfully. Finally, the prior appropriation and riparian doctrines support the creation of a market.

The CWP takes several specific steps to reduce the supply-demand gap. These include the following:

> (1) Supporting the evaluation, feasibility, and completion of BIPs through grants;
> (2) Supporting increased consistency and technical support in the BIPs in the following ways:
> a. Providing technical support for many of the BIPs through continued decision-support development and maintenance to explore municipal, industrial, agricultural, and environmental shortage analyses;
> b. Providing technical support to several other BIPs to explore the use of project information sheets and project prioritization;
> c. Supporting the further quantification of costs associated with projects and methods, development of new acre-feet, development of new irrigated acres, and protection of stream-miles;
> (3) Incorporating BIP information into the next version of Statewide Water Supply Initiative (SWSI) and reassessing the municipal, environmental, industrial, recreational, and agricultural gaps at that time; and
> (4) Establishing guidelines for basin-roundtable grants, enabling basin roundtables to facilitate the implementation of BIPs in their basins, with the goal of using grants as a way to foster the ability to meet municipal, industrial, agricultural, environmental, and recreational needs in a way that is consistent with the BIPs.[107]

A market would connect these aspects by allowing stakeholders (industries, agencies, and citizens using water for personal use) to trade both water rights and physical water. Additionally, an exchange would help the market to grow, as the Chicago exchanges

[107] COLORADO WATER CONSERVATION BOARD, *supra* note 65.

did.[108] Finally, it would also do the following: improve price discovery, link smallholder water sellers to the market, reduce transaction costs, and increase export earnings.[109]

While the actions above create a comprehensive plan, they fail to put a price on water. A price is critical because it signals that a commodity should not be wasted, and if it is wasted, there is a monetary opportunity cost to accompany the physical one.[110] The CWP creates a system that values water, demonstrated by the careful monitoring described above. Therefore, a price is a natural accompaniment.

Physical water could be traded as easily as one basin turning off a pump while another basin simultaneously turns on a connected pump. Alternatively, stakeholders could register shares of water that would be traded with the help of a broker. [111] In Colorado, this approach could be used with the Colorado River, but it could also be incorporated into the basin system that is already in place. Crowley County, discussed below, could offer another alternative to water trading.

The decade leading up to the CWP saw an important paradigm shift in Colorado water laws. Historically adversarial views shifted toward collaborating on projects that benefit all parties, using money to solve problems instead of using escalating litigation, and capitalizing regional connections that tie Colorado together economically and hydrological.[112] The following are the CWP's specific goals:

(1) to reduce the municipal water supply-demand gap expected by 2050 from as much as 560,000 acre-feet to zero acre-feet by 2030;
(2) to conserve 400,000 acre-feet of municipal and industrial water conservation b 2050;

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[108] *See* HISTORY OF THE BOARD OF TRADE OF THE CITY OF CHICAGO 597-98 (Charles Henry Taylor, ed. 2008).
[109] JOHN BAFFES, *supra* note 24.
[110] *See The Importance of Pricing as an Influential Marketing Mix Tool: Factor and Principal Component Analysis*, 3 INT. J. OF SALES & MARKETING 1-12 (Mar. 2013), http://tjprc.org/publishpapers/2-33-1354962913-1.Sales%20-%20IJSMMRD%20-%20The%20importance%20(4).pdf.
[111] Why Water Markets Might Work In California, NPR.ORG, http://www.npr.org/2015/04/18/400573611/a-water-markets-might-work-in-california (last visited Oct. 9, 2017).
[112] *See generally* COLORADO WATER CONSERVATION BOARD, COLORADO'S WATER PLAN (2015) (describing measurable objectives).

(3) that by 2025, 75% of Coloradans will live in communities that have incorporated water-saving actions into land-use planning;
(4) that agricultural economic productivity will keep pace with growing state, national, and global needs;
(5) to attain 400,000 acre-feet of water storage to manage and share conserved water and the yield of IPPs by 2050 (which equates to an 80% success rate for these planned projects);
(6) by 2030, to cover 80% of locally prioritized lists of rivers with stream management plans, and 80% of critical watersheds with watershed protection plans;
(7) to sustainably fund the Plan by the State investigating options to raise additional revenue in the amount of $100 million annually ($3 billion by 2050), starting in 2020; and
(8) to improve public awareness by 2020, as determined by public surveys.[113]

The CWP also places responsibility for implementation of the plan in the CWCB, which is the agency responsible for the following: (1) streams, (2) watersheds, (3) lake protection, (4) water conservation, (5) flood mitigation, (6) stream restoration, (7) drought planning, (8) water supply planning, (9) and water project financing.[114] The agency works with other state and federal agencies to protect Colorado's water apportionments.[115] In the 2013 executive order calling the CWCB to take action, the executive order explicitly stated that "[t]he [CWCB] was created in 1937 '[f]or the purpose of aiding in the protection and development of the waters of the state, for the benefit of the present and future inhabitants of the state.' . . . More than 75 years later, we reaffirm this purpose and seek to tap Colorado collaboration and innovation in addressing our water challenges."[116] The CWCB should have a central role in a water market because of its longstanding leadership position in Colorado water issues.

