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Improving the Viability of Alternative Water Transfer Methods (ATMs) in Colorado:

A Synthesis of Research and Findings from the Getches-Wilkinson Center, 2014-2015

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1. Introduction

Water being a resource central to most facets of life and economic activity in the state, the ongoing Colorado Water Plan process touches an extremely wide variety of issues, sectors, and concerns. Among the most salient of those concerns is the observation—supported by data compiled in the SWSI (Statewide Water Supply Initiative) reports and the Basin Roundtable discussions—that future municipal and industrial water systems will require an influx of new supplies which, lacking any better alternative, are likely to come largely from agricultural-to-urban water transfers.[1] While such transfers are already a fact of life in most western states (WGA, 2012; Basta and Colby, 2010), Colorado's history with these market transactions is more extensive and, in some cases, more troubling than most. In particular, Colorado's Arkansas Valley, which has been the source of many agricultural-to-urban transfers, has been held up as the unwanted poster child of "buy-and-dry" transfers—situations in which a farmer permanently sells his or her full water right to a city or industry and retires the land from irrigation and, in most cases, any future agricultural production (Devine, 2015; NRC, 1992).

While these are voluntary transactions that can serve the interests of both buyers and sellers, the resulting loss of water and agricultural production can bring a host of hardships for affected communities, including remaining irrigators, those in agricultural support industries, rural governments, and the general public dependent upon schools, law enforcement, and other social services funded by tax revenues. Such transfers may also adversely affect the environment, and may be viewed as predatory in nature, with wealthy cities and industries taking advantage of a financially stressed farmers and small rural communities with limited resources. The degree to which such characterizations are supportable vary from case to case and are subject to interpretation, but the fact remains that there is widespread interest amongst potential buyers and sellers, policymakers, and other interested parties in moving toward a better model of water management.

ATMs (Alternative Transfer Methods) is the acronym used to describe a host of newer types of approaches to facilitate additional water transfers from rural areas, but in a way that minimizes local impacts or, in some cases, even produces local economic and/or environmental benefits (CWCB, 2012). ATMs typically differ from buy-and-dry approaches in three ways: transfers are temporary, land is not permanently taken out of production, and ownership of the water right (at least in part) is retained by the irrigator.

In our work, we are focused on three main techniques to conserve agricultural water. The simplest of these is fallowing, which entails taking a given parcel of land out of production for a

[1] These efforts are led by the Colorado Water Conservation Board (CWCB); *see* http://cwcb.state.co.us/water-management/Pages/WaterManagementHome.aspx

given period, typically a year. Often this is done on a rotational basis (e.g., one different acre out of every ten is fallowed each year), thereby establishing a consistent rest period for the soil in addition to a steady stream of conserved water. Another common form of fallowing is to take lands out of production only in drought years, perhaps as part of an Interruptible Water Supply Agreement (IWSA). The other two techniques keep all lands in production, but save water either by crop switching (i.e., replacing water thirsty crops with those using less water), or some form of deficit irrigation (in which crops are given a reduced amount of water on the premise that yields are likely to decrease, if at all, in a proportion less than the amount by which water deliveries were reduced).[2]

Once conserved, water is then transferred to urban or industrial users who compensate the farmer for expenses associated with equipment, transaction costs, and/or lost revenues. Ideally, this becomes a stable new revenue stream that shores up, rather than undercuts, the rural agricultural economy, while allowing cities and industries to meet new growth pressures without looking to already overtapped streams. In some cases, ATMs are also seen as a vehicle for augmenting instream flows, addressing drought emergencies, and dealing with potential curtailments associated with compact calls.

All these applications are predicated on two frequently-occurring conditions: agricultural water uses that are less sensitive to periodic water shortages than other water uses; and situations in which there are higher economic returns possible for water used for municipal and industrial waters than the same amount of water used in agriculture. With proper arrangements, these conditions can be a source of flexibility that can be creatively exploited for mutual benefit. In practice, however, a host of barriers have impeded the widespread application of ATMs in Colorado.

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[2] A variety of field and lab studies have explored the potential water savings from these types of agricultural water conservation strategies. Much of this literature focuses on those southwestern US locales with the longest (and often hottest and driest) growing seasons, and often target one of the region's thirstiest crops: alfalfa. For example, Cohen et al. (2013) calculate that 834,000 acre-feet of water per year could be saved by a realistic application of deficit irrigation in the lower Colorado River Basin. In Colorado, other crops, such as corn and fruit trees, may offer greater opportunities. For example, Squillace and McLeod (forthcoming) suggest that applying deficit irrigation methods to half of Colorado's current acreage in corn production might save 250,000 acre-feet/year. Significant water savings also appear viable from crop switching. For example, many studies explore savings associated with the replacement of alfalfa with other crops, such as soybeans, barley, beans, beets, cantaloupe, potatoes, sorghum, sweet potatoes, and wheat. While the potential water savings varies according to climate, soil type, and many other factors, potential savings of 40-70% are commonly reported (Squillace and McLeod, forthcoming: Table 2). Finally, water savings from rotational fallowing can be significant, closely tracking the percentage of acreage that is fallowed in any given year. In Colorado, the Super Ditch project in the Arkansas River basin is emerging as a key test bed for this approach, inspired largely by the efforts taking place in California's Palo Verde Valley.

This Synthesis Report

In this report, we summarize some of the recent research and thinking of the Getches-Wilkinson Center (GWC) on this topic, primarily with an eye toward informing the Colorado legislature on options for facilitating a greater application of ATMs. The ideas herein are pulled from a diverse suite of integrated activities conducted between 2014-2015, including:

- A review of all ATM related bills considered by the Colorado Legislature since 2000.[3]
- A review of the draft Colorado Water Plan.[4]
- A review of relevant literature and case studies, drawing heavily on the ATM studies and pilot projects sponsored by the Colorado Water Conservation Board (CWCB) beginning in 2009.[5]
- A comparative study of ATM opportunities, barriers, and options focused on the western US and Australia's Murray-Darling Basin (which is often held up as the gold standard in water transfer efficiency).[6]
- A GWC workshop of attorneys, administrators, and others familiar with Colorado water court "change cases," focused on the "no injury" provision of Colorado water law.[7]
- A case study focused on the struggles in Colorado's Arkansas Basin to learn from the buy-and-dry experience of Crowley County and the nascent efforts to develop the Super Ditch.[8]
- Discussions from two sessions ("Agricultural Conservation and Transfers," and "The Colorado Water Plan") at the GWC conference "Innovations in Managing Western

[3] This work was led by GWC collaborators Monica Green and Colin Mayberry and is featured in Appendix 1.

[4] This effort was led by the GWC's Lawrence (Larry) MacDonnell. Those elements of the review focused on ATMs are reprinted here in Appendix 2; the full report is entitled "Navigating a Pathway to Colorado's Water Future" (cited herein as MacDonnell, 2015), available at http://scholar.law.colorado.edu/books_reports_studies/152/

[5] This work was primarily led by the GWC's Doug Kenney, as was this synthesis report.

[6] This effort was led by the GWC's Mark Squillace, in conjunction with Tony McLeod of the Murray-Darling Basin Authority. Several elements of that work are cited here (as Squillace and McLeod, forthcoming). Full publication of the work in an academic journal is expected in upcoming months. In addition to the cross-national comparison, the article focuses in detail on the opportunities for conserving water in western US agriculture. A very brief note on the Australian approach is provided as Appendix 4.

[7] This effort was led by Britt Banks (GWC Director) and Peter Nichols (GWC Advisory Board Chair). The workshop report (entitled "A Roundtable Discussion on Colorado's No Injury Rule") is attached as Appendix 3 (and cited herein as: Banks and Nichols, 2015).

[8] This effort was conducted by a CU graduate student (Brian Devine) in cooperation with GWC advisors, and is published as a master's thesis (herein cited as: Devine, 2015) entitled: "Moving Waters: The Legacy of Buy-and-Dry and the Challenge of Lease-Fallowing in Colorado's Arkansas River Basin." The Executive Summary is provided herein as Appendix 5.

Water: New Approaches for Balancing Environmental, Social and Economic Objectives" (in June, 2015) that featured sessions that directly tied into GWC's ATM research.

Drawing on this body of work, we next turn to a discussion of ATM barriers, followed by a review of legislative reform efforts, and conclusions and recommendations for moving forward.

2. Barriers to ATMs in Colorado

A variety of barriers impede the development of well-functioning water markets in the West, including ATMs. Some of these barriers are unique to the institutional and physical setting of Colorado, whereas others are more widely applicable. While a great diversity of studies and cases inform our thinking on these issues[9], one of the richest sources of information comes from projects, beginning in 2009, sponsored by the Colorado Water Conservation Board (CWCB) designed specifically to explore ATM barriers and potential solutions.[10] In the CWCB's summary of these efforts, ATM barriers of three general (and interrelated) types are noted: technical, financial/economic, and legal/institutional (CWCB, 2012). Our focus is primarily on legal/institutional considerations, but some of the key technical and financial/economic barriers are first briefly summarized below, as they are important context when considering potential legislative remedies.

Technical and Financial Issues

Measuring Changes in Consumptive Use (CU)

In the studies and pilots overseen by the CWCB, the most commonly cited challenges to ATM adoption are deemed "technical," with many barriers pertaining to the measurement of consumptive use (CU) water savings associated with water conservation projects. When water is sold and transferred to a new user, the amount actually moved is limited to the historical consumptive use (CU), and not the diversion amount. This is done to ensure that other rightsholders on the stream where water is diverted will experience no reduction in water availability due to the transaction. Determining CU occurs as part of a "change case" in water

[9] A variety of the most useful studies are included in the References section.

[10] CWCB funded 15 projects in two phases (2009 to 2011, and 2011 to 2012), at a total cost of $3 million. In the 2007, 2009, and 2012 CWCB Project Bills, the legislature has provided $4 million to assist ATM studies and pilot projects. The Western Governors' Association has suggested other states follow Colorado's example (CWCB, 2012).

court (or in a State Engineer-approved substitute supply plan), typically supported by studies provided by water resource engineers, often using sophisticated computer models.

In an ATM change case, the challenge thus is not only to determine historic CU, but the reduction in CU associated with the conservation effort, with that difference being the amount transferred. The concern is that if the amount of CU saved in a proposed ATM is overestimated, then the transfer of that amount could result in a net increase of depletions by the participating irrigator thereby harming juniors on the system. A simple water balance is useful to understand this challenge in measurement:

Amount Diverted – Return Flows = Amount Consumed (CU)

For many irrigation rights, the diversion amount is often measured using a weir or other technology. However, the other two values can be very difficult to directly measure, and can only be estimated. This can be a real burden for those wishing to use ATMs, as those proposing a water transfer must be able to prove that post-transfer water conditions (including both volume and timing) will remain the same as pre-transfer conditions, in order to avoid injury to other water right holders. To do this requires credible estimates of return flows and CU that are based, in whole or in part, on sanctioned models and tables calibrated with data such as acreage, soil conditions, crop types, local climate conditions, and so on. Of particular importance are efforts to understand how the new irrigation regime affects evapotranspiration (ET). Doing so can involve utilizing a variety of field instruments and remote sensing equipment to monitor variables such as soil moisture, air and crop temperatures, and precipitation, and can entail adjusting assumptions driving energy balance models and other standardized calculations, such as the Penman-Monteith equation.[11]

Infrastructure Considerations

Given that water transfers involve changing the location at which water is consumed, the range of possible transactions is dependent on the infrastructure available to physically move water from one place to another. In some situations, this is not a serious impediment: for example, transferring an upstream water right to a downstream user can be as simple as letting the water flow downhill in the natural streamcourse. However, if the seller is downstream of the purchaser, then the water either needs to be physically transferred upstream, or it has to be "exchanged" upstream with another water source. In the South Platte, where exchanges have

[11] The development of tools such as ReSET (Remote Sensing Evapotranspiration) in the South Platte Basin (Jaeger et al., 2012) and LFAT (Lease Fallowing Accounting Tool) in the Arkansas Basin are relevant examples (Scanga, 2012; Walter, 2012; CWCB, 2012).

been used for years, very little exchange potential remains, which suggests to many participants that new infrastructure--namely storage and pipelines--may be necessary to take full advantage of ATMs that might otherwise be financially and legally viable (CWCB, 2011).

Conversely, the presence of infrastructure to move water can physically concentrate water transfer activity in ways that are problematic. For example, the concentration of buy-and-dry activity in Crowley County (in the Arkansas Basin's Colorado Canal) was facilitated, in part, by the presence of existing storage and delivery infrastructure (Devine, 2015; see Appendix 5 herein). Part of the appeal, as well as the physical mechanism, of ATMs is that they presumably would draw small percentages of water out of an agricultural region's water portfolio, leaving sufficient water in place to maintain crop production. Pulling 5% of water from all agricultural regions rather than 100% of water from 5% of those regions has dramatically better socioeconomic implications for rural Colorado--at least for those in the 5%. But whether or not that can happen is shaped, in part, by the ways in which new infrastructure decisions are made. Those decisions are already inherently complex and feature important economic, environmental and political considerations; assessing how they aid or harm the pursuit of ATMs is a further complication that may, in some cases, merit legislative attention.

The Costs of Doing Business

Much of the promise of water markets hinges on the observation that the economic value of water in municipal and industrial (M&I) uses is often dramatically greater than its value in agricultural uses (Annes, 2015). M&I users often have the financial resources to make such transactions beneficial to participating farmers; however, cities do not wish to overpay, and farmers do not wish to undersell. Lacking information about what constitutes an appropriate price can deter participation in the market, especially for farmers who feel at a strategic disadvantage to cities with the expertise and resources to research the market. With a few exceptions (most notably, for water from the Colorado-Big Thompson Project[12]), relevant transaction prices are rarely available for comparison.

While determining appropriate pricing is a challenge to all water transfers, including traditional buy-and-dry transactions, ATMs raise two special complications. First, given the "partial" farming operations associated with ATMs, and the frequent market-driven changes in crop and

[12] The C-BT market, however, is not representative of most Colorado water markets, in part because the water is "foreign" (i.e., imported from another basin) and can thus be used to extinction without regard for return flows, which greatly simplifies the water court process, and because the Northern District provides a degree of central coordination of the market (Nichols et al., 2001; Howe, 2006). It is also a federal water project, so the "rights" are contractual ones.

livestock profitability, estimating the economic merits of leasing arrangements can be particularly challenging for farmers. Tools such as AgLET (the Agricultural Water Lease Evaluation Tool), CropOptimizer, and related efforts from entities such as the Agricultural Research Station in Fort Collins, and the Regenesis Corporation, are being refined to aid farmers in these calculations (LAVWCD, 2011, 2012; CCGA et al., 2011; Cabot et al., 2012; Squillace and McLeod, forthcoming). Presumably, more experimentation with ATMs, along with efforts to better compile and publicly disseminate information about market activity, will help establish appropriate pricing structures, and could overcome some reluctance to participation.

The other ATM-specific challenge is more fundamental and challenging, and speaks directly to the legal/institutional issues described below. A significant financial impediment to all water transfers is the transaction costs—namely, the legal and engineering fees associated with pursuing the change case in water court.[13] Given that ATMs can modify diversion amounts, CU levels, and return flow volumes in ways that are much more difficult to estimate than in a simple buy-and-dry arrangement, the transactions costs of ATMs are generally assumed to be "equivalent or higher as a permanent buy-and-dry" (CWCB, 2012:9, citing research from CCGA et al., 2011). For cities that might already be reluctant to pursue temporary rather than permanent exchanges, the specter of added transactions costs is a significant additional barrier.[14]

Institutional and Legal Issues

Of particular concern in this investigation are those barriers that are legal or institutional in nature. Some of the barriers are not unique to ATMs, but exist in all transfer situations; ATMs may or may not exacerbate those barriers. Similarly, not all identified barriers are unique to Colorado, although Colorado's reliance on water courts to interpret and enforce the water code creates a special set of challenges (Howe, 2006).

Under the prior appropriation water rights system followed in Colorado, the concept of "beneficial use" plays a central role. Beneficial use is said to be both the basis and the measure of a water right. Beneficial use encompasses several concepts, including: (1) the purpose for which the water is used must be beneficial (typically interpreted quite broadly); (2) the water subject to a water right must in fact be put to use, or else the right to its future use is lost ("use it or lose it"); and (3) the amount of water used is reasonable and appropriate--water may not be wasted.

[13] This is not a new observation. In "Water and Growth in Colorado," published in 2001, Nichols et al. identified high transactions costs as a primary driver of water decisions in the state.

[14] As noted by the CWCB, "In [the cities'] view, the transaction costs for a leased or temporary water supply do not merit participation in the ATM" (CWCB, 2012:10, citing research from CCGA et al., 2011).

The use of water for agricultural, municipal, and industrial purposes are all considered to be "beneficial" uses in Colorado, so a transfer from agricultural use to municipal or industrial use is unlikely to be challenged seriously on that ground during the course of a water right change proceeding.[15] However, the other beneficial use requirements pose potential risks to those interested in conserving water with the idea of transferring that water to other users, whether on a permanent or temporary basis. First, the change proceeding could produce a finding that the conserved water is no longer being "used," and thus is lost to the water right holder. Second, a court could conclude that the ability to conserve water is evidence that past practices were wasteful, thereby justifying a decrease in the amount of water subject to the water right or available for transfer.