Colorado has the system in place to tweak its water laws to make them more amenable to water as a tradable commodity. Many of the goals of the CWP could also be achieved through water trading and investing, and the CWCB could act as a trading board with responsibilities similar to the United States Commodity Futures Trading

[113] *See id.* (describing the critical action plan).
[114] *Id.*
[115] *Id.* (describing the collaboration on the Plan in the introduction).
[116] COLORADO EXEC. ORDER NO. D 2013-005, *Supra* 4 at 1 (citation omitted).

Commission (CFTC).[117] The CWCB is part of the Colorado Department of Natural Resources, maintains expertise in a variety of programs, and provides technical expertise to many of these programs. Its statutory authority comes from the agency's strategic framework.[118] The variety of expertise and capacity to work with technical issues makes the CWCB a prime candidate to oversee the water market, but doing so would require an amendment to the strategic framework. Further, the Strategic Plan mandates that the CWCB "provides common technical platforms for planning and policy decisions" and "works with partners to develop policies and implement strategies for meeting Colorado's consumptive and non-consumptive water needs."[119] The CWCB is a natural body to act as a trading platform.

Lastly, Colorado's water values, which are at the core of the CWP, reflect the characteristics of a healthy industry and reveal a regulatory scheme that would be welcome to a market.[120] The following are Colorado's water values:

(1) "A productive economy that supports vibrant and sustainable cities, viable and productive agriculture, and a robust skiing, recreation, and tourism industry;
(2) Efficient and effective water infrastructure promoting smart land use; and
(3) A strong environment that includes healthy watersheds, rivers and streams, and wildlife."[121]

The overarching goals of collaboration and transparency would also be seen in a market where transparency is the leading goal. A water market is in line with the CWP's values and would help to meet its goals.

[117] The CFTC promotes market integrity by policing the market for various abuses. *See* United States Commodity Futures Trading Commission, ABOUT THE CFTC, U.S. COMMODITY FUTURES TRADING COMMISSION http://www.cftc.gov/About/MissionResponsibilities/index.htm (last visited Oct. 12, 2017).
[118] About Us, COLORADO WATER CONSERVATION BOARD, http://cwcb.state.co.us/about-us/about-the-cwcb/Pages/main.aspx (last visited Oct. 12, 2017).
[119] Colorado Water Conservation Board, Strategic Framework 2 (Jan. 28, 2013), http://cwcbweblink.state.co.us/WebLink/ElectronicFile.aspx?docid=169613&searchid=1bda1d2a-a8e0-4e31-9140-953cd1443900&dbid=0.
[120] COLORADO'S WATER PLAN, *supra* note 2 at 10-5.
[121] *Id.*

C. A Free Market Approach is Dangerous and Some Level of Regulation is Necessary

Regulation is important to avoid market failure, but regulation can also promote human rights and social solidarity.[122] First, regulation can help to avoid a monopoly situation in which a single entity produces for the entire market. To avoid this, regulation can reduce barriers to entering the market, helping prevent a situation in which monopolies naturally develop.[123] This is particularly important in the case of a water market because the objective of the market is to allow individual people and businesses to trade both small and large quantities of water to meet current and future demands. Additionally, a factor that makes monopolies more likely to develop is lack of a suitable substitute for the product.[124] This counter-productive impact of a monopoly on the water market is exacerbated by the fact that the effects of monopoly include reduced output and higher prices.[125]

In addition to the intensive industry use of water, basic life depends on it. Communities—particularly those in the western part of the United States—have built their foundations on water. Crowley County, located in southeast Colorado, literally dried up after introducing a completely free-market approach to water.[126] Crowley County relied on water from a tributary of the Colorado River near Aspen to supplement the Arkansas River, and farmers owned shares in ditch systems and reservoirs that distributed the water.[127] A total of about 60,000 acres of farmland were cultivated with the water in the 1960s, and three neighboring cities purchased significant water rights from the