A third potential threat stems from the way beneficial use with respect to an irrigation water right is defined; the right is defined in terms of the amount of water historically and reasonably necessary to grow crops on a designated parcel of land, and the amount of water that a water right holder can transfer is limited to average historic consumptive use. Water conservation, by design, reduces consumptive use, which means that each year of conservation will lead to a decline in the water right's average historic CU compared to pre-conservation efforts. So an agricultural water right holder contemplating a temporary or partial transfer of water to other users may rightly fear that his or her water right will steadily lose value through participation in a conserve-and-transfer arrangement. The bottom line being that if a strategy is employed to reduce (i.e., conserve) the amount of water used, it is not at all clear, in the absence of specific law to the contrary, that the water rights holder will retain legal ownership to that saved water, thereby negating any incentive to engage in efforts to reduce water use (*see* Squillace and McLeod, forthcoming).

Such risks are common in the western states, where only a few states provide any means for a water right owner to retain some ownership of conserved water (Duval and Colby, 2013). But there are exceptions, as in California, where conserved water can be "sold, leased, exchanged, or otherwise transferred" (California Water Code, § 1011(b)). Similarly, Montana law asserts that it is the "declared policy of the state to encourage the conservation and full use of water …. [and that] holders of appropriation rights who salvage water may retain the right to the salvaged water for beneficial use" (Montana Code Annotated § 85-2-419). Narrower, but arguably much more effective, programs in Washington and Oregon link conservation to the promotion of instream flows. In Oregon, a water rightsholder can retain ownership of up to 75% (and no less than 25%) of conserved water, with the remainder allocated to the state either for instream flows or for appropriation by other users (Oregon Revised Statutes, §§

[15] The acceptance of some other potential water uses as "beneficial," especially those of an environmental or recreational nature, has proven to be somewhat more contentious. For example, see discussion "Instream Flows for Environmental and Recreational Purposes" in Section 3 below.

537.455-.500). The Washington program primarily targets conservation efforts funded by the state or federal government, with a negotiated portion of the conserved water transferred into the state's instream flow program (Washington State Water Code § 90.42.030).

In Colorado, the assumption is that conserved waters are to be returned to the stream and made "subject to call by prior appropriators" (*See* Colorado Water Conservancy District v. Shelton Farms, Inc. 529 P.2d 1321, 1325 (Colo. 1974)). To encourage ATMs, the legislature can establish certain activities and pilot programs modifying these terms, and has done so in the certain limited contexts (see Section 3 and Appendix 1). But absent such actions, and absent a track record of successfully utilizing such programs, the fear among many irrigators that they may lose at least some portion of their water rights by reducing consumptive use is quite real, regardless of whether they choose to continue farming, decide to sell out completely (buy-and-dry) at a later date, or pursue an ATM.

Beyond establishing who owns any CU freed up on-farm and offered up for transfer, there is the issue of precisely quantifying that amount. As noted earlier, the measurement of water conserved can be a particularly difficult technical challenge in ATMs--especially in those approaches that keep all land in production. In many cases, this amount is unknown until a transfer is proposed, at which time this becomes an issue to resolve in water court--absent any special legislative exceptions.

Anticipating what this ruling might be is a source of considerable uncertainty for transfer applicants, both sellers and buyers. It is also of particular interest to other rightsholders, as any transfer that increases CU on a stream, or that changes the pattern of return flows, has the potential to detrimentally impact the functioning of other water rights. As discussed in detail in Appendix 3, such impacts are prohibited under the "no injury" doctrine. Under Colorado law as currently implemented, any impact--no matter how small or distant--on the magnitude or timing of waters made available to third-party rightsholders constitutes injury, and is grounds for denying the transfer. Additionally, it is the burden of the applicants, not the opposers, to demonstrate that no such injuries could occur from the transfer, in essence, proving a negative.

Combined, these requirements can impose huge costs in legal and engineering fees, as well as lengthy delays. Not only does this discourage transfers, to the extent that these transactions costs apply to both permanent and temporary transfers, it disproportionately discourages temporary and small transactions associated with ATMs.

Other statutes and water court hurdles can provide additional burdens for ATMs. One group of rules are those designed to prevent speculation in water, which normally require that all proposed transfers specify in advance the future users and uses associated with any transfer action (Zellmer, 2008). This can impede efforts to establish highly flexible, group-based efforts,

where multiple actions on multiple farms create a pool of water presumably marketed to many potential buyers, perhaps at flexible time periods (such as droughts).[16]

As noted in the following section (and Appendix 3), the legislature routinely debates many such issues as part of efforts to broaden the suite of ATMs, but change is slow, and uncertainties about how new rules will be implemented is an ongoing concern. If entering into an ATM raises questions about what actions will or will not require water court approval, what the decisions are likely to be in that process (e.g., will rights be diminished?), and how many trips to water court could be required, then the proposal is unlikely to be pursued. Legal uncertainty is a powerful deterrent to experimentation.

3. Reform Efforts

Significantly reforming the environment that precludes widespread ATM adoption is likely to require action and experimentation involving many constituencies, including potential buyers, sellers, third parties, and government actors. Perhaps the most central role falls to legislators, as they are charged with establishing (and reforming as needed):

- What types of arrangements are allowed (and under what terms)?
- Whose interests are to be protected (and whose placed at risk) by these arrangements?
- What bodies and processes will regulate such arrangements/activities?
- What information is needed to establish compliance in the established processes?

Collectively, decisions in these areas establish opportunities, risks, and transactions costs.

Relevant legislative activity in Colorado from 2000 through 2015 is reviewed below.[17] The purpose of this section is to review only enacted legislation; *see* Appendix 1 for a more detailed discussion of all proposed and enacted legislation, highlighting the political realities of each.[18]

[16] This has been an issue in the Super Ditch effort in the Arkansas Valley (Devine, 2015); *see* Flex Water Market HB 15-1038.

[17] Determining what is "relevant" can be difficult. For example, a bill promoting conservation is not a "water transfer" action *per se*, but to the extent that it may incentivize saving water that might later be leased or sold, then it qualifies for this review in that it affects the development of water markets.

[18] Legislative activity involving the CWCB Construction Fund are not be reviewed herein. The Construction Fund is a revolving loan program to fund projects that increase the consumption of Colorado's undeveloped river entitlements and that repair and rehabilitate existing water storage and delivery facilities. Construction Fund legislation may be viewed in Appendix 1.

Flexibility in the Use of Water Rights

Much of the enacted legislation speaks to efforts to establish more flexible rules and processes for water transfers. Four topics are particularly salient: promotion of water banking, facilitating partial fallowing of agricultural land, the methods of creating interruptible water supply agreements (IWSA), and the use of substitute water supply plans. Thirteen key bills were enacted across these categories, and are summarized below:

- Promotion of water banking: HB 01-1354, HB 03-1318, HB 07-1305
- Fallowing of agricultural land: HB 06-1124, HB 13-1248, SB 15-198
- Methods of creating IWSA: HB 03-1334, HB 04-1256, SB 04-032, HB 13-1130
- Use of substitute water supply plans: HB 02-1414, HB 03-1001, SB 03-073

Promotion of water banking. Colorado has a lengthy, but rather unsuccessful, history of trying to promote a flexible and active water market through the use of water banks. In 2001, **HB 01-1354** created a water banking pilot program in the Arkansas River basin in. The bank was designed to provide a clearinghouse to facilitate short-term (one year) bilateral trades between willing buyers (urban users) and willing sellers (agricultural users) through an online bulletin board listing service administered by the Southeastern Colorado Water Conservancy District (Weiner, 2005). Two years later, **HB 03-1318** expanded the banking program to give water conservancy and conservation districts the power to request a water bank in their water division. In 2007, **HB 07-1305** extended the Arkansas River Basin Bank, which was scheduled to sunset that year.

The Arkansas Basin water bank was contentious from the start, highlighting longstanding issues in that basin associated with local economic and environmental impacts of transfers, particularly out-of-basin transfers (Weiner, 2005).[19] It also proved to be burdensome for potential buyers, as the lease price through the bank was not competitive with water marketed through other means (Clifford et al. 2004). Further, while the process was intended to streamline transfers, the administrative process and associated waiting periods were prohibitive, especially for single-year leases (Clifford et al., 2004). As a result, the bank is not utilized, and the water banking concept has not spread to other regions of the state.[20]

[19] Initially, the bank had a "preference" against out-of-basin transfers that, by 2003, had become a firm policy. Transactions were also limited to stored water (Weiner, 2005).

[20] Currently, the only water banking effort receiving serious attention is the nascent effort to develop a Colorado River water bank for responding to an interstate compact call.

Fallowing of agricultural land. In 2006, **HB 06-1124** created a rotational crop management contract as an alternative to permanently transferring an irrigator's entire water right. The program allows water conserved through rotational fallowing to be temporarily transferred to another water user. Though some saw this as a mechanism for cities to surreptitiously set the stage for future buy-and-dry, the fallowing of agricultural land was greatly expanded by reforms in 2013 (**HB 13-1248**) authorizing pilot programs to test fallowing-leasing arrangements. In 2015, **SB 15-198** further expanded the fallowing pilot program to add leases for temporary agricultural, environmental, industrial, or recreational use. A key innovation is that these pilots are administered by the CWCB, with the intent of speeding approvals and limiting transactions costs.

The most high-profile pilot is the Super Ditch effort in the Lower Arkansas Valley, which is implementing its first (very small scale) transfer in the 2015 irrigation season. Many other proposed ATMs in the state, including the proposed Colorado River Compact compliance water bank, seek to build upon the rotational-fallowing model. Opposition to this model has generally touched on two familiar issues: first, a concern that it accelerates the movement of water out of agriculture, and second, that the goals of flexibility and administrative simplicity may reduce both the substantive and procedural protections for objecting parties.

Methods of creating IWSAs. The Colorado General Assembly recognized interruptible water supply agreements (IWSAs) for the first time in 2003, as part of reforms inspired by the 2002 drought conditions that gripped most of the state. Receiving broad support, **HB 03-1334** authorized water users to transfer a portion of their water right to another water user on a temporary basis without permanently changing the water right. The scope of the program was significantly expanded the following year in **HB 04-1256**, when the legislature removed restrictions that permitted IWSAs only during dry years, governor declared emergencies, or when farmers were unable to irrigate. The increased flexibility of interruptible supply agreements garnered support among environmental groups, the Colorado Farm Bureau, and the Colorado Municipal League, and passed unanimously in the House and Senate. Also enjoying broad support in 2004, **SB 04-032** amended the CWCB's Instream Flow statute[21] to allow the loan of agricultural water rights to others for agricultural irrigation uses on the same stream system, and to the instream flow program administered by the CWCB.

Initially, the IWSA program allowed for transfers to occur no more than 3 years in a single 10 year period, with no option for renewal. In 2013, this limitation was eased in **HB 13-1130**, which retains the 3-in-10 limit but allows a water right owner to request up to two additional ten-year periods for the IWSA. Opposition to the program (and its expansion) has mostly come

[21] *See* Colo. Rev. Stat. § 37-83-105.

from water interests in the South Platte basin concerned about potential impacts to senior water rights, especially since IWSAs are approved by the State Engineer instead of the water court.

Use of substitute water supply plans - Following the Supreme Court ruling in *Empire Lodge Homeowners v. Moyer*, the 2002 and 2003 General Assemblies granted additional authority to the State Engineer to allow limited approval of substitute water supply plans involving out-of-priority diversions (*see* **HB 02-1414**, **HB 03-1001** and **SB 03-073**). Substitute water supply plans provide water users a mechanism to replace out-of-priority depletions on an interim basis. This allows temporary changes of use and, in the case of permanent changes, the protection of other water rights during litigation involving water change cases and augmentation plans. Importantly, the State Engineer has determined that substitute water supply plans cannot be used to support new or proposed residential subdivisions.[22]

Opposition to the expansion of substitute water supply plans has followed a familiar pattern, with senior rightsholders (mostly on the South Platte) concerned that approval of plans by the State Engineer do not ensure adequate protections for other rightsholders, and that **SB 03-073** is merely a mechanism for delaying the establishment of augmentation plans for out-of-priority depletions. Water court, they argue, is the proper place to deal with such complicated injury issues.

Protections for Those Marketing Water Rights

Enacted legislation in this period explores two topics: protecting historical consumptive use (CU) from reductions due to water conservation, and clarifying mechanisms for determining historical CU. Five key bills were enacted across these categories, and are summarized below:

- Protecting historical CU from reductions due to water conservation: SB 05-133, SB 13-019, SB 13-075
- Clarifying mechanisms for determining historical CU: SB 13-074, SB 15-183

[22] See POLICY 2003-2: IMPLEMENTATION OF SECTION 37-92-308, C.R.S. (2003) REGARDING SUBSTITUTE WATER SUPPLY PLANS (dated 8/12/03) which states: "Requests for substitute water supply plans for providing domestic water within new or proposed residential subdivisions will not be granted because of the potential of the substitute water supply plan not being renewed and a permanent plan for augmentation not being approved by the water court. Under these circumstances, persons purchasing lots and constructing homes could potentially be faced with mandatory curtailment of their water source" (page 2). http://water.state.co.us/DWRIPub/Documents/policy2003-2.pdf

Protecting historical CU from reductions due to water conservation. As noted earlier, one of the greatest deterrents to ATMs is the notion that the "use it or lose it" concept could be utilized to reduce the water right of an irrigator that conserved water. **SB 05-133** was the first bill to address the issue, providing that an owner of a water right that participates in an approved water conservation program can overcome the presumption of abandonment of their unused water right. In 2013 (during the second year of drought), the General Assembly went further in **SB 13-019** by prohibiting water judges from considering years of reduced consumption (due to participation in a conservation program) in calculating a water user's historic CU. The final legislation was not as broad or forceful as proponents had intended, but some clarification has occurred.

During the same legislative session, the General Assembly extended this protection to the withdrawal of designated groundwater in **SB 13-075**. There are few rivers in eastern Colorado, but there are large groundwater resources that are important to agriculture and eastern municipalities. Some irrigators in the designated groundwater basins wanted to reduce groundwater withdrawals by shutting off part of their irrigation system, but such action may have adversely impacted the owner's groundwater rights. In response, **SB 13-075** specifies that once the State Engineer issues a final permit for the withdrawal of designated groundwater, a reduction in the amount of water used pursuant to the permit due to the conservation of water is not grounds to reduce the maximum annual volume of the appropriation, the maximum pumping rate, or the maximum number of acres that have been irrigated.

Clarifying mechanisms for determining historical CU. Since 1937, all irrigation water rights in Colorado included in their decree a specific maximum amount of acreage to which the water right could be applied. However, pre-1937 water rights lacked a decreed acreage limit. Given that these senior rights are often the most desirable candidates for water transfers, and that the acreage of land irrigated is a key factor in determining how much water is available for transfer, this was seen as an impediment to transfer activity. In 2013 the General Assembly enacted **SB 13-074** to create certainty in pre-1937 water rights by establishing a mechanism to determine the amount of irrigated acreage available to a pre-1937 water right. Specifically, the maximum amount of acreage irrigated during the first 50 years following the original decree is now the amount of acreage available to a water right where such acreage was not already adjudicated.

In 2015, the legislature enacted **SB 15-183**, which provides that a water judge shall not reconsider or re-quantify the historical CU portion of a water right for which a previous change of water right has been judicially approved and for which the historical CU was previously quantified. By way of background, when a water right is initially adjudicated, the decree

generally sets forth a point of diversion, a decreed amount of water attributable to the right and the decreed uses for the water. Notwithstanding the amount set forth in the initial decree, over time the water right is further defined and limited by the historical use made of the decreed right. The owner of such right is entitled to change the point of diversion or uses in a change of use proceeding, but generally must quantify the historical CU of the relevant water right so as not to expand the historical uses that have been made of the right and cause injury to other users. This has always been a source of some fear (and cost), as these proceedings often result in a "ratcheting down" of a water right. Under **SB 15-183**, once the historical CU has been established in a change of use decree, those CU determinations carry forward in subsequent change of use proceedings. This provides a needed element of certainty to irrigators considering a water transfer.

Protections for Other Water Rightsholders and Third Parties

Other water rightsholders and third parties who are not the actual buyers and sellers of water can also be impacted by transfers. Enacted legislation in the period from 2000 to 2015 addresses three topics concerning these third-party effects: protecting water quality resulting from a change in use, mitigating transfer impacts on local economies, and the protection of stored water. Three key bills were enacted across these categories, and are summarized below:

- Protecting water quality issues resulting from a change in use: HB 07-1132
- Methods for mitigating transfer impacts on local economies: SB 03-115
- Protection of stored water: SB 13-041

Protecting water quality resulting from a change in use. Water diversions can increase water pollution concentrations in a stream. For example, a water diversion upstream of a polluted river segment can remove water that would otherwise dilute the pollution. As such, downstream water users are potentially left with degraded water quality when water is diverted higher up on the stream. In 2007, the Colorado General Assembly addressed these concerns by enacting **HB 07-1132**, which authorized water court judges to address decreases in water quality resulting from a change in the use of a water right and that cause a violation of the water quality standards for the affected stream. The bill is an amended version of **HB 06-1352**, postponed indefinitely in 2006, which received strong opposition. Critics argued that issues of water quality should be left with the Colorado Water Quality Control Commission, and expressed concern regarding potential impacts on future water development projects. By limiting the scope of the bill to permanent large transfers (greater than 1,000 acre feet), **HB 07-1132** won support from previous opponents.

Mitigating transfer impacts on local economies. Large areas of agricultural lands in Colorado have been dried up to provide water to growing municipalities ("buy-and-dry"). Dried up farms pay less in property taxes and provide fewer economic benefits to a rural community. In order to mitigate the reduction in property tax revenues or bond repayment revenues attributable to agricultural water transfer to another county, the General Assembly considered a bill in 2002 (**SB 02-148**) that would have compelled water court judges to consider requiring payments to offset lost tax revenue and to pay for bonded indebtedness. Although the intent was to protect rural areas, agricultural interests strongly opposed **SB 02-148**, arguing that a decree forcing terms on an agricultural water right owner that wishes to sell his or her water to a location outside his or her own county would be an assault on the fundamental rights inherent in private property ownership. The matter was tabled until 2003, when the legislature enacted a narrower, and much more popular, bill in **SB 03-115**, which authorized the court to impose specified payments to mitigate for the reduction in property tax revenue upon any person who files an application for removal of water as part of a significant water development activity.

Protection of stored water. Colorado has over 2,000 dams and reservoirs that store water for a variety of immediate and potential future uses. In 2011, the Colorado Supreme Court held that storage of water is not a beneficial use, at least where flood control and fire or drought protection are not the stated uses of the water, and that to perfect a conditional storage right, the water must be released from storage and put to beneficial use. Moreover, an applicant must show that it has first exhausted its absolute storage rights before its conditional storage rights can be perfected. This decision was of concern to many interests, but particularly municipalities holding water in storage as a long-term drought buffer or to meet projected future demands, as those rights would be required to remain conditional until the date they were actually used.

In response, the General Assembly enacted ***SB 13-041*** to expand the term "beneficial use" to include the impoundment of water for firefighting or storage for any lawful purpose, and further specifies that a system with multiple water storage features may be granted an absolute water storage right without evidence of full utilization of all component water rights. The legislation also specifies that a water right is not abandoned when the water is in long-term storage. By adopting **SB 13-041**, the Colorado General Assembly determined that the "use it or lose it" rule should not be strictly applied to water storage rights, because holding water in storage for drought protection and to meet future demand is prudent water management.

Instream Flows for Environmental and Recreation Purposes

Enacted legislation in this period explores three topics: the scope of recreational in-channel diversions ("RICDs"), the scope of environmental instream flows, and the mechanisms and incentives associated with rightsholders who temporarily loan (or lease) consumptive use rights to the state's Instream Flow Program. Seven key bills were enacted across these categories, and are summarized below:

- Recognition of RICDs: SB 01-216, SB 06-37
- Scope of Environmental Instream Flows: SB 02-156
- Water Loaned to the Instream Flow Program: HB 03-1320, HB 05-1039, HB 07-1012, HB 08-1280

Collectively, this body of legislation may initially appear to lie outside of our "water transfer" focus. However, they are included here for two primary reasons. First, they are important in shaping how, where and for what water is allocated--all qualities that are relevant in shaping possible water marketing behavior. And second, despite the focus on instream flows, these bills touch on several subjects that are prominent concerns in the ag-to-urban temporary water marketing context, such as the time parameters associated with transfers, the impact of transfers on the definition (or potential redefinition) of historical consumptive use (CU), the determination of injury to other rightsholders, and the role of state agencies--especially the CWCB--in making such determinations.

Recognition of recreational in-channel diversions (RICDs). In 1992, the Colorado Supreme Court recognized for the first time an appropriative water right for in-channel use to support boating ("RICDs").[23] Many parties found this threatening, arguing that an appropriator could potentially obtain high recreational in-channel flows that severely limited opportunities for new water development, thus intensifying the pressure for ag-to-urban water transfers. RICD proponents, in contrast, feared that the unclear status of these rights would relegate them to "second-class" status under Colorado water law. These competing interests were addressed in legislation in 2001 and 2006.

SB 01-216 established the process and criteria for reviewing and approving new RICDs. A critical component of the legislation specified that only "a county, municipality, city and county, water district, water and sanitation district, water conservation district or water conservancy district" could establish RICDs, and only with the approval of the CWCB. Further restrictions

[23] *City of Thornton v. City of Fort Collins*, 830. P.2d 915 (Colo. 1992).

were sought in 2005's **SB 05-062**, prompted by Steamboat Springs RICDs on the Yampa River, which would have required CWCB to consider whether a proposed RICD would "affect" development of future upstream storage and water development projects. Recreation interests, joined by environmental organizations and some local governments, successfully defeated **SB 05-062**, and helped motivate RICD hearings that resulted the following year in **SB 06-037**. Debate over **SB 06-037** was intense, with RICD proponents primarily seeking to reduce CWCB's review in the RICD approval process, while RICD opponents focused on ensuring that RICDs were limited to only the minimum flows necessary. The compromise legislation finally enacted appears to have found a stable middle ground, and RICDs are now entrenched as a permanent feature of Colorado water rights and allocation (Porzak et al. 2007).

Scope of Environmental Instream Flows. The scope of the state's instream flow program was also a subject of debate in this period. When first established in 1973 by **SB 73-97**, the Instream Flow Program recognized "the need to correlate the activities of mankind with some reasonable preservation of the natural environment." To environmental interests, the program featured two serious limitations: first, that rights were limited to an amount necessary only to "preserve" the natural environment, not improve it; and second, that only CWCB could hold such rights. In 2002, the Colorado General Assembly enacted **SB 02-156** to address the first (and only the first) of these concerns, empowering CWCB to acquire water, water rights or interests in water to "improve" the natural environment to a reasonable degree (more than "preserve").

Water loaned to the instream flow program. Efforts to permit and incentivize water rights holders to loan (or lease) water temporarily to the state's instream flow program has been a major focus of legislative activity. The ability to temporarily "loan" water to CWCB for instream flows was at issue in two 2003 bills, **SB 03-085** and **HB 03-1320**. The key difference in the two bills was that **HB 03-1320** limited this option to years when the Governor declared a drought emergency, whereas **SB 03-085** did not have any such drought limitation, but did call for loans to be limited to 3 years in 10. Both measures passed the legislature, but only **HB 03-1320** was signed by the Governor into law. This choice was essentially flipped in **HB 05-1039** in 2005, in which the drought declaration requirement (featured in **HB 03-1320**) was eliminated, and the 3 years in 10 requirement (featured in **SB 03-085**) was adopted. If the loan is not exercised in the first 10-year period, a second 10-year period is authorized.

In 2007, **HB 07-1012** addressed the perceived risks of making such instream flow loans or leases, clarifying that loaned water could not be considered "abandoned" and thus lost to the rightsholder. A similar theme of protecting right holders who loan or lease water for instream flows was featured in **HB 08-1280**, which provided that leasing or loaning water to the CWCB

for instream flow use will not result in a reduction of the historic consumptive use (CU) credited to the subject water right in any future water court proceeding to change that water right. The legislation also eliminated the presumption of abandonment for water rights that are the subject of a long-term lease or loan of water to CWCB for instream use. Also notable in 2008 was the failed effort to pass **HB 08-1369**, which would have provided financial incentives for rightholders to make permanent instream flow donations.

In recent years, the biggest legislative effort has centered on proposals to allow any reduced diversions resulting from irrigation efficiency improvements (such as canal lining) to be transferred into the state instream flow program. After several years of effort, this idea emerged in **SB 14-023**, which was passed by the legislature but was vetoed by the Governor. While some agricultural interests had supported the bill (e.g. the Colorado Cattlemen's Association), the Colorado Farm Bureau argued it could potentially injure other water rightsholders and could increase the necessity and related expenses of defending agricultural rights in water court against potential transfers, a concern cited by the Governor.[24] The bill was also opposed by the Colorado River District, a critical ally in the Governor's efforts to craft a Colorado Water Plan. Instead, Governor Hickenlooper urged the establishment of a pilot program to test the idea, a topic addressed the next year in **HB 15-1222** which closely follows the follow established in **HB 13-1248**. The bill called for CWCB to approve up to a total of 12 pilot projects, with a maximum of 5 pilot projects in any one water division, with only water divisions 4, 5, 6, and 7 eligible to participate. The pilot projects would have only affected a temporary change in the use of the water right, and the amount of water efficiency savings could not have been more than the minimum amount necessary to preserve the natural environment to a reasonable degree. However, opponents were not convinced that the no-injury standard and transaction costs were sufficiently addressed, and **HB15-1222** died on party lines in the Senate Finance Committee.

4. Conclusions and Recommendations

Despite all the promise of ATMs, the fact remains that their application in Colorado has been very slow and isolated, and for a diversity of reasons. In a few key areas, the legislature could be instrumental in moving ATMs forward. In the remaining pages, two areas are identified that are likely most suited to legislative reforms. However, prior to discussing those two "action areas," it is first necessary to acknowledge the political setting in which ATMs reside.

[24] Governor Hickenlooper noted in the veto letter: "[I]mportant questions remain about how best to expand the state's in-stream flow program without creating injury or cost to downstream users, principally in agriculture."

The Challenging Politics of ATMs

As noted in the general summary of ATM barriers and, more directly, the review of reform efforts, efforts to promote ATMs bring out deep divisions among various water constituencies, with some parties arguing that streamlined transfers and a broader adoption of ATMs is key to avoiding buy-and-dry and protecting rural economies, while others argue that ATM reforms only make it easier to accelerate the dry-up of agricultural lands. In part, this is a question of differing philosophies, but in part it is also a question of trust, particularly among some residents of rural Colorado who fear that ATM reforms will be unduly shaped by urban and environmental interests--with the implicit backing of state officials--and also, by senior water rights holders who feel that efforts to build flexibility and administrative ease into transfers do so by removing the substantive and procedural protections currently afforded to them in water court. Many also fear that a focus on ATMs may do nothing to quell the trend of transfer activity being concentrated in areas that have the "misfortune" of being in regions that--due to geography, economics, and the presence of infrastructure--are most desirable for Front Range urban customers. This regional dimension can be an important factor in shaping legislative deliberations.

Given this reality, it is critically important to acknowledge an important overarching impediment that is not often captured in the literature—namely the political reality that ATMs are rarely anyone's preferred option: their "Plan A." While those in the agricultural community generally view ATMs as preferable to buy-and-dry, it is still less desirable than having no ag-to-urban water transfers at all. Cities are generally eager to avoid the bad publicity of buy-and-dry, but the fact remains that ATMs are often not seen as offering the same level of reliability and predictability as outright purchases, and can entail proportionally larger transactions costs.

Environmentalists and public interest advocates are often more focused on managing urban demands—for both environmental and financial reasons—than promoting ATMs that expand urban consumption (and sprawl) and create a need for new infrastructure. Political leaders are also torn—attempting to facilitate ATMs on one hand, while also working to maintain existing protections for other rightsholders and establishing new protections to those third-parties historically impacted by transfers. As shown in Appendix 1, it is not unusual for the legislature to simultaneously consider competing bills that both streamline and further regulate water transfers.[25]

[25] While this report focuses primarily on efforts to broaden, streamline and otherwise encourage water transfers, the legislative record is full of efforts that seek to restrict transfers. For example, among the bills requiring buyers to provide mitigation/compensation to areas-of-origin are SB 02-148, SB 03-236, SB 03-115, HB 03-1113, HB 04-1040, HB 05-1296, and HB 10-1159. Furthermore, for many bills, it not unusual for proponents to characterize the proposed legislation as a means of protecting agriculture,

Similarly, while the Colorado Water Plan (second draft) labels the "rapid removal of water from farms and ranches to supply urban growth" as an "unacceptable" outcome, it also uses that same language to lament those "transactional costs that prohibit efficient and effective water sharing" (chapter 1, pages 1 and 2).[26] Surely it is possible to both dislike agricultural-to-urban water transfers in general while supporting the development of ATMs that open up new and streamlined transfer opportunities, but for many, that position is a less than ideal compromise. Working through the many legal, technical, administrative, and financial issues that impede ATMs is difficult work, a task made all the more challenging when guided by a coalition of interests that view these options with muted enthusiasm.

Moving forward, the political base of support for ATMs will likely need to be strengthened before the legislature will be sufficiently motivated to aggressively tackle the barriers. This is a task that will largely need to occur in processes outside of the legislative arena, and quite possibly, outside of the Colorado Water Plan process itself (with its reliance on the Basin Roundtables) in which many stakeholders see the need to take a "defensive posture." An academic setting may prove useful for this task, as might processes that are professionally facilitated and that provide some anonymity for the participants. The "no injury" workshop conducted by the GWC and summarized in Appendix 3 may be an appropriate model.

Action Areas

Each of the highly varied GWC projects described in this summary identify specific recommendations for future legislative action, and the reader is encouraged to consult those sources for detailed suggestions. Here, the majority of the recommendations are distilled into two broad categories:

- Simplifying how conserved water savings are calculated in ATM transactions; and
- Creating an institutional environment that makes it easier to conduct ATM transactions.

If there is an observation that ties these two "action areas" together, it is that ATMs will never prevail over buy-and-dry until temporary transfers are easier than permanent ones. Currently, with a few exceptions, this is generally not the case in Colorado. A commitment to pursuing streamlined processes and innovative rules and procedures regarding temporary transfers not only can shift the focus in the market to ATMs, but can establish the ideal laboratory for rapid

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while opponents challenge the bill as a mechanism for accelerating buy-and-dry (e.g., see SB15-038, Flexible Water Markets, summarized in Appendix 1).

[26] See *Introduction*, pages 1-2; https://www.colorado.gov/pacific/sites/default/files/2ndDrftCh1.pdf

learning and adaptation of the rules that will not only shape future ATMs, but any reforms aimed at the permanent water rights market.

Simplifying the Estimation and Proof of Water Savings Through a Combination of Technical, Administrative, and Legal Reforms

Estimating water savings is largely a technical challenge, and is one for which we already have a significant base of data and computational tools which could be rapidly expanded. Some error will always be present, but establishing agreement on methodologies and standard assumptions (e.g., evapotranspiration rates given certain crop, soil and regional considerations), and requiring the use of a simple "safety net" (e.g., a 10% reduction of the calculated amount) to account for slight uncertainties in savings estimates, should suffice for ATMs. A legislative directive (and appropriations) to a technical body (likely the State Engineer's Office) to implement guidelines, refine techniques, and to oversee the ongoing monitoring and research necessary to continuously verify and improve assumptions and procedures, could quickly advance the state-of-the-art.[27] More importantly would be the presumption that proposed ATMs which conform to and satisfy these technical guidelines--as reviewed by technical body noted above--satisfy the "no injury" standard. Any party that disputed that finding could appeal to water court, but would assume the burden of proof in such a proceeding.[28]

Should the legislature choose to take these bold steps, the result would be a process that insulates many ATMs from the transactions costs and uncertainties associated with water court, and that provides a transparent and accessible means for potential buyers and sellers to easily anticipate the volume of a potential water transfer. That would go a long way toward making ATMs easier than permanent transfers.

This type of simplified process for estimating water available for transfer is less technically challenging for temporary or rotational land fallowing techniques than for methods that keep all land in production (via deficit irrigation or crop switching), both from a technical and legal standpoint. This is likely an argument for building on reforms in the fallowing program in the

[27] In our "no injury" workshop (see Appendix 3), some participants argued that the State Engineer may already have the authority to undertake this role, but all agreed that legislative direction could erase any doubt.

[28] Participants in our "no injury" workshop (Appendix 3) were divided on this proposal, although the need to reduce the existing burden of the "no injury" standard was widely recognized.

short term[29]; addressing the technical and legal challenges of deficit irrigation and crop switching may be a longer-term challenge.

Establish and Empower Independent Third Party Organizations to Facilitate ATMs

Establishing a healthy and diverse temporary water transfer market requires reforms that can broaden the suite of buyers and sellers and the ATMs at their disposal, that can help connect those buyers and sellers, and that can empower both parties with the information needed to make sound decisions. Also desirable would be reforms that can help guide participants through the administrative process, and perhaps additionally, that can play a coordinating role in addressing potential regional and cumulative concerns, such as the concentration of transfer activity in confined regions, and the potential need to coordinate the development of new infrastructure. A wide variety of exchanges, water banks, and other "bodies" are possible; in Colorado, some of the relevant ideas and nascent efforts include the Super Ditch effort, the Flex Market, and the Lower South Platte Water Cooperative (CWCB, 2012).

The establishment of such bodies needs to be married to reforms that allow them to succeed. One such required reform will be to ease existing anti-speculation rules, which condition approval of any transfer on the upfront identification of a specific new user and use.[30] In the context of a third party organization attempting to market water made temporarily available, the anti-speculation doctrine is likely to preclude the necessary "bundling" of rights needed to allow multiple irrigators to contribute a supply marketed to many potential buyers at many potential time frames.[31]

[29] Pilot projects authorized under HB 13-1248 already focus on fallowing, and include efforts to limit transactions costs by placing approval authority within an administrative body: the CWCB.