[122] *See generally* ROBERT BALDWIN, MARTIN CAVE & MARTIN LODGE, UNDERSTANDING REGULATION: THEORY, STRATEGY, AND PRACTICE (2d ed. 2012).
[123] *Id.*
[124] *Id*.
[125] *Id*.
[126] Abrahm Lustgarten & Propublica, *A Free-Market Plan to Save the American West From Drought*, THE ATLANTIC, http://www.theatlantic.com/magazine/archive/2016/03/a-plan-to-save-the-american-west-from-drought/426846/ (last visited Oct. 8, 2016).
[127] Abrahm Lustgarten & Propublica, *A Free-Market Plan to Save the American West From Drought*, THE ATLANTIC, http://www.theatlantic.com/magazine/archive/2016/03/a-plan-to-save-the-american-west-from-drought/426846/ (last visited Oct. 8, 2016).

Crowley farmers.[128] This was followed by a period of significant sales as Crowley farmers realized how much they could profit from the water.[129]

The early sales permanently diverting a large amount of the region's water had, dried up thousands of acres or pasture, and opened farmer's eyes to the impressive cash value of the remaining water.[130] Crowley farmers, who had been struggling with low crop prices, youth emigration, and an aging population, saw the quick profits of unregulated water trading as a solution.[131] This problem has been foreseen by other experts as well.[132]

Crowley County illustrates the added utility of commodity exchanges compared to simpler water trading. Water trading laws should be receptive to a commodity exchange because of the tremendous benefits, especially in drought-prone places like Colorado. In Ethiopia, bumper harvests in 1984 and 2002 were shortly followed by food starvation crises.[133] During Eleni Gabre-Madhin's research for her graduate thesis on the topic, she observed that there was a shortage in northern Ethiopia but a surplus in the west.[134] Almost one million people died in the 1984 crisis because they could not physically access the water, despite a surplus in the south.[135] In 2002, the situation repeated, and prices collapsed again following a bumper harvest. Ethiopia was forced seek emergency food aid for 14 million people at risk of starvation.[136] Gabre-Madhin concluded that producing more could not be the answer; instead, distribution had to be improved and efficient markets had to be developed that worked for everyone—buyers and sellers.[137] She decided that a commodity exchange was the best method.[138] The CWP

[128] *Id.*
[129] *Id.*
[130] Lustgarten & Propublica, *supra* note 132.
[131] *See Id.*
[132] *See Why Water Markets Might Work in California*, NATIONAL PUBLIC RADIO, http://www.npr.org/2015/04/18/400573611/a-water-markets-might-work-in-california (last visited Oct. 12, 2017).
[133] Eleni Gabre-Madhin, *A Commodities Exchange for Ethiopia*, TED, https://www.ted.com/talks/elene_gabre_madhin_on_ethiopian_economics#t-84404 (last visited Sep. 18, 2016).
[134] *Id.*
[135] *Id.*
[136] *Id.*
[137] *Id.*
[138] *Id.*

is similar to Gabre-Madhin's exchange in that it is an innovative solution to the problem of a commodity shortage. This article proposes that a merging of the two ideas would help to close the water gap in Colorado and meet the goal of the CWP by incorporating the best of both worlds into a fully comprehensive solution.

Regulating exchanges, as opposed to an unregulated free market, is important for risk management, transparency, public trust in the market, and price control. Commodity exchanges can ensure that natural resources are used in a way that maximizes benefits to as many members of the public as possible. Fledgling commodity exchanges in developing countries provide a good example of the type of exchange and regulatory laws that might work in Colorado; these exchanges are developing in relatively underdeveloped markets—similar to the proposed Colorado water market. In Africa, Eleni Gabre-Madhin founded the continent's first modern exchange, which established a reliable interface for buyers and sellers to meet.[139] The African Development Bank Group has stated that "[c]ommodity exchanges are highly efficient platforms for buyers and sellers to meet; primarily to manage their price risks better, but also to improve the marketing of their physical products. They. . . [make] economies more inclusive, boosting the links between agriculture and finance, and making the commodity sector more efficient and competitive."[140] Before exchanges, agriculture in Africa was a low-profit and high-risk business.[141] This article contends that water is on the same trajectory in the United States. For this reason, exchanges must be developed at some point, and once commodities exchanges are created the financial exchanges will follow. A legal framework must be receptive to both.

[139] Gabre-Madhin, *supra* note 135.
[140] *Guidebook on African Commodity and Derivatives Exchanges*, AFRICAN DEVELOPMENT BANK GROUP (Jan. 24, 2014), https://www.afdb.org/en/documents/document/guidebook-on-african-commodity-and-derivatives-exchanges-42998/.
[141] *Id*.

D. How Should the Proposed Provision be Worded to Create the Regulatory Framework?

The proposed provision could be either an executive order or codified in the Colorado State Constitution after Sections 37-82-101[142] and 37-92-102,[143] which discuss the doctrine of prior appropriation. Although grounded in the doctrine of prior appropriation, the proposed provision is also supported by the riparian system because it is grounded in "reasonable" use.[144] Each provision is laid out below. Although a market might appear counter to the CWP at first glance, it builds on support from both the riparian and prior appropriations doctrines.[145]

Property rights under the riparian doctrine are determined based on where the water is located.[146] This is important in a water market where physical water is traded, as opposed to water titles, because it makes the allocations of original rights uniform and simple to determine. A deviation from the riparian doctrine occurs when water titles are traded, more closely following the doctrine of prior appropriation by trading the right to use water instead of physically trading water.

In support of the proposed provision, Colorado's seven water courts would issue decrees confirming water use rights that comply with the provision. The water courts also provide a natural appeals chamber because of their current role as the proper venue for water dispute settlement.[147] Additionally, including water courts would legitimize the market by connecting it to the doctrine of prior appropriation. A market is meant to fit into existing water law as a useful addition, and incorporating the seven water courts into the market would help accomplish this essential goal. A potential area of dispute is CWCB's jurisdiction versus that of the water courts. Initially, using the courts as an

[142] COLO. REV. STAT. § 37-82-101 (2014).
[143] COLO. REV. STAT. § 37-82-102 (2014).
[144] *See, e.g.*, Lauer, *supra,* note 60 at 61.
[145] *Id*.
[146] *Id*.
[147] *See Non-Attorney's Guide to Colorado Water Courts* at 5, http://water.state.co.us/DWRIPub/Documents/NonAttorneysGuidebookToColoradoWaterCourts.pdf.

appellate chamber could alleviate these concerns.[148] Vesting appellate jurisdiction in the water courts would mean that parties would appeal market cases directly to the water court and bypass the seven local courts entirely.[149]

Finally, the provision is inspired by the Australian model because Australia, like Colorado, has a semi-arid climate and has faced similar problems in the water market.[150] It is also firmly based in Colorado's doctrine of prior appropriation because it involves trading water rights. A slight deviation from the doctrine of prior appropriation occurs where physical water is traded, but this could also be interpreted as a form of trading property rights. Given Colorado's long-standing history of using the doctrine of prior appropriation and its continued loyalty to the doctrine, it is crucial that a market not disturb the doctrine.[151] For example, incorporating the courts is possible in a water rights market partly because the courts are already involved in water rights.[152]

Considering the policy and legal addressed above, the following sections outline the proposed provision.

Section One:
Water licenses must be attained by any legal person who desires to exercise their property right to water. There will be four types of licenses: two for individuals who are interested in physically trading water, and another two for individuals who are interested in trading water titles. In each group, there will be one license for those in possession of water/water titles and another for those interested in obtaining possession. If a single entity wishes to do both, then they must obtain multiple licenses.

Section Two:
Water users, both personal and industrial, should indicate what volume of water they need for irrigation, agricultural, industrial, and personal use, and inform the CWCB.

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[148] The water courts have filing fees ranging from $20 to $447. *Supra* note 120. The CWCB may wish to reimburse parties for these fees, or the courts might waive them for cases arising from the market, furthering the policy goal of promoting participation in the market.
[149] In states without water courts, appealing directly to the state court could provide a viable alternative.
[150] Yee Huang, *A Tale of Two Countries: Lessons from Australia for Water Law in the United States?*, CENTER FOR PROGRESSIVE REFORM (Nov. 1, 2016), http://www.progressivereform.org/CPRBlog.cfm?idBlog=860CB207-02D4-BB7A-B891B40E9ECFF220.
[151] *Supra* note 20.
[152] The courts define water rights as "[a] property right to the use of a portion of the public's surface or groundwater resource obtained under applicable legal procedures." *Supra* note 78 at 17. This definition applies to the sections of the proposed provision that mention water rights.

Individuals wishing to do so may install pumps to withdraw groundwater. The physical pumps will be the property of the State of Colorado, which will also mandate a percentage of groundwater that may be pumped. Groundwater will be subject to all provisions applicable to surface water once withdrawn from the ground.

Section Three:
The CWCB may allocate the amount of water that can be taken from a river system as a percentage. Individuals collecting diffused surface waters should inform the CWCB of this use.

Section Four:
The CWCB may create specific trading rules to govern licenses. These will include, but may not be limited to, creating and governing trading platforms for both groundwater and surface water. Spots and forward transactions will both be included in the types of trades that are permissible.