[30] In the past 2 legislative sessions, reforms have been proposed to overcome this barrier, but were unsuccessful. (See Appendix 1 for a discussion of HB 14-1026 and HB 15-1038, which propose the creation of "flex" markets, a term used to describe a water right change where the designation of the eventual buyer/user is "flexible.")

[31] MacDonnell (2015) (herein in Appendix 2) suggests the use of a credit system to allow easy bundling of rights.

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6. Appendices

- Appendix 1: Summary of ATM Legislative Activity in Colorado (2000-2015)
- Appendix 2: Navigating a Pathway to Colorado's Water Future: ATMs
- Appendix 3: A Roundtable Discussion on Colorado's No Injury Rule
- Appendix 4: An Overview of the Australian Water Marketing Model
- Appendix 5: Moving Waters: The Legacy of Buy-and-Dry and the Challenge of Lease-Fallowing in Colorado's Arkansas River Basin (Executive Summary)

Appendix 1: Summary of ATM Legislative Activity in Colorado (2000-2015)

-2015-

House Bill 1038 Flexible Water Markets

House Bill 15-1038, 70th Gen. Assemb., 1st Reg. Sess. (Colo. 2015), would have created a more flexible change-in-use system that would have allowed an applicant who seeks to implement fallowing, regulated deficit irrigation, reduced consumptive use cropping, or other alternatives to permanent agriculture dry-up of irrigated lands to apply for a change in use to any beneficial use, without designating the specific beneficial use to which the water will be applied. The bill was a revision of proposed HB 14-1026, which did not pass, in part, because of concern that it did not comply with Colorado's anti-speculation doctrine. HB 15-1038 was an attempt to comply with the state's anti-speculation doctrine as outlined to the interim water resources review committee in September 2014 by Justice Greg Hobbs.[32] Unlike the previous version, the bill prevents conserved water from moving anywhere, anytime for any use. It also prevents water from being transferred from one basin to another and restricts the flex right to a 10-year trial period in the South Platte River basin to avoid opposition from the Western Slope and Arkansas River basins.

Critics believed the proposed legislation, backed by water interests in the South Platte, would harm the Arkansas River basin by allowing 10 consecutive years of the entire consumptive use from a farm to be moved to other uses. West Slope interests claimed that allowing these transfers would increase the value of water and spur more sales for municipal uses, leading to buy-and-dry.[33] Opposition also expressed concern that the legislation would harm irrigation water right holders who want to continue in agriculture but aren't parties to such flex agreements because it would force them to protect their water rights in court. Postponed indefinitely.

[32] STAFF SUMMARY OF MEETING, WATER RESOURCES REVIEW COMMITTEE, (Justice Hobbs responded to questions from the committee regarding House Bill 14-1026, concerning the authorization of flexible use markets), Sept. 4, 2014.

[33] Ashby, Charles, *House Approves 'flex-use' Water Bill*, (February 10, 2015) http://www.gjsentinel.com/news/articles/house-approves-flexuse-water-bill

House Bill 1222 Water Efficiency Savings Instream Use Pilot

House Bill 15-1222, 70th Gen. Assemb., 1st Reg. Sess. (Colo. 2015), would have allowed the CWCB to acquire water rights for instream flow use on a pilot project basis without the need for a water court-decreed change of water right. Those water rights would have represented the savings attained by implementing a limited number of nonconsumptive water efficiency pilot projects. The intent of the bill was to incentivize efficient irrigation practices that would result in agricultural water savings which then would temporarily transfer to instream flows.

The proposed legislation was the result of Governor Hickenlooper's veto of SB 14-023 in 2014. SB 14-023 was vetoed because, "important questions remain about how best to expand the state's in-stream flow program without creating injury or cost to downstream users, principally in agriculture."[34] As a result, HB 15-1222 allowed CWCB to approve up to a total of 12 pilot projects and up to 5 pilot projects in any one water division, but only in divisions 4, 5, 6, or 7. The pilot projects would have only affected a temporary change in the use of the water right, and the amount of water efficiency savings could not have been more than the minimum amount necessary to preserve the natural environment to a reasonable degree.

After extensive stakeholder meetings and an educational webinar hosted by Colorado Water Congress providing a factual overview of the bill's contents, intention, and process,[35] opponents were not convinced that the no-injury standard and transaction costs were addressed. The bill died on party lines in the Senate Finance Committee.

Senate Bill 183 Quantify Water Rights Historical Consumptive Use

Senate Bill 15-183, 70th Gen. Assemb., 1st Reg. Sess. (Colo. 2015), created a set standard for the quantification of the actual historical consumptive use of a water right and protects that quantified amount moving forward. The bill requires that when a water judge decrees a change in water right, the quantification of the actual historical consumptive use of the water right be based on a representative study period that includes wet years, dry years, and average years; does not include years of undecreed use of the subject water right; and need not include every year of the entire history of use of the subject water or periods of nonuse of the water right.

[34] Gov. John Hickenlooper, Veto Letter, https://www.colorado.gov/pacific/governor/news/gov-hickenlooper -vetoes-bill-over-unresolved-concern-water-rights-supports-pilot-program-keep (last visited on Aug. 20, 2015).

[35] Webinar - The Story of SB-023, Colorado Water Congress (presentation includes an introduction from the bill sponsor, Senator Gail Schwartz, an overview of the bill from Kevin Rein, Deputy State Engineer, and a narration of the bill's long journey with Bruce Whitehead of Southwestern Water Conservation District and Aaron Citron of the Environmental Defense Fund)

The bill also prohibits reconsideration or re-quantification of the historical consumptive use if the historical consumptive use has already been quantified in a previous change decree. However, to limit future consumptive use to the previously quantified historical consumptive use, the water judge may impose terms and conditions on the future use of the portion of the water right that is subject to the change.

The purpose of the bill was to reduce litigation by providing certainty in the complex system of changing water rights from agricultural to municipal use. In a letter of support, the City of Westminster wrote that its "water rights portfolio is one of its most valuable assets, thus this issue is of the utmost importance. A portion of these water rights will need to be changed in water court from agricultural to municipal use. SB-183 ensures our rights are protected during the change process. The issues in this bill have been argued at length in water court, and in several cases up to the Supreme Court. If the bill is passed, Westminster will have more certainty about the quantity of water in our portfolio, and will not be forced into buying more water to meet the needs of our community."[36] West Slope interests expressed concern that the bill would allow water right holders who use water for unapproved purposes to get away with that illegal use. The bill was supported from virtually every water group in the state except the Colorado River Water Conservation District. Effective May 4, 2015.

Senate Bill 198 Expand Fallowing Pilot Program Non-municipal Uses

Senate Bill 15-198, 70th Gen. Assemb., 1st Reg. Sess. (Colo. 2015), expanded the fallowing pilot program to add leases for temporary agricultural, environmental, industrial, or recreational use. In 2013, HB 1248 established a procedure for the CWCB to approve up to 10 pilot projects that temporarily transfer agricultural water rights to municipal water users. An agricultural water rights owner can lease his or her water to a municipality for up to 3 out of 10 years, during which time the owner fallows the affected agricultural land. To date, one pilot project has been approved under HB 13-1248. Critics were concerned that the pilot program would bypass water court proceedings meant to prevent injury to other water right holders.[37] The bill was also criticized because it disallows transfers only from the Colorado River and Rio Grande basins, while ignoring more exports from the Arkansas River basin.[38] Effective May 1, 2015.

[36] SENATE BILL 15-183 – Official City Position, http://www.ci.westminster.co.us/Portals/0/Repository/Documents/CityGovernment/SB%2015-183%20Official%20City%20Position.pdf (Mar. 5, 2015).
[37] Transcript of Audio Tape: Hearing on SB15-198 Before the Senate Comm. on Agriculture and Nat. Resources, 63rd Gen. Ass., 1st Reg. Sess. (Colo. Feb. 12, 2015) (on file with Colorado State Archives).
[38] *Id*.

-2014-

House Bill 1026 Water Flexible Markets

House Bill 14-1026, 69th Gen. Assemb., 2nd Reg. Sess. (Colo. 2014), would have created a more flexible change-in-use system by allowing an applicant who seeks to implement fallowing, regulated deficit irrigation, reduced consumptive use cropping, or other alternatives to the permanent dry-up of irrigated lands to apply for a change in use to any beneficial use, without designating the specific beneficial use to which the water will be applied. The purpose of the bill was to create a market-driven approach to Colorado's water resource management regime by promoting more efficient water allocation practices.

Opponents were primarily concerned that the bill ran afoul to the anti-speculation doctrine. In *Upper Yampa Water Conservancy Dist. v. Dequine Family L.L.C.*, the Colorado Supreme Court, held that in order to obtain a "speculative" water right, a municipal entity must demonstrate "firm contractual commitments" and the municipal entity must "have a specific plan and intent to divert (or store) and control 'a specific quantity of water for specific beneficial uses.'"[39] Accordingly, opponents claimed that a flex decree would, in essence, allow for a species of water speculation because the holder of the flex decree will not be required to designate the specific beneficial use to which the flex decree will be applied.

Furthermore, opponents voiced a strong distrust for creating a flexible water market. A detractor of the bill, Jay Winner, general manager of the Lower Arkansas Valley Water Conservancy District, stated that the bill "could be a Trojan horse for municipalities to come in and take water from farms."[40] He stated that the bill would allow "cities [to] take water off the land 80 percent of the time."[41] The Pueblo Chieftain, a newspaper from the historically agriculturally-based community of Pueblo, Colorado, alleged that the "[p]olitically powerful urban interests are flexing their muscles again in a greedy quest to take water from Colorado's farms and ranches. The convergence of money and political influence, both natural offspring of rising city and suburban populations, threatens to destroy Colorado's farm communities…"[42]

Senate Committee on Agriculture, Natural Resources, & Energy voted 6-0 to postpone indefinitely to allow for more stakeholder conversations around the flexible water market

[39] 249 P.3d 794, 800 (Colo.2011) citing § C.R.S. 37–92–103(3)(a), (3)(a)(II).

[40] Chris Woodka, *Flex Marketing Bill Advances*, The Pueblo Chieftain (Feb. 12, 2014).

[41] I*d*.

[42] Frank Hoag, *Flexing Muscle*s, The Pueblo Chieftain (Feb. 12, 2014), http://www.chieftain.com/opinion/editorials/2277431-120/publisher-colorado-frank-hoag.

concept.[43] As a result, proponents introduced House Bill 15-1038 Flexible Water Markets the following year that addressed the anti-speculation concern.

Senate Bill 23 Transfer Water Efficiency Savings to Instream Flow

Senate Bill 14-023, 69th Gen. Assemb., 2nd Reg. Sess. (Colo. 2014), would have allowed water efficiency savings to be transferred through a change of water right only to the CWCB, and only for instream use, with the approval of a water judge. Applicable only in water division 4, 5, 6, or 7, water efficiency savings that would have changed under this bill would not have been subject to abandonment. The bill was a product of a several years of efforts identifying incentives for agricultural water efficiency. In 2013, SB13-019 protected Colorado headwaters by allowing water right owners to conserve by diverting less five out of every ten years without it impacting their historical consumptive use. After an extensive stakeholder process, SB 14-23 was introduced to incentivize irrigation efficiency and not penalize the water rights of those making irrigation infrastructure improvements. The bill was designed to allow the "saved" non-consumptive water from efficiency upgrades to be put back into the stream while protecting the water rightsholders and downstream users.

Agricultural interests were divided over the proposed legislation. The Colorado Cattlemen's Association supported the bill while the Colorado Farm Bureau opposed it expressing concern for potential injury to other water right holders.[44] According to Chris Treese, Colorado River Water Conservation District, the principal concern is that the process could represent a cost to surrounding water users who take it upon themselves to investigate whether the change would harm their rights. Governor Hickenlooper vetoed the bill, saying in his veto letter, "important questions remain about how best to expand the state's in-stream flow program without creating injury or cost to downstream users, principally in agriculture." Hickenlooper asked the Colorado Department of Natural Resources and the Colorado Water Conservation Board to team up with lawmakers to make a pilot program in anticipation of tackling the issue in the following session.[45] As a result, House Bill 15-1222 Water Efficiency Savings Instream Use Pilot was introduced the following year.

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[43] See http://www.gailschwartz.org/legislation/2014-legislation/ (last visited on March 29, 2015).

[44] The Colorado Farm Bureau opposed Senate Bill 23. "It's an interesting dilemma," Shawcroft said. "Colorado water law says the state and anyone changing a water right has to prove they're not injuring anyone else. Anyone who believes they're injured has to lawyer up and engineer up and has to prove their point…"

[45] *Id*.

-2013-

House Bill 1248 Pilot Projects for the Leasing of Water for Municipal Use

House Bill 13-1248, 69th Gen. Assemb., 1st Reg. Sess. (Colo. 2013), added a new subsection to Colo. Rev. Stat. § 37-60-115 that calls for the CWCB to select and help finance pilot projects, which may last up to 10 years, to demonstrate the feasibility of fallowing agricultural irrigation and the leasing of the associated water rights for temporary municipal use. The bill was introduced to demonstrate cooperation, evaluate feasibility, provide sufficient data, and demonstrate how to operate, administer and account for the practice of fallowing irrigated agricultural land for leasing water for temporary municipal use without causing material injury to other vested water rights, decreed conditional water rights or contract rights to water.

Opponents were concerned that the pilot projects bypassed water court proceedings meant to prevent injury to other water users. The bill was also criticized because it disallows transfers only from the Colorado River and Rio Grande basins, while ignoring more exports from the Arkansas River basin. Effective May 5, 2013.

House Bill 1130 Extension of Interruptible Water Supply

House Bill 13-1130, 69th Gen. Assemb., 1st Reg. Sess. (Colo. 2013), extended operation of interruptible supply agreements by authorizing the state engineer to re-approve a ten-year interruptible supply agreement up to two times. Interruptible water supply agreements ("IWSAs") enable water users to transfer a portion of their water right, called the historical consumptive use, to another water user on a temporary basis, without permanently changing the water right. For one ten-year period affecting a current water right the state engineer is authorized to approve IWSAs that permit a temporary change in point of diversion, location of use, and type of use of a water right. Prior to HB 13-1130, IWSAs could not be renewed, and required a water court decree to continue the arrangement beyond the initial 10-year period.

The purpose of HB 13-1130 was to facilitate lease agreements between cities and farmers while avoiding buy-and-dry (McLane and Dingess, 2014). The bill was supported by Aurora, farmers from the Rocky Ford area, the Colorado Farm Bureau and the Colorado Cattlemen's Association. Opponents, mostly water interests in the South Platte basin, were concerned that the legislation may allow injury to senior water rights without due process in water courts. Effective June 5, 2013.

Senate Bill 019 Concerning Promotion of Water Conservation Measures

Senate Bill 13-019, 69th Gen. Assemb., 1st Reg. Sess. (Colo. 2013), amends Colo. Rev. Stat. § 37-92-305(3), governing standards for judicial water right determinations, by providing a safe haven for water right owners that decrease the consumptive use of their water rights. The bill restricts a water judge from determining a water user's historical consumptive use based on water use reductions resulting from the enrollment in a federal land conservation program; participation in certain water conservation programs; participation in an approved land fallowing program or to provide water for compact compliance; or participation in a water banking program. The bill brought to the forefront an issue that has been controversial for some time, as many believe that little if any water in Colorado is meaningfully available for conservation. Prior to SB 13-019, there was a disincentive in Colorado law that penalized appropriators who decreased their consumptive use of water ("use it or lose it").

The purpose of the bill was to create an additional tool, besides CWCB's Instream Flow Program, to motivate agricultural water users to adjust their diversions at specific times. One of the objections to the original bill had to do with unintended consequences for other areas of the state, such as the Rio Grande Basin. As a compromise, the legislation was reduced to Water Districts 4, 5, and 6 on the West Slope. Effective May 18, 2013.

Senate Bill 041 The Protection Of Stored Water

Senate Bill 13-041, 69th Gen. Assemb., 1st Reg. Sess. (Colo. 2013), reversed the holdings of *Upper Yampa Water Conservancy District v. Wolfe*, 255 P.3d 1108 (Colo. 2011). In *Yampa*, the Colorado Supreme Court "held that the storage of water is not a beneficial use, at least where flood control and fire or drought protection are not the stated uses of the water, and that to perfect a conditional storage right, the water must be released from storage and put to beneficial use. Further, an applicant must show that it has exhausted its absolute storage rights before its conditional storage rights can be perfected." This posed a substantial problem for municipal water supply entities that need to maintain storage reserves for times of drought. They must either exhaust their storage reserves to make a conditional water right absolute, or they must continue every six years, indefinitely, to run the gauntlet of a diligence application—repeatedly re-litigating the validity of the underlying conditional decree, even after the reservoir is built and the water has been stored.

SB 13-041 resolved this problem by expanding the definition of "beneficial use" in Colo. Rev. Stat. § 37-92-103(4) to cover the impoundment of water for firefighting or any other beneficial use for which an appropriation is lawfully made. Further, it amends the diligence statute, *id.* § 37-92-301(4), to provide that a conditional water storage right is made absolute for all decreed

purposes to the extent that the volume of the appropriation has been diverted and stored in the decreed storage structure. It also amends that section to provide that when a water project or integrated water system comprises more than one water storage facility, an applicant need not demonstrate that all existing decreed absolute water rights that are part of the project or integrated system have been utilized to their full extent in order to make a conditional water storage right decreed as a separate feature of the project or integrated system absolute. Effective August 7, 2013.

Senate Bill 74 Irrigation Water Right Historical Use Acreage

Senate Bill 13-074, 69th Gen. Assemb., 1st Reg. Sess. (Colo. 2013), established a mechanism to determine the amount of irrigated acreage available to a pre-1937 water right which created certainty to pre-1937 water right holders. Under the bill, the maximum amount of acreage irrigated during the first 50 years following the original decree is the amount of acreage available to a water right where such acreage has not already been determined in an adjudication. Since 1937, all irrigation water rights in Colorado included in their decree a specific maximum amount of acreage to which the water right could be applied.

Colorado law governing water rights requires agricultural users to designate acreage to be irrigated by a given water right, but statute did not provide a mechanism for determining the amount of acreage available to pre-1937 water rights that lack a decreed amount. In some cases, the Colorado Supreme Court interpreted pre-1937 water rights to provide for dramatically less irrigated acreage than the amount historically irrigated by that water right for close to 100 years. *See, e.g., In re Water Rights of Central Colorado Water Conservancy District*, 147 P.3d 9 (Colo. 2006). As a result, the Court's decision destabilized pre-1937 irrigation water rights.

To address this, the bill provided that the lawful historical use of an irrigation water right adjudicated prior to January 1, 1937, in a decree that does not expressly limit the number of acres to be irrigated, includes irrigation of the maximum area of land irrigated in compliance with all of the express provisions of the decree, unless a court has entered a final judgment to the contrary. Acreage considered lawfully irrigated may include land located within a reasonable proximity to the ditch, including extensions and lateral delivery infrastructure, as the same were constructed within the first 50 years after entry of the original decree. Effective August 7, 2013.

Senate Bill 13-075 Promote Water Conservation of Designated Ground Water

Senate Bill 13-075, 69th Gen. Assemb., 1st Reg. Sess. (Colo. 2013), specifies that once the State Engineer issues a final permit for the withdrawal of designated ground water, a reduction in the amount of water used pursuant to the permit due to the conservation of water is not grounds to reduce the maximum annual volume of the appropriation, the maximum pumping rate, or the maximum number of acres that have been irrigated. There are few rivers in eastern Colorado, but there are large groundwater resources that are important to agriculture and eastern municipalities. Wells are the primary source of water used in this area. To administer these wells, the law allows the formation of designated groundwater basins that are regulated according to a modified doctrine of prior appropriation. Some irrigators in designated basins want to reduce groundwater withdrawals by shutting off parts of their irrigation system that use more water. Prior to SB13-075, taking such action may have impacted an owner's groundwater right. Specifically, the amount of water that can be changed to a new type or place of use is limited by its historical consumptive use. Consequently, conserving water would risk devaluation of a water right. Similar to SB13-019, this bill created a safe haven for irrigators from the possibility of being penalized for conserving their water. Effective March 15, 2013.

-2012-

- No significant Legislation -

-2011-

House Bill 11-1068 State Engineer Approve Agriculture Water Transfer

House Bill 11-1068, 68th Gen. Assemb., 1st Reg. Sess. (Colo. 2011), would have authorized the State Engineer to approve agricultural water transfer agreements for periods of up to 40 years in the Arkansas Valley below Pueblo Dam. The agreement could have been reapproved using the same process for one additional period of up to 40 years. The bill's intent was to establish a long-term leasing mechanism so agricultural holders of water rights could continue to reap financial benefits for their rights without forfeiting them. Further, the State Engineer's authority over the transfers would have made the process more accessible. The existing channels in Water Court to establish leasing arrangements is cost-prohibitive to some water rightsholders.

Critics of the bill were concerned with the Hydrological Institutional Model used for determining consumptive use. The Model was developed by Kansas to quantify water depleted from the Arkansas River by wells in Colorado. Terry Scanga, Upper Arkansas Water

Conservation District general manager, said the Model contains presumptive numbers that could cause injury to water rightsholders.[46] Lower valley water rightsholders rely on return flow from upstream use, where inaccurate numbers could affect amount and timing of return flow. In a change of water right under a temporary transfer, faulty numbers could cause more water to be transferred than was historically used that could lead to premature calls by holders of senior rights in the lower valley. According to Scanga, premature calls would cause injury by reducing the amount of water available for junior rightsholders in the upper valley. Critics also questioned the bill for being an end-run around water court that benefited only the Arkansas Valley Super Ditch.[47] Postponed indefinitely.

-2010-

House Bill 1159 Mitigation for Water Exports Across District Boundaries

House Bill 10-1159, 67th Gen. Assemb., 2nd Reg. Sess. (Colo. 2010), would have required a water judge to include terms and conditions in the water decree that protect the users in the water division from which the water would be transferred. The decree would have been required to ensure that present and prospective beneficial uses of water would not be impaired or increased in cost in the originating water division. This bill would have pertained to leases of water of at least 10 years, or where the amount of water to be transferred between water divisions was at least 1,000 acre-feet. These terms and conditions would only have applied to applications for conditional water rights, conditional appropriative rights of exchange, or a change of water rights. To meet the terms and conditions of the water decree, a water rights applicant would have been allowed to enter into a mitigation agreement with affected water conservation and water conservancy districts. The intent was to mitigate economic and ecological impacts of originating communities in water transfers.

Criticism of the bill was offered by both urban water and agricultural interests. Denver Water, Aurora Water, the North Sterling Irrigation District, the South Platte Water Conservancy District and the Northern Colorado Water Conservancy District opposed the bill because current state statute already outlines mitigation requirements, along federal laws and regulations that govern environmental and economic mitigation. The bill would create a cumbersome process for willing sellers and buyers so that water transfers would become too expensive and time consuming, serving as an insurmountable obstacle to future water transfers. However, the Colorado River Water Conservation District and Lower Arkansas Valley Water Conservancy

[46] Upper Arkansas Water Conservation District 2011 meeting

[47] Colorado Water Congress 2011 Annual Convention

District supported the bill because it would compel parties involved in negotiating water transfers to work out differences that otherwise might never be resolved.[48] Lost in House Second Reading.

-2009-

House Bill 1017 CWCB Water Efficiency Grant Program

House Bill 09-1017, 67th Gen. Assemb., 1st Reg. Sess. (Colo. 2009), authorized the CWCB to carry over and spend funds transferred from the severance tax fund to the Water Efficiency Grant Program's cash fund from previous financial years. Original authorizing legislation for the Grant Program lacked the technical language to the spending of those funds. HB09-1017 corrected this technical oversight. The bill received little opposition. Effective May 21, 2009.

Senate Bill 125 Water Conservation Board Construction Fund

Senate Bill 09-125, 67th Gen. Assemb., 1st Reg. Sess. (Colo. 2009), authorized the Alternative Transfer Methods grant program in the Construction Fund Bill and funded a variety of other water-related projects through loans, direct appropriations, and fund transfers from the CWCB Construction Fund as well as the Perpetual Base Account and the Operational Account of the Severance Tax Trust Fund. SB 09-125 allowed CWCB to continue to develop and implement a statewide competitive grant program to advance various agricultural transfer methods as alternatives to permanent agricultural dry-up, including interruptible water supply agreements, long-term agricultural land fallowing, water banks, reduced consumptive use through efficiency or cropping while maintaining historic return flows, and purchase by end users with leasebacks under defined conditions. The bill unanimously passed both the House and Senate Committee on Agriculture and Natural Resources. Effective June 1, 2009.

[48] Transcript of Audio Tape: Hearing on HB10-1159 Before the House Comm. on Agriculture Livestock and Nat. Resources, 63rd Gen. Ass., 1st Reg. Sess. (Colo. Feb. 3, 2010) (on file with Colorado State Archives).

-2008-

House Bill 1280: Protect Leased Instream Flow Water Rights

House Bill 08-1280, 66th Gen. Assemb., 2nd Reg. Sess. (Colo. 2008), specified that water rights which have been leased or loaned to the CWCB for instream flow purposes to preserve or improve the natural environment be excluded from the water court's historic consumptive use analysis, and will not be considered an abandoned water right. The water court is required to determine that a lessor or lender has not entered into the contract or agreement for speculative purposes. The intent of the bill was to promote flexibility in state water policy by allowing a water right holder to bypass irrigation diversions for the health of the river without risking a reduction in historical consumptive use. The bill did not receive significant opposition. Effective April 21, 2008.

House Bill 1369: Incentives for Donations of Water Rights

House Bill 08-1369, 66th Gen. Assemb., 2nd Reg. Sess. (Colo. 2008), would have provided financial incentives in the form of a six-year transferrable tax credit for water rightsholders who chose to permanently transfer their water rights to the state for instream flow use. Tax credits would have been awarded based on appraisals of the value brought in terms of preservation or improvement of the environment of the stream to which the water rights were being contributed. The intent was to encourage instream flows. Colorado Farm Bureau opposed the bill due to concerns of permanently drying up agricultural lands. Postponed indefinitely.

House Bill 08-1044 Excess Augmentations Credits Spots Market

House Bill 08-1044, 66th Gen. Assemb., 2nd Reg. Sess. (Colo. 2008), would have allowed a person to lend excess agricultural water resulting from a decreed augmentation plan during a one-year period without the need for water court. A decreed augmentation plan is a court-approved plan designed to protect senior water rights, while allowing junior water rightsholders to divert water out of priority. Loans must have been for current-year water depletion caused by previous-year well pumping. The owner of the excess water would have used "excess augmentation credits" to lend the water. The intent was to create a flexible short-term lease option by allowing voluntary lending of excess augmentation credits to another user. Objectors, primarily representing large agricultural water rightsholders on the Front Range, worried that accurate accounting would suffer. The bill was lost on second reading in the House of Representatives on February 4, 2008.

-2007-

House Bill 1132 Water Quality Term in Change Decrees

House Bill 07-1132, 66th Gen. Assemb., 1st Reg. Sess. (Colo. 2007), authorizes water court judges to address decreases in water quality resulting from a change in the use of an irrigation water right that involve more than 1,000 acre-feet consumptive use and that causes a violation of the water quality standards for the affected stream. The law specifies that the applicant for such a change in use is responsible for mitigating only that portion of the decline in water quality resulting from their change. The intent was to mitigate water quality issues that may occur as a result of a transfer. The bill was modeled on similar water quality legislation that failed to pass for seven years in the state legislature. Opponents criticized the bill as a measure to stop water transfers throughout the state of Colorado. Effective March 12, 2007.

Senate Bill 07-122 Colorado Water Conservation Board Construction Fund

Senate Bill 07-122, 66th Gen. Assemb., 1st Reg. Sess. (Colo. 2007), authorized the CWCB to develop a grant program to facilitate the development and implementation of alternative agricultural water transfer methods. The legislation provided for $1,500,000 for the board to develop and implement a competitive grant program to advance various agricultural transfer methods as alternatives to permanent agricultural dry-up in the South Platte and Arkansas River basins.

The intent of the grant program is to illustrate how and when ATMs may present benefits to not only the parties to the transfer, but other third party beneficiaries. The CWCB's goal is to further the development of alternative water transfers to the point that municipal water providers view them as viable options for a portion of their water supply portfolios. Critics expressed concern that the grant program may fund trans-basin diversions. Effective May 31, 2007.

House Bill 1012 Instream Flow 2007

House Bill 07-1012, 66th Gen. Assemb., 1st Reg. Sess. (Colo. 2007), prohibited water courts from determining the historic consumptive use of a water right from a period of time in which the water rights owner was loaned these water rights to the state for instream flow purposes. The bill exempted the loan of water to the CWCB for instream flows from consideration of abandonment due to nonuse. Effective March 14, 2007.

House Bill 1305 Extend Arkansas River Water Bank Program

House Bill 07-1305, 66th Gen. Assemb., 1st Reg. Sess. (Colo. 2007), removed the repeal of the Arkansas River Water Bank Program, which was scheduled for July 2007. The Water Bank Program was intended to reduce the costs associated with water transactions and to help water rightsholders to realize the value of their asset without being forced to sell the right. Finally, House Bill 07-1012 seeks to encourage the loan of agricultural water rights to the CWCB's instream flow program. It provides that the time period when the water right is loaned for instream flow purposes will be excluded from historical consumptive use analysis of the water right in any water court proceeding, and that such a loan is not considered non-use for abandonment of a water right. Effective April 9, 2007.

-2006-

House Bill 1124 Rotational Crop Management Irrigation Water Rights

House Bill 06-1124, 65th Gen. Assemb., 2nd Reg. Sess. (Colo. 2006), allowed a water court to approve a rotational crop management contract as an alternative to permanently transferring an irrigator's entire water right. Under this contract, an owner may forgo irrigating part of his or her land, called fallowing, and transfer the savings to another water user. HB 06-1124 allows the fallowed land to be rotated annually, provided no other water rights are injured. The intent of the legislation was to help water rightsholders to realize the value of their asset without being forced to sell the right. Rocky Mountain Farmers Union expressed concern about the bill because it allows the sale of irrigation water rights for non-agricultural purposes and the bill does not adequately define "beneficial use." The Colorado State Engineer's Office, Colorado Water Congress, and Denver Water supported the bill, explaining that the bill doesn't change the standards under which a sale of water may occur, and simply gives water owners another opportunity to gain value from their water rights by providing more flexibility.[49] Effective May 25, 2006.

House Bill 1352 Water Quality Term in Change Decrees

House Bill 06-1352, 65th Gen. Assemb., 2nd Reg. Sess. (Colo. 2006), would have allowed the water court to impose terms and conditions on an application to change a water right that causes a stream to exceed state water quality standards. The bill would have applied to

[49] Transcript of Audio Tape: Hearing on SB06-1124 Before the Senate Comm. on Agriculture and Nat. Resources, 63rd Gen. Ass., 1st Reg. Sess. (Colo. Mar. 23, 2006) (on file with Colorado State Archives).

applications that seek to change water rights that are greater than 1,000 acre-feet. The Water Quality Control Division would have been authorized to assess civil and criminal penalties against violators of the state's water quality laws. The intent was to provide uniformity to how courts handle water quality standards in a change case. Downstream water users, such as those on the lower Arkansas River, are left with degraded water quality when water is diverted higher up on the stream and transferred from agricultural to municipal use.

HB 06-1352 would have protected water quality by allowing the water courts to consider harmful impacts to water quality in cases involving a change of use, if the proposed change resulted in the remaining water exceeding public health standards. The provisions of the bill only applied to large transfers of water, and the applicant seeking to move the water was only responsible for the portion of the exceedance caused by the change of use. Conservationists joined the Lower Arkansas Conservancy District, Denver Water, and Northern Colorado Water Conservancy District to support this bill. Opposition, including Colorado Water Congress, Coloradans for Water Conservation and Water Development, Colorado Farm Bureau, East Cherry Creek Water and Sanitation District, and Phelps Dodge Corp., argued issues of water quality should be left with the Colorado Water Quality Control Commission and expressed concern regarding potential impact on existing water rights and future water development projects.[50] Similar bills have been defeated each of the last three years. Lost in Senate third reading.

Senate Bill 37 Recreational In-channel Diversions

Senate Bill 06-037, 65th Gen. Assemb., 2nd Reg. Sess. (Colo. 2006), amends the requirements for obtaining a water right decree for recreational water rights. It limits the Colorado Water Conservation Board's review of applications for such rights and imposes construction requirements on these water diversion structures. The act limits the types of water-based recreation that may qualify for these rights to non-motorized boating. If an owner claims more than 50 percent of a stream's average annual stream flow, the act limits the administration of stream flows from April 1 to Labor Day unless the owner can demonstrate a need for additional days.

Defeat of SB 05-062 and questions raised in the *Gunnison* decision prompted the 2005 General Assembly to ask the Water Resources Review Committee, a standing committee of senators and representatives that consider water matters for possible legislative action, to hold hearings

[50] Transcript of Audio Tape: Hearing on SB06-1352 Before the House Comm. on Agriculture Livestock and Nat. Resources, 63rd Gen. Ass., 1st Reg. Sess. (Colo. Mar. 6, 2006) (on file with Colorado State Archives).

to determine the need for legislation addressing RICDs. The outcome of this process was introduced in the 2006 General Assembly as SB 06-037. One major change proposed by SB 06-37 was to reduce the CWCB's review role. To this end, the bill proposed removing the requirement that the CWCB hold a hearing, and replaced the hearing with a public meeting. It also proposed eliminating from CWCB review the "appropriate stream reach and access factors" first established in SB 01-216.

The original bill was significantly modified in both the Senate and the House. On the Senate side, the primary bill sponsor, Senator Isgor, successfully reintroduced the word "minimum" into the definition of RICD. On the other hand, the call threshold was lowered to 85%, and it was clarified that this was the amount that had to be generated by a call for it not to be deemed futile. As the Bill was finally enacted, everyone seemed to feel it was an acceptable compromise. Most hoped its enactment would put an end to legislative attempts to kill RICDs. In the final analysis, SB 06-037 was an important victory for proponents of recreation water rights. Despite constitutionally doubtful limitations imposed on this kind of appropriation, the ability to appropriate water for RICDs was again confirmed by the Legislature. Most importantly, in the space of a few short years, proponents of water rights for recreation had pushed the law from the State's claim that such water rights could not exist at all, to legislative recognition that 50% or more of the historic flow in a river was likely a reasonable flow amount. Effective May 11, 2006.

-2005-

House Bill 1215 Temporary Transfer Water Rights

House Bill 05-1215, 65th Gen. Assemb., 1st Reg. Sess. (Colo. 2005), would have provided a single definition for fallowing agreements as a contract between an owner of irrigation water rights and a water provider in which the owners loaned a portion of their water rights for a specified time to the water provider. The bill would have also permitted a water district to establish a fallowing program upon the request of one or more water providers, given that the applicant detailed the amount of water requested under the fallowing agreement, the term of the agreement, and the total payment and payment schedule per acre-foot to the water rights owners. Due to a lack of support, Representative Hodge, sponsor, requested that the bill be postponed indefinitely. Postponed indefinitely.

House Bill 1039 Instream Flow Loans

House Bill 05-1039, 65th Gen. Assemb., 1st Reg. Sess. (Colo. 2005), eliminated the constraint that allowed water rights to be loaned to the CWCB for instream flow purposes only under a governor-declared drought emergency. The bill further specified that instream flow loans could operate no more than three years out of a single, non-renewable ten-year period. The renewal of the instream agreement could only occur if the loan was not exercised at any point during the initial 10-year period. The purpose was to expand the ability of an agricultural water right holder to loan their water right for an instream flows. Colorado Farm Bureau opposed the bill. Effective March 25, 2005.

Senate Bill 133 Overcome Presumption of Water Right Abandonment

Senate Bill 05-133, 65th Gen. Assemb., 1st Reg. Sess. (Colo. 2005), allows an owner of a water right to participate in an approved water conservation program, land fallowing, or water banking program to overcome the presumption of abandonment of their unused water right. The bill received little opposition. Effective April 14, 2005.

House Bill 1296 Area of Origin Mitigation

House Bill 05-1296, 65th Gen. Assemb., 1st Reg. Sess. (Colo. 2005), would have limited transfers of water outside of certain water districts and counties that are not covered by enforceable mitigation agreements or have court-imposed protections for affected water users. It would also have required affected districts or counties to allow for public comment on proposed mitigation agreements. The bill would have obligated transferring parties to minimize or avoid economic and environmental impacts of reduced surface water flow and water costs.

The purpose was to minimize and mitigate the environmental and economic impacts of transferring water. The bill received broad opposition ranging from agricultural interests to urban suppliers. The primary concern was that the bill would hinder future water transfers. Lost in House during the Second Reading on April 26, 2005.

Senate Bill 62 Recreational In-channel Diversions

Senate Bill 05-62, 65th Gen. Assemb., 1st Reg. Sess. (Colo. 2005), would have limited recreational water rights, called recreational in-channel diversions (RICD), to flows of less than

350 cubic feet per second. It also prohibited RICD owners from claiming their right during water shortages if they could not control the amount of water that was being requested. The bill would have limited RICDs to kayaking, canoeing, inner tubing, boating, and rafting, and would have applied to applications for RICDs filed in water court after February 17, 2005.

The purpose of SB 05-062 was to undercut and legislatively defeat the Steamboat Springs RICDs on the Yampa River. It attempted to do this by adding as a factor for CWCB review whether the RICD would "affect" development of future upstream storage and water development projects. The bill also declared water diverted by a RICD to be wasted unless at least ten kayakers were using the water at or near the structures. Finally, it would have limited in-channel recreation to kayaking only. A subsequent amendment would have restricted flow rates for RICDs to no more than 350 cfs. Because the bill would have effectively undermined future water rights for boating parks, the recreation community believed the only option was its defeat, not its amendment. This opposition continued, even when the bill was amended to exclude all existing applications and decrees for RICDs. With the support of most traditional water interests, the bill passed out of the Senate and through the House Agriculture Committee. However, as the result of an intensive lobbying campaign by a coalition of recreation water interests, the bill was finally killed on the House floor.

-2004-

HB 1256 Increased Flexibility for Water Loans between Farmers and Cities

House Bill 04-1256, 64th Gen. Assemb., 2nd Reg. Sess. (Colo. 2004), permitted the creation of interruptible water-supply sharing agreements between irrigation rightsholders and municipal water providers. The bill removed restrictions that permitted temporary leases of water only during dry years, governor declared emergencies, or when farmers were unable to irrigate. The expansion and increased flexibility of interruptible supply agreements garnered support among environmental groups, the Colorado Farm Bureau, and the Colorado Municipal League. The bill passed unanimously in the House and Senate. Effective June 28, 2004.

Senate Bill 32 Authorization for Loans of Agricultural Water Rights

Senate Bill 04-032, 64th Gen. Assemb., 2nd Reg. Sess. (Colo. 2004), authorizes the owner of an irrigation water right to loan the stated right to another owner on the same stream for up to 180 days, subject to approval by the division engineer and given a finding of lack of material injury to other decreed water rights. One of several drought relief bills passed in 2003 was a bill allowing the loan of water rights to the CWCB for instream flow purposes. *See* Colo. Rev. Stat. §

37-83-105. SB 04-032 amends the statute to allow the loan of water rights used for agricultural irrigation to others for agricultural irrigation uses on the same stream system. The intent was to increase flexibility of water transfers between agricultural users. The proposal received broad support with little opposition. Effective June 21, 2004.

Senate Bill 104 Water Conservancy Efficiency Requirements

Senate Bill 04-104, 64th Gen. Assemb., 2nd Reg. Sess. (Colo. 2004), would have mandated that water providers adopt, implement and update water use efficiency plans if they transferred water from other districts or divisions to supplement supplies. The bill contained further provisions that required public notice and comment procedures during the development of the efficiency plan. SB 04-104 would have restricted the CWCB's ability to provide financial assistance only to water providers who submitted use efficiency plans that met the bill's specified standards. Postponed indefinitely.

House Bill 1040 Protecting Local Economies and the Environment

House Bill 04-1040, 64th Gen. Assemb., 2nd Reg. Sess. (Colo. 2004), would have required that a water judge include conditions for each trans-division diversion of water rights to ensure that the transfer did not impair the current and prospective beneficial uses of water or increase the cost of water within the water division from which the water is exported. The bill would have required the applicant for the decree to prove the necessity of the transfer, as well as to develop an enforceable plan for mitigation that would be approved by the conservancy district from within whose boundaries the waters were transferred.

The purpose was to minimize and mitigate the environmental and economic impacts of transferring water. The bill received broad opposition ranging from agricultural interests to urban suppliers. The main concern was that the bill would hinder future water transfers. Lost in House in second reading.

-2003-

Senate Bill 115 Protect In-Basin Agricultural Use

Senate Bill 03-115, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), requires applicants for water transfers of over one thousand acre-feet to notify affected local governments, school districts, and water districts and prohibits such transfers without an agreement or decree mitigating the

transfer's impacts. The bill also requires water rights owners transferring these rights to another district to develop specific guidelines for transitional mitigation payments based on the loss of local production and bond revenues. Generating the most concern, SB 03-115 authorizes the court to impose specified mitigation payments upon any person who files an application for removal of water as part of a significant water development activity. Opposition expressed concern that the increase in county tariffs imposed by the water judges may create a restraint on trade, contradicting the Colorado constitution's right to appropriate water without injury to other water rights.[51] SB 03-115 is an amended version of SB 02-148, postponed indefinitely, that is narrower in scope and viewed as a fair compromise. Effective April 7, 2003.

House Bill 1113 Basin Of Origin Compensation

House Bill 03-1113, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), requires a water judge include, in each decree for a water right that diverts agricultural water from one water division into another, conditions to address the direct economic effects of the diversion on the basin of origin. The intent of the legislation was to mitigate economic effects of a diversion. Critics were concerned that imposing conditions contradicted state constitution's right to appropriate water and the conditions amount to a county tariff on water transfers. Lost in House Second Reading Special Order.

House Bill 1090 Develop Denver Basin Aquifers

House Bill 03-1090, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), would have prohibited water courts from decreeing a water right from one basin to another that overlays the Denver Basin Aquifer unless the applicant can show it is using its maximum entitlement. The purpose of the bill was to require Front Range water users to tap their own existing resources, in particular the Denver Basin Aquifer, before looking to the Western Slope for water needs. Postponed indefinitely.

House Bill 1334 Interruptible Water Supply Agreements

House Bill 03-1334, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), grants the State Engineer the authority to approve interruptible water supply agreements between agricultural water

[51] Transcript of Audio Tape: Hearing on SB03-115 Before the Senate Comm. on Agriculture and Nat. Resources, 63rd Gen. Ass., 1st Reg. Sess. (Colo. Jan. 29, 2003) (on file with Colorado State Archives).

users and municipal, domestic or industrial users that would allow agricultural users to stop irrigating and allow the other user to divert the agricultural right subject to the priority system. HB 03-1334 received broad support. Kent Holsinger, Colorado Department of Natural Resources, stated that the bill would help farmers and ranchers remain in business by allowing them to temporarily transfer water to other users while protecting other water rights due to limiting transfers to 3 out of 10 years. Hal Simpson, State Engineer, explained that the bill would enable municipalities to better address droughts.[52] Effective June 5, 2003.

Senate Bill 236 Revenue Bonds for Water Infrastructure and Storage

Senate Bill 03-236, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), was amended by the Senate State Veterans and Military Affairs Committee and submitted as a ballot measure—Referendum A—to the voters at the 2003 General Election. The bill would have allowed the CWCB to issue up to $10 billion of water infrastructure revenue bonds for the purpose of financing water infrastructure projects pending review and approval by the Governor. Despite approval by the Governor, Colorado voters voted down Referendum A (Senate Bill 03-236) in the November 2003 elections. Effective June 5, 2003; Referendum A (No, 67%). [Election Results: http://ballotpedia.org/Colorado_Water_Projects_Bond,_Referendum_A_(2003)]

SB 236: Basin of Origin Amendment

A critical amendment within Senate Bill 03-236 would have required that a water judge include conditions for each trans-division diversion of water rights to ensure that the transfer did not impair the current and prospective beneficial uses of water or increase the cost of water within the water division from which the water is exported. The bill would have required the applicant for the decree to prove the necessity of the transfer, as well as to develop an enforceable plan for mitigation that would be approved by the conservancy district from within whose boundaries the waters were transferred. The amendment passed in the House 33 – 22. But two House members reversed their original positions, and the committee report was amended 31 to 34.

[52] Transcript of Audio Tape: Hearing on HB03-1334 Before the Senate Comm. on Agriculture and Nat. Resources, 63rd Gen. Ass., 1st Reg. Sess. (Colo. April 25, 2003) (on file with Colorado State Archives).

Senate Bill 73 State Engineer Water Supply Authority

Senate Bill 03-073, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), allows the state engineer to temporarily approve annual substitute supply plans under limited circumstances, including the absence of injurious effect on other water rights, for junior appropriators who had plans previously approved by the state engineer in the South Platte basin. In December 2001, the Colorado Supreme Court issued its decision in *Empire Lodge Homeowners' Association v. Moyer*.[53] That decision held that the State Engineer was without authority to approve substitute water supply plans in most situations. In response, the General Assembly passed SB 03-073, as well as HB 02-1414 and HB 03-1001, which authorized certain wells in the South Platte River Basin to continue pumping tributary ground water that would otherwise be required to cease diversions. Opposition expressed concern that the bill would allow injury to senior surface water rights on South Platte River by delaying requirements for augmentation of out-of-priority depletions. Further, conditions listed for State Engineer to approve plans are inadequate, and that water court is the proper place to deal with such complicated injury issues as well depletion timing, impact of out of priority depletions and the adequacy of augmentation sources.[54] Effective April 30, 2003.

Senate Bill 319 Expedited Adjudication of Transbasin Water

Senate Bill 03-319, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), would have authorized the applicants for the adjudication of transbasin water diversions to file an application with the CWCB prior to complying with statutory provisions governing applications for water rights or changes of water rights during a drought emergency declared by the governor. The bill would have required the applicant filing with the CWCB to pay an additional fee to cover the direct and indirect administrative costs of applicant evaluation, with monies generated being contributed to the Transbasin Diversion Fund. Postponed indefinitely.

House Bill 1001 Increased Flexibility in the Use of Water Resources

House Bill 03-1001, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), required the Colorado Water Resources and Power Development Authority to subsidize a portion or all the costs of the issuance of bonds and notes for projects that were jointly sponsored by two or more government agencies. Furthermore, the bill required state agencies to cooperate with water

[53] *Empire Lodge*, 39 P.3d 1139 (Colo. 2001).

[54] Transcript of Audio Tape: Hearing on SB03-073 Before the Senate Comm. on Agriculture and Nat. Resources, 63rd Gen. Ass., 1st Reg. Sess. (Colo. Feb. 13, 2003) (on file with Colorado State Archives).

rights owners desiring right-of-way access to water conveyance structures. The bill obliges water providers to develop billing systems that encourage water use efficiency. Finally, the bill authorized the State Engineer to approve a temporary change of water right as a substitute water supply plan. The bill received broad support. Effective April 25, 2003.

House Bill 1318 Creation of Water Banks

House Bill 03-1318, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), expanded upon the Arkansas River Pilot Program by allowing water banking in every river basin in the State of Colorado. The bill requires the state engineer to develop rules for the governance of water banks within individual water divisions upon requests from water conservancy or conservation districts located within division boundaries which desired to serve as directors of the proposed water bank. Effective June 5, 2003.

Senate Bill 85 In-stream Water Donations

Senate Bill 03-085, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), would have allowed water rights owners to donate water temporarily to instream flow or to an agricultural user on the same stream at any time for ecological benefits, but no more frequently than three times out of a ten-year period. Opponents were concerned that Injury issues from changes in water rights, even if temporary, are too complex and controversial to be left to the State Engineer and Division Engineers; these are functions better suited to the water court. Senate Bill 03-85 passed both chambers unanimously, but was vetoed by the Governor June 22, 2003.

House Bill 1320 In-stream Water Donations

House Bill 03-1320, 64th Gen. Assemb., 1st Reg. Sess. (Colo. 2003), authorized water rights owners in any basin, division or county in which the governor had declared a drought emergency to loan water to the CWCB for instream flows, contingent upon approval from the state engineer acknowledging that the action would not be injurious to other water rightsholders. Effective June 5, 2003.

-2002-

Senate Bill 148 Protection of Agricultural Water Rights

Senate Bill 02-148, 63rd Gen. Assemb., 2nd Reg. Sess. (Colo. 2003), would have allowed a water court to impose mitigation requirements to protect local governments from the impact of large agricultural water rights transfers to municipalities including payments to offset lost tax revenue and to pay for bonded indebtedness. Local governments may also levy sales, use, and property taxes to purchase, adjudicate, lease, or sell water rights. Dried up farms pay less property taxes and provide fewer economic benefits to a rural community. The bill would have required judges to consider provisions in the decision of trans-district adjudication to ensure payment of mitigation fees to offset reductions in property tax and bond revenue in the district from which water would be transferred. Opposition, consisting of both the Colorado Farm Bureau and Colorado Water Congress, criticized the bill due impacts on fundamental private property rights of water rights owners.[55] Postponed indefinitely.

SB 156 Water Rights for In-stream Use

Senate Bill 02-156, 63rd Gen. Assemb., 2nd Reg. Sess. (Colo. 2003), awarded the state additional authority to acquire water rights for instream flow to preserve or improve the natural environment to a reasonable degree. The bill permitted CWCB to accept donations of water rights from water rights owners for instream purposes and to utilize all funding sources, except its specified construction fund, to acquire and convert water rights to instream flows. SB 02-156 was a compromise with environmental groups who wanted to introduce a bill authorizing private instream flow water rights. Expanding CWCB's authority to use acquired water to "improve" the natural environment enabled the Instream Flow Program to meet more environmental needs. Limiting the expanded authority to acquire water addressed concerns of water users about impacts of instream flows on ability to develop Colorado's compact entitlements.[56] Effective May 23, 2002.

[55] Transcript of Audio Tape: Hearing on SB02-148 Before the Senate Comm. on Agriculture and Nat. Resources, 63rd Gen. Ass., 1st Reg. Sess. (Colo. Feb. 12, 2002) (on file with Colorado State Archives).
[56] Instream Flow Program, Colorado Water Conservation Board ("CWCB"), http://cwcb.state.co.us/ENVIRONMENT/INSTREAM-FLOW-PROGRAM/Pages/main.aspx (last visited August 7, 2015); *see also* Colorado's Instream Flow Program: History and Current Activities, http://uttoncenter.unm.edu/Powerpoints/E-Flows/Bassi_NM_E-Flows.pdf.

House Bill 1020 State Planning and Water Infrastructure for Drought

House Bill 02-1020, 63rd Gen. Assemb., 2nd Reg. Sess. (Colo. 2003), would have required the CWCB to solicit proposals for the development of projects and programs designed to meet drought and growth-related increases in water demand. The CWCB was only to recommend a project proposal to the General Assembly by December 15, 2003, if all existing water infrastructure and facilities were already being used to their greatest feasible extent in the district of origin. The bill authorized the Colorado Housing and Finance Association to finance the projects through issuing bonds. Postponed indefinitely.

House Bill 1414 Engineer Limited Substitute Water Supply Plans

House Bill 02-1414, 63rd Gen. Assemb., 2nd Reg. Sess. (Colo. 2003), established a formal process by which the state engineer could approve limited, temporary substitute water supply plans involving out-of-priority diversions. In December 2001, the Colorado Supreme Court issued its decision in *Empire Lodge Homeowners' Association v. Moyer*.[57] That decision held that the State Engineer was without authority to approve substitute water supply plans in most situations and suggested that if such authority was desired, it should come from the General Assembly. In response, the General Assembly passed 02-1414, which sets up a new statutory framework for approval of substitute water supply plans by the State Engineer. The bill authorized the state engineer to approve the plan if it was approved prior to January 1, 2002 and the terms of the renewal were similar to the terms of the original substitute plan. Effective May 23, 2003.

-2001-

House Bill 1354 Establishment of a Water Banking Program

House Bill 01-1354, 63rd Gen. Assemb., 1st Reg. Sess. (Colo. 2001), created the "Arkansas River Pilot Water Banking Act" and the Arkansas River Water Bank Pilot Program. The bill established a pilot water bank program in the Arkansas River Basin, with the approval of water leases, loans, and exchanges, including interruptible supply agreements, if such programs sought to reduce the costs associated with water transactions and increase the availability of water related information. The bank was designed to provide a clearinghouse to facilitate short-term (one year) bilateral trades between willing buyers (urban users) and willing sellers (agricultural users) through an online bulletin board listing service and was administered by the

[57] *Empire Lodge*, 39 P.3d 1139 (Colo. 2001).

Southeastern Colorado Water Conservancy District (SCWCD) (Weiner 2005). The intent of the pilot water bank was to test the effectiveness of alternative water transfer methods that allowed irrigation water rightsholders to derive income from water rights and meet the needs of other users without permanently losing their water rights (Simpson, 2005).

The Arkansas River Water Bank Program was contentious primarily because it potentially allowed some out-of-basin permits, which could result in local economic and environmental impacts (Weiner 2005). Soon after its establishment, out-of-basin transfers were explicitly prohibited, and transfers were limited to water in storage. These limitations, combined with the fact that prices were higher than what was available outside the bank and that the approval process was prohibitively long for single-year leases (Clifford et al., 2004), are among the reasons why the bank has never been used. HB 01-1354 was scheduled to sunset in 2007; however, in 2007, HB 07-1318 expanded the pilot project from the Arkansas Valley to six other water districts and restricted out of basin transfers. Effective June 5, 2001.

Senate Bill 161 Water Banks

Senate Bill 01-161, 63rd Gen. Assemb., 1st Reg. Sess. (Colo. 2001), would have authorized the CWCB to conduct a study to identify future water demands in Colorado and alternative supply to meet those demands. The bill specified that the study produce a timely report that addressed future population projections and identify legal or technological constraints. Furthermore, it asked the report developer to propose mitigation or compensation alternatives for any adverse impacts associated with necessary water development. In addition, the bill would have required the board to fund a study by the State Engineer's Office on interruptible supply plans and water banking. Postponed indefinitely by Senate Committee on Appropriations.

House Bill 1111 Tax Credits Conserved Agricultural Water

House Bill 01-1111, 63rd Gen. Assemb., 1st Reg. Sess. (Colo. 2001), would have provided an income tax credit to offset up to $300,000 of the cost of an agricultural water conservation project. The bill authorized the State Engineer to issue conserved water certificates upon proof that a water rightsholder's existing water use practices were reasonably efficient and that implementation of a water conservation project would result through increased efficiencies in conserved water. The conserved water could then be transferred or exchanged, provided other water rights are not impacted. Postponed indefinitely.

SB 216 Recreational Flow Rights

Senate Bill 01-216, 63rd Gen. Assemb., 1st Reg. Sess. (Colo. 2001), established the process and criteria for reviewing and approving new applications for recreational in-channel water rights by a local government or special district. The bill was enacted, in part, in response to fears that under *City of Thornton v. City of Fort Collins*, 830 P.2d 915 (Colo. 1992), an appropriator could obtain high recreational in-channel flows, severely hindering Colorado's future development by either exporting or just tying up large amounts of water.[58] According to Senator Entz, the bill's sponsor in the Senate, "[e]ntities could use the current law [SB 87-212, Ch. 269, 1987 Colo. Sess. Laws 1305 (codified as amended at § 37-92-102(3), C.R.S. (2004))] to claim very high flows at the State borders to essentially export water to California, Kansas and other states for use outside the State of Colorado. And if Senate Bill 216 does not pass this year, the floodgates could be opened and we'd have a run on the courthouse."[59] The bill was introduced to place limits on the ability of a municipality or similar governmental entity to appropriate in-channel flows for recreational purpose.[60]

Critics of the bill consisted primarily of environmental groups. The concern was that Colorado water law already permits water to be kept in the stream for recreational or environmental purposes (in-channel diversions) and that the proposed legislation makes these rights harder to obtain. Under the existing law, individuals may put water to beneficial use through the use of recreational, in-channel diversions. However, under SB 01-216, only local governments and water districts may hold in-channel diversion rights, conditional rights may not be converted to recreational rights, and applicants must seek CWCB approval. Effective June 5, 2001.

-2000-

- No significant Legislation -

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[58] *Colorado Water Conservation Bd. v. Upper Gunnison River Water Conservancy Dist*., 109 P.3d 585, 601-2 (Colo. 2005).

[59] Transcript of Audio Tape: Hearing on SB01-216 Before the Senate Comm. on Pub. Policy and Planning, 63rd Gen. Ass., 1st Reg. Sess. (Colo. Apr. 12, 2001) (on file with Colorado State Archives).

[60] *See Colorado Water Conservation Bd. v. Upper Gunnison River Water Conservancy Dist*., 109 P.3d 585, 601-2 (Colo. 2005) ("Confronted with the perceived problem of appropriators obtaining high recreational in channel flows as beneficial uses, the General Assembly chose to impose limits by defining which recreational in-channel flows constituted beneficial uses—SB 216's restrictive definition of a RICD in § 37-92-103(10.3)—and establishing adjudication standards—the statutory factors in § 37-92-102(6)(b).").

Appendix 2: Navigating a Pathway to Colorado's Water Future: A Proposed Process for ATMs

- The following text originally was published as Appendix B (A Proposed Process for ATMs) of "Navigating a Pathway to Colorado's Water Future" (and cited herein as MacDonnell, 2015). Some changes in formatting, pagination, and/or footnotes/endnotes may be associated with this reprinting; please consult the original document as needed, available at: http://scholar.law.colorado.edu/books_reports_studies/152/.

The key to making alternative transfers a viable option to permanent transfers is to establish procedures that make ATMs faster, easier, and cheaper to complete than permanent transfers. We offer here one possible way this outcome might be accomplished.

We suggest focusing on fallowing of irrigated land under which a predetermined amount of consumptive use associated with particular acres of irrigated land would be potentially available for other use whenever that land is temporarily removed from irrigation.[1] The CWCB and the Colorado Division of Water Resources have already developed criteria to govern such fallowing arrangements.[2] We envision the development of a consumptive-use credit system[3] under which the Division of Water Resources would determine and assign such credits[4] to each irrigated acre of land the owner would like to be potentially available for temporary transfer. Credits then offered for temporary transfer would be assembled, either by the irrigators themselves (such as through a Super Ditch), by the potential purchasers, or by some entity such as a water bank[5] created especially for this purpose.

The major hurdle in change-of-use cases is the no injury rule. [6] To satisfy this requirement, the applicant for the change must demonstrate that there will be no change in stream conditions associated with the proposed change of use, i.e., in quantity of flows, their location, or their timing. This requirement may sound simple but, in water court proceedings, is enormously complicated to meet in practice.[7] As noted in a recent report: "As currently implemented, any type of impact, no matter how small or distant in the future, is deemed to be 'injurious'."[8] This report added:

Proving lack of "injury" can lead to costly engineering and expensive and lengthy litigation, and can result in the imposition of burdensome terms and conditions. In many cases, the risk of these negative effects can deter applicants from even attempting to change the use of a water right, and in other cases changes that would foster maximum utilization of the state's water resources do not proceed because the costs required are simply too high.[9]

In addition, the Colorado Supreme Court has applied the anti-speculation doctrine to permanent changes of water rights, requiring applicants to specifically identify the new uses to which the changed right(s) will be placed and their locations.[10] Moreover, the Court has limited the historic consumptive use associated with a water right in a change case to the use(s) and on the lands authorized under the decreed water right and has upheld the requantification of a water right based on contemporary and legally authorized use.[11] Legislative provisions intended to mitigate some of the local adverse effects of permanent transfers of water out of irrigation add still another set of requirements that must be met.[12]

We suggest that proposals for alternative transfers be eligible for use of special procedures that simplify and streamline the change of use process. First, we would handle such transactions administratively, similar to the process now authorized for pilot transfers projects. Second, we propose that such procedures apply a standard of no unreasonable harm to other water rights.[13] Third, we favor placing the burden of proving unreasonable injury on opposers.[14] Fourth, we believe the anti-speculation requirements applied by the Colorado Supreme Court in the High Plains A&M case should be waived for ATMs.[15] Fifth, we suggest that the only requirement for determining consumptive use credits for ATMs should be that the water has been beneficially used on identified irrigated lands for the preceding ten years, without regard to whether that use was strictly in accord with associated water right decrees.

Irrigators interested in participating in a fallowing-leasing arrangement would offer certified credits associated with specific lands to an entity serving as the transfer facilitator. Based on demands for use of credit water, the facilitator would have the responsibility of putting together suitable packages of consumptive-use credits and to do so in a manner that avoids unreasonable harm. These arrangements could be for different periods of time, depending on purchaser needs and interests and irrigator willingness. Thus, a water user with a high aversion to reductions of use that might be necessitated by extreme but short-term droughts could enter into an interruptible supply agreement, in effect acquiring an insurance policy against drought risks. Another user might only need short-term use of water and would be satisfied with use of water for that specific period of time. Still another user might need a long-term, reliable supply of water; such a user would probably want a long-term arrangement that offered the kind of supply security needed for the purpose of use. The facilitator would work with the irrigators and their water supply organizations to rotate fallowed lands as necessary to provide sufficient water while ensuring their periodic return to irrigation use. [16]

[1] This is the approach taken by the Super Ditch Company. Draft Plan at 189. We recognize there are other possible ways of freeing up some irrigation water for other uses such as deficit or seasonal irrigation. A helpful discussion of these options is provided in Brad Udall, *The Colorado River Critical Conservation Program: Recommendations and Considerations for a Successful NRCS Regional Conservation Partnership Program*, November 2014.

[2] *Criteria and Guidelines for Fallowing-Leasing Pilot Projects*, Nov. 19, 2013 (Criteria and Guidelines).

[3] For a discussion of using consumptive use credits, *see* Mark Squillace, Water Transfers for a Changing Climate, 53 NAT. RESOURCES J. 55, 102-03 (2013). *See also* Lawrence J. MacDonnell, Public Water—Private Water: Anti- Speculation, Water Reallocation, and High Plains A&M, LLC v. Southeastern Colorado Water Conservancy District, 10 U. DENV. WATER L. REV. 1, 15 (2006); *Protecting Local Economies*, Report to the Legislature – State of Washington 57 (2008).

[4] As part of the fallowing-leasing pilot project, these agencies have developed the Lease Fallowing Tool: The Lease Fallowing Tool ("LFT") is another computational model and predictive tool developed by DWR and the Colorado Water Conservation Board with a technical committee consisting of approximately 20 water engineers. The LFT is used to implement ag-municipal water sharing pursuant to HB 13-1248. It employs a number of conservative assumptions, e.g., irrigation efficiency, surface runoff and deep percolation, specific aquifer yield, that together underestimate historical consumptive use (HCU) and overestimate return flows by at least 5% to 10% or more according to the consulting water engineers involved in its development. Getches-Wilkinson Center, A Roundtable Discussion on Colorado's No-Injury Rule (undated), at 5, fn. 3 (Roundtable).

[5] A useful discussion of water banking is provided in O'Donnell & Colby, *Water Banks: A Tool for Enhancing Water Supply Reliability* (January 2010). The water bank established in 2001 was extremely restricted (e.g., only storage water) and thus unused. *See* Colorado Water Conservation Board, Brief History of Ark Basin Water Bank, Feb. 21, 2012, available online at http://cwcb.state.co.us/LoansGrants/alternative-agricultural-water-transfer-methods-grants/Pages/main.aspx.

[6] This limitation is expressed in statute as follows: "A change of water right, implementation of a rotational crop management contract, or plan for augmentation, including water exchange project, shall be approved if such change, contract, or plan will not injuriously affect the owner of or persons entitled to use water under a vested water right or a decreed conditional water right." Colo. Rev. Stat. §37-92-305(3)(a).

[7] First, it is necessary to document the historic rates of diversion over some substantial period of time that includes a range of water supply variability. Then it is necessary to determine the amounts of beneficial consumption (including delivery efficiency and crop evapotranspiration) and losses (such as ditch and field seepage) associated with the use during that time period. The analysis of consumption can be complex, depending on the nature of the use. Return flows to the water source, both on the surface and underground, must be determined both in amount and timing.

[8] Roundtable at 2.

[9] Roundtable at 2-3.

[10] High Plains A&M, LLC v. Southeastern Colo. Water Cons. Dist., 120 P.3d 710 (2005).

[11] Santa Fe Trail Ranches Property Owners Ass'n v. Simpson, 990 P.2d 46 (1999). *See also* Concerning the Application for Water Rights of Central Colo. Water Cons. Dist., 147 P.3d 9 (2006).
[12] Colo. Rev. Stat. §§37-92-305(4.5) (a), (b).
[13] For a discussion of this standard, *see* Lawrence J. MacDonnell, Prior Appropriation: A Reassessment, U. DENV. WATER L. REV. (forthcoming 2015).
[14] This shift in the burden of proof also was proposed in the Roundtable report.
[15] High Plains A&M, LLC v. Southeastern Colo. Water Cons. Dist., 120 P.3d 710 (2005).
[16] The following criteria provide that no acre of irrigated land could be fallowed more than three years in ten, and no more than thirty percent of a single irrigated farm could be fallowed during a ten-year period. Criteria and Guidelines at 6.

Appendix 3: A Roundtable Discussion on Colorado's No Injury Rule

- The following text originally was published as "A Roundtable Discussion on the No-Injury Rule of Colorado Water Law" (and cited herein as Banks and Nichols, 2015). Some changes in formatting, pagination, and/or footnotes/endnotes may be associated with this reprinting; please consult the original document as needed.

by Britt Banks and Peter Nichols[i]

ABSTRACT

This article reports on a workshop on the no-injury rule of Colorado Water Law sponsored by the Getches-Wilkinson Center for Natural Resources, Energy & the Environment of the University of Colorado School of Law.[ii]

INTRODUCTION

Colorado, like many arid places in the world, faces an uncertain water future. Demand for water is projected to continue to accelerate due to an expanding economy, growing population and associated urbanization, growth in the tourism and oil and gas sectors, and increasing international demand for agricultural products.

At the same time, pressures on water supplies are also expected to continue to accelerate, due in part to climate change impacts (e.g., longer growing seasons, reduced average flows, increasingly frequent droughts, higher temperatures and earlier melting of high-country snow pack), and on-going depletion of groundwater aquifers. Increasing demand for water from powerful downstream states such as California and Arizona could also negatively affect future supplies available to Colorado users.

The potential for a water crisis in the Centennial State is real and growing every day. At some point soon, demands for water could substantially exceed available supplies, threatening significant economic, social and environmental consequences. The fact that there are legal claims for more water than falls on Colorado in all but the snowiest years underscores the challenges facing the state. As the Colorado Supreme Court presciently observed, "As administration of water approaches its second century the curtain is opening upon the new drama of *maximum utilization* and how constitutionally that doctrine can be integrated into the law of vested rights." *Fellhauer v. People*[iii]. The goal of maximizing the use of our waters, however, must sometimes yield to the protection of vested rights. *State Eng'r v. Castle*

Meadows[iv]. That said, there is increasing discussion regarding whether Colorado water law, as it currently stands, is flexible enough to accommodate unmet current and forecast water demands to avoid a crisis, while at the same time protecting vested water rights.

Working within the system often requires hiring expensive engineering and legal advisors, and—in the view of some—overcoming a hard-wired resistance to the changes needed to promote maximum utilization, efficiency, conservation and sustainable use.

In October 2014, the Getches—Wilkinson Center sponsored a roundtable discussion, among a diverse group of expert water jurists, water lawyers, water engineers, state water officials, and academics on Colorado water law and Colorado water policy. The workshop discussed one aspect of the state's water law seen by some as impeding the type of flexibility needed to avoid a crisis: namely, the "no injury rule". The rule is of overriding importance because appropriators have claimed virtually all of the water available; accommodating new or additional demands therefore generally requires adjudicating changes to existing irrigation water rights.[v]

THE NO-INJURY RULE

Under Colorado water law, a water right cannot be changed unless the applicant can demonstrate that such action will not "injuriously effect" water rights held by others – the "no-injury rule."

> Injury involves diminution of the available water supply that a water right holder would otherwise enjoy at the time and place and in the amount of demand for beneficial use under the holder's decreed water right operating in priority. *Farmer's Reservoir and Irrigation Co. v. Consolidated Mut. Water Co*.[vi].

Burlington Ditch Reservoir & Land Co. v. Metro Wastewater Reclamation Dist.[vii] Moreover, "a change of water right proceeding precipitates quantification based on actual historical consumptive use, in order to protect other appropriators.[viii] [ix]

As currently implemented, <u>any</u> type of impact, no matter how small or distant in the future, is deemed to be "injurious". Thus, satisfying other water right owners' allegations of injury usually requires the applicant to prove they can maintain the stream conditions that existed prior to the change, i.e., guarantee that essentially every drop of water is present at the same "time, location, and amount" as before the change. Too often, the result is costly, years-long

litigation over small amounts of water – so-called "teacup changes to stream conditions" – given overcrowded dockets and the extensive expert disclosure process in the court rules. Complicating matters for the applicant, it is hard to propose mitigation without a clear and accepted approach to evaluate injury. It is accordingly often easier and cheaper for applicants to simply relinquish or transfer part of their water right to the stream or objectors than to prove no injury.

A number of Colorado water lawyers, engineers, and managers—certainly not all—are concerned that this doctrine, as currently implemented in the state, limits the flexibility needed to manage water in a supply-constrained environment, especially in the South Platte and Arkansas river basins. Many of the participants in the roundtable noted that, under current law, there is no "material" or "*de minimis*" standard for injury. One participant cited an example of terms and conditions to protect a downstream water right from a stream depletion of less than a cup of water more than five years in the future.

Proving lack of "injury" can lead to costly engineering and expensive and lengthy litigation, and can result in the imposition of burdensome terms and conditions. Many feel that recent changes in the court rules regarding expert disclosures have exacerbated this problem. And too often, and often long after the objecting water users have settled with the applicant, the State and Division Engineers increasingly challenge changes irrespective of injury.[x] Increasingly, the risk of these negative effects can deter applicants from even attempting to change the use of a water right, and in other cases changes that would foster maximum utilization of the state's water resources do not proceed because the costs required are simply too high.

Some roundtable participants expressed the view that no injury rule must be reformed to permit and promote the flexibility and innovation that is needed now and will become critical to manage Colorado's water to meet future needs. As one jurist observed, we're boxed into a corner by climate change; preserving the past means a lack of flexibility to address the future.

Participants focused on three topics related to the no-injury rule in change cases in particular: (1) the role of data collection and modeling in determining injury; (2) whether a "material" or "de minimis" injury standard should be developed and how it could be applied; and (3) whether rules governing the "burden of proof" and standing in water court proceedings should be altered in some way. The discussion on each of these three topics follows.

ENGINEERING AND DATA

In order to calculate whether a proposed change will reduce return flows of water to other holders of water rights, engineers employ various formulae, computerized spreadsheets, and mathematical models, e.g., GLOVER, AWAS, State CU, MODFLOW, etc. ("models"). These models produce long-term predictions of impacts, with results often quantified at a very high level of detail, e.g., daily time steps extending for decades into the future. Although the science and the models are widely accepted, their application can be problematic. Modeled effects are highly dependent upon data and assumptions. Whether or not the application of a model to any given hydrological setting accurately captures its essential behavior is often the subject of contention among applicants, opposers, and the State and Division Engineers.

Many workshop participants expressed concern that the models currently being used are simply incapable of the level of precision that is implicitly attributed to them by courts and the Division of Water Resources ("DWR"). Some participants expressed skepticism that any model could measure a natural system such as stream flows and groundwater to the degree of accuracy that is needed or presumed to address injury at the level recently specified in water court decrees and DWR approvals. One noted in particular that groundwater is extremely hard to model, especially deep groundwater due to complex geology, and that one key variable is at best accurate at an order of magnitude. Others stated that the results of these models are often only correct within plus-or-minus 10 percent, and that this level of uncertainty needed to be understood and recognized by lawyers, courts and DWR using these models to approve terms and conditions to prevent injury to other water rights. Implicit in these criticisms was the idea that it makes no sense to spend months or years, and tens or hundreds of thousands of dollars, arguing over the accuracy of models that are by their nature incapable of being as accurate as objectors demand where simpler models could suffice.

The limitations on the accuracy of the modeling and in river administration have been implicitly recognized by the water courts and the State Engineer. By way of example, numerous decrees of water courts and substitute water supply plans approved by the State Engineer provide for "folding" the final 5 percent to 10 percent "tail" of calculated return flows obligations back into earlier years to address tiny amounts of water calculated to be owed to the river in distant years.

For some participants, the bigger issue is the over-reliance on these models by engineers, lawyers, courts and DWR—the concern is that the models are used as a substitute for professional judgments that, in decades past, were commonplace in water court cases. One participant asked, "What happened to the application of professional engineering judgment?"

In fact, this may be a manifestation of a larger issue, i.e., the interface between engineering and the law, and engineers and lawyers, who see things through different lenses. For example, when lawyers see a number, say 0.1 acre-feet, they tend to treat it as fact, whereas engineers understand the limitations inherent in the supporting science and data, e.g., while 0.1 acre-feet may be the "answer" from the model and data, the "actual" effect on the system could be 1 or 0.01 acre-feet, or even more or less. Jurists, however, seem to understand that it is not possible to get the desired accuracy because there will be errors in modeling naturally non-uniform and often complex hydrogeology, and scientific understanding will improve and change over time. That said, everyone agreed that generally-accepted models would give the courts better information to make good decisions.[xi]

Many participants also pointed to the limited data feeding into the models, and noted that this lack of data limits the precision of any model. In addition, many noted that it can be prohibitively expensive for individual applicants, objectors or DWR to collect the data needed in any particular case, necessitating the use of simplifying assumptions, which introduce uncertainty into the modeled results. All agreed on the need to collect more data, on a basin or subbasin-wide basis where possible. The San Luis Valley was mentioned as an example where basin-wide data collection efforts have worked well; the South Platte Basin was mentioned as an example where more localized data is needed.

The Water Court Committee of the Colorado Supreme Court recognized these problems in 2008, when it recommended, "The Colorado General Assembly should continue to foster the development of publicly-usable river basin computational models, predictive tools, and model data transparency."[xii] There are a couple of promising recent examples of accepted computational models and predictive tools.[xiii]

Out of this discussion came a number of proposals for reform:

- The State Engineer's Office should develop through rulemaking (a few thought through policy) computational models and predictive tools to determine historical consumptive use, return flows, injury, and compact compliance for basins or sub-basins where their use would facilitate resolution of numerous, complex or broadly contested applications.
    - Although some think the State Engineer has the authority to undertake this now, others disagreed. Most thought that legislative direction would be very useful.
    - Some suggested that there should be a statutory rebuttable presumption for an applicant that uses a model developed through State Engineer's rulemaking, as that process would provide everyone with an opportunity to participate in adjudication of the validity of the model, like ISAM or RGDSS.[xiv]

- The State legislature or CWCB should provide funding for expanded basin and sub-basin data collection in each of the State's water divisions.
- The Water Courts and DWR should recognize the inherent uncertainty in computational models and predictive tools, and stop applying the results to impose terms and conditions that are beyond the scientific accuracy of the models, tools, and data.
- Some thought that as more data is collected and the models are improved, there should be some provision for reopening decisions or decrees based on earlier less-accurate modeling.

The last recommendation was controversial and highlights the tension between the certainty needed by individual water users in decrees and administrative action, on the one hand, and the need for flexibility and reliance on sound science, on the other.

Everyone agreed we should "follow the science," although all did not agree on how to do that. As science is not static, some thought decrees and administration should adjust in some manner as data, science and engineering improves. One participant posed the dilemma between wanting decrees now and certainty for the future, or providing for the incorporation of better science and engineering in 50 years. Another participant noted that the legal concepts of res judicata and collateral estoppel are not well suited to Colorado water law given the technical and scientific uncertainty behind many prior decisions, which seemingly opens the door for future modifications.

DEFINING A "MATERIAL" OR "*DE MINIMIS*" INJURY STANDARD

As stated above, most participants felt that as Colorado law is currently applied, any impact appears to constitute injury, and there is no *de minimis* or other practical materiality standard to define injury. There was a lengthy discussion about whether a material or *de minimis* injury standard could or should be defined by statute. Many participants argued that the State Legislature, or perhaps the State Engineer, should define an acceptable range of impact to apply to changes of water rights.

It was noted that, in certain specific instances, the State Legislature has statutorily declared that certain water uses do not constitute injury, effectively legislating findings of *de minimis* injury. Examples include gravel pits,[xv] small capacity household wells,[xvi] and groundwater depletions.[xvii] It was also noted that, on a cumulative basis, the impacts from these types of activities can be quite significant, e.g., exempt wells consume 20,000 to 40, 000 acre-feet/year statewide and South Platte gravel pits consume 10,000 acre-feet/year. These examples were advanced to support the proposition that the State Legislature has the authority to define what

constitutes injury, and could define what constitutes a *de minimis* injury. A few, however, thought that such legislation might interfere with the constitutional right to appropriate or could constitute an unconstitutional taking or inverse condemnation.

One participant noted that the Idaho Supreme Court adopted a materiality standard of 10 percent, although many thought this too high.[xviii] Others threw out numbers ranging from 1/10 of 1 percent to 1 percent to 5 percent, or 50 acre-feet. For comparison, Colorado statute defines non-tributary groundwater using a depletion standard of 1/10 of 1 percent within 100 years,[xix] although one participant reminded everyone that water engineers and lawyers had recommended 1 percent and the legislature reduced that by a factor of 10, perhaps enacting a preference in 1985 for protecting vested rights. The Colorado Water Conservation Board has a 1 percent *de minimis* rule, although the CWCB may still object to a change.[xx] And Colorado statute requires the user of not non-tributary groundwater more than a mile from a stream to relinquish 4 percent of the annual withdrawal per year.[xxi] Still another example is the State Engineer's confidence level in stream depletions modeled by the Rio Grande Decision Support System ("RGDSS"), which is currently fifty acre-feet per year.[xxii] Other than these and a few other isolated exceptions, any other diminishment of stream flow resulting from a change of water right would constitute injury. Some argued that a range of acceptable percentage impact should be implemented, while others argued for a fixed quantitative standard, or a combination.

A statutory definition of injury could relate to depletion of the river (return flow), to a limitation on the yield (CU) of the applicant's water right, or to a reduction of yield (CU) of an objector's water right. Basing a standard on a percent of applied-for change or objector's water right would be different for every application (1 percent of 1 cfs is 0.01 cfs, 1 percent of 100 cfs is 1 cfs), however, and might not be equitable because the standard would be more stringent for small changes than for larger ones. Furthermore, the cumulative effects of multiple changes on individual water rights complicates application of a *de minimis* standard and requires consideration. These considerations may favor a methodology that results in an applicant relinquishing water to ensure no injury – effectively formalizing the ad hoc approach of innumerable historical decrees.

Some participants felt that any standard needed to address the frequency and duration of impacts. A few also favored a multi-tiered approach, with different standards related to the size of the change, perhaps relative to the native stream flow.

APPLYING A "MATERIAL" OR "*DE MINIMIS*" INJURY STANDARD

While many participants agreed on the need for an injury standard, there was less agreement on how such a standard should be applied. Some thought that proposed changes that are within an injury standard should be allowed to proceed. Others argued that proposed changes within an injury standard should still be required to mitigate predicted depletions, but that there should be much more flexibility or discretion as to how that should be done, such as through cash payments, structure improvements, or stream improvements.

One proposed approach would be to give the water court explicit direction and flexibility to make a finding of no injury within some statutorily-defined parameters.[xxiii] That approach, however, may not address the issue, but instead could merely recast the argument between the applicant and the objectors in water court. Others proposed that the General Assembly should create a framework approach on injury, and then charge the State Engineer's Office with exercising technical judgment within that framework, similar to his authority to administer futile calls.[xxiv] Many others, however, did not favor giving the State Engineer this additional authority given widespread concern over legal positions taken by his office in recent cases.

BURDEN OF PROOF AND STANDING

Finally, there was a robust discussion on burden of proof and standing in change of water rights proceedings.

> An applicant seeking a change of water right decree bears the burden of showing that injury to other adjudicated water rights will not result. *Weibert v. Rothe Bros., Inc*.[xxv] If the applicant successfully meets this burden, objectors have the burden of going forward with evidence of injury to other adjudicated water rights. *City of Thornton v. Bijou Irrigation Co*.[xxvi]

Burlington Ditch Reservoir & Land Co. v. Metro Wastewater Reclamation Dist.[xxvii] The burden shifts back to the applicant if the objectors provide evidence of injury to their vested water rights. While this is a straightforward three-step process in theory, it is not simple in practice. For example, some decisions have held that on an over-appropriated stream, there is a presumption of injury the applicant must overcome.[xxviii] Moreover, an objector does not have to show that a depletion actually causes an injury to their water right. Instead, the applicant must prove a negative, i.e., that its proposed action will not cause injury. Proving a negative is, of course, extremely difficult. Complex change cases regularly generate myriad terms and conditions and accounting obligations designed to assure objectors there will be no

diminution of their water rights. In practical effect, such terms and conditions usually mean that the applicant leaves water court with significantly less wet water than when they entered.

Many participants accordingly felt that the rules on burden of proof needed to change, because they give too much power to objectors and lead applicants to acquiesce to onerous conditions simply out of fear of litigation. This is a particular concern of asset-rich cash-poor applicants, such as owners of irrigation rights. Many believed that "injury" is seldom the real issue, but becomes the proxy to force resolution of other matters between an objector and the applicant.

Some felt that the burden of proof should squarely shift to an objector, and that objectors should be required to prove that their water rights would be actually harmed by a proposed change, at least after an initial showing by the applicant of non-injury.[xxix] Another suggestion was that the burden of proof rules should work in tandem with a statutory injury standard. So, for example, if the injury standard were one percent of an objector's water right, and the applicant's modeling shows that its proposed action would fall below that standard, then the burden of proof would shift to the objector to prove injury to their water right.

One participant advanced a different approach: they proposed that once a water right holder objects in a change case, the applicant should be able to question whether the objector is wasting water or using water inefficiently. If the applicant can demonstrate waste or inefficient use by the objector of an amount equal to or more than the alleged impact of the proposed action, then the proposed change would be allowed to proceed.

With respect to standing, many noted, and some objected to, the State Engineer's recent practice of objecting to changes purportedly to protect the state's water supply and represent the "little guys," perceived by some to be on behalf of future appropriators.[xxx] Many felt that only the holders of actual water rights should be allowed to file objections and assert injury in change cases. Standing to assert injury requires the objector to show a legally protected interest in a vested water right or a conditional decree.[xxxi] Anyone, however, can oppose a change, and insist on strict proof of all elements of the application, even if they do not own any water rights.[xxxii]

CONCLUSION

Climate change, growth, and evolving social values pose major challenges for Colorado's water future. Addressing these issues through reallocation of existing water rights will be particularly challenging within a generally over-appropriated system. One participant posed this issue as a question of philosophy: should the law err on the side of protecting existing users, provide a

level playing field, or err on the side of facilitating reallocation to meet changing social needs? There was vigorous advocacy during the roundtable on all sides of this issue. Most seemed to agree, however, that the current system is generally too costly and too rigid.

In Colorado, all surface and ground water is a public resource.[xxxiii] Shifting of some legal burden onto opposers could establish a balance that's lacking, whereby opposers have the upper hand in maintaining the status quo. Although some cautioned about approaching the General Assembly, most participants did seem to agree that everyone would benefit from more statutory guidance on what constitutes injury to water rights.

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[ii] Approximately twenty judicial officers, state officials, private and public practicing attorneys, and water engineers participated in the five-hour Workshop in Boulder, Colorado on October 20, 2014. The Workshop followed the "Chatham House Rule" to encourage openness and the sharing of information, *i.e.*, "participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed." http://www.chathamhouse.org/about/chatham-house-rule#sthash.VjRHwmAF.dpuf
[iii] *Fellhauer v. People*[iii], 167 Colo. 320, 336 (Colo. 1968).
[iv] *State Eng'r v. Castle Meadows*, 856 P.2d 496, 505 (Colo. 1993).
[v] *See, e.g., Orr v. Arapahoe Water &Sanitation Dist.*, 753 P.2d 1217, 1217-22 (Colo. 1988).
[vi] *Farmer's Reservoir and Irrigation Co. v. Consolidated Mut. Water Co*., 33 P.3d 799, 807 (Colo. 2001).
[vii] *Burlington Ditch Reservoir & Land Co. v. Metro Wastewater Reclamation Dist*., 256 P.3d 645, 661 (Colo. 2011).
[viii] *Id.*, at 674-75.
[ix] David Taussig argues that the Court added this second test to the traditional no-injury rule in *Santa Fe Trail Ranches Prop. Owners Ass'n v. Simpson,* 990 P.2d 46 (Colo. 1999), and that "requantification" of historical consumptive use has eclipsed the issue of injury in change cases. David C. Taussig, "The Devolution of the No-Injury Stand in Changes of Water Rights,"18 U. Denv. Water L. Rev. 116 (Fall 2014).
[x] *See* Taussig, 18 U. Denv. Water L. Rev. at 141-142, *citing State Eng'r v. Bradley (In re Application for Water Rights in Rio Grande Cnty