Section Five:
Decisions of the CWCB regarding the water market may be appealed to the Colorado Water Courts.

Water markets would be codified in Sections 37-82-101 and 37-92-102 of the Colorado state constitution. All trading platforms would be required to provide real-time prices and continuous market access to promote transparency.[153] By monitoring water use, trading, and prices, they will also provide invaluable data about the demand for water and its social cost. A market would also help fill the remaining gap by allowing greater flexibility in usage and ownership. A market would provide a more nuanced way to micro-manage the supply-demand gap left by the CWP, creating a space for smaller amounts of water to be traded. It would also help to avoid the monopoly that could arise where the state is the primary seller of water.[154] A natural response to monopolies is to

[153] Transparency is critical in emerging markets because it promotes participation and allows markets to grow organically. *See* John Custer, *Why Transparency Matters for Emerging Market Companies*, CIPE DEVELOPMENT BLOG (Oct 23, 2013), http://www.cipe.org/blog/2013/10/23/why-transparency-matters-for-emerging-market-companies/#.WgeSH4ZrwU0; *see also The role of transparency in the financial sector*, TRANSPARENCY INTERNATIONAL (June 1, 2011), http://ec.europa.eu/internal_market/bank/docs/gebi/terray_en.pdf; *see also* Bill Witherell, *The Roles of Market Discipline and Transparency in Corporate Governance Policy*, OECD (May 16, 2003) http://www.oecd.org/corporate/ca/corporategovernanceprinciples/2717763.pdf.

[154] ROBERT BALDWIN, MARTIN CAVE, & MARTIN LODGE, UNDERSTANDING REGULATION: THEORY, STRATEGY, AND PRACTICE 16 (2d ed. 2012).

create a business environment that promotes competition.[155] The provision's ambiguity about types of trades is intentional: platforms may specialize in temporary trades, permanent trades, or forwards. Each operates differently and provides different benefits to stakeholders.

Spots would also be permitted under the proposed provision. Temporary and permanent trades are spots, meaning that the transfer of title is immediate or close to immediate.[156] Temporary trades are transfers that could be specifically for irrigation season because they allow for an immediate trade.[157] Under temporary trades, the purchaser is the beneficiary of an increase in allocation or increase in value from the date of purchase.[158] Permanent water trades are similar to the sale of land, because the water rights are permanently transferred to a different party.[159] The purchaser retains property rights and benefits from any increase in value indefinitely. These permanent trades would be best suited to the sale of physical water for immediate use and would apply to trades through the pump system or other immediate transactions.

At this early stage, the forwards market may take longer to develop. As previously discussed, a forward market and futures exchange is dependent upon the preexistence of an active cash market, which will be developed through the spot market.[160] Forwards allow market participants to hedge their bets by betting for and against future changes in price. Forwards also help with risk management by allowing market participants to transfer risk to others who might be better suited to manage it.[161] In Colorado, forwards would help close the water gap because consumers who might not utilize all the water in their position would be able to sell it to individuals who would

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[155] *Id*.
[156] *See Spot Contracts – What Are They?*, Trade Finance Global, https://www.tradefinanceglobal.com/currency/spot-contracts/.
[157] *Id*. (defining spot markets); *see also generally* MARKETS FOR WATER: POTENTIAL AND PERFORMANCE (K. William Easter et al. eds., 1998).
[158] *See* BRADFORD CORNELL & MARC R. REINGANUM, FORWARD AND FUTURE PRICES: EVIDENCE FROM THE FOREIGN EXCHANGE MARKETS, 36 The Journal of Finance 1035 (1981).
[159] *Id*.
[160] *Id*.
[161] *See* ASWATH DAMODARAN, INVESTMENT VALUATION: TOOLS AND TECHNIQUES FOR DETERMINING THE VALUE OF ANY ASSET 926 (3d ed. 2012).

make better use of it. Allowing such transfers ensures that a legal person who owns water would be the person best able to utilize it. Trading water titles would be a type of forward contract because the physical water would be used by the buyer at a later date. Finally, another benefit to establishing a water market in a single state, especially one with such advanced water laws, is that it would provide a useful test-case in how to create similar markets in other states or a national market. This will be especially important in coming decades as water scarcity increases globally.

V. CONCLUSION

The CWP has successfully integrated Colorado's water goals into a comprehensive plan that aims to close the supply-demand gap. The provision proposed in this article will add value to the CWP by introducing a solution that is capable of making Colorado a national leader in water markets and is adapted to the state's current water system and water laws. Colorado already has advanced water laws in place—a market would help the existing laws reach their goals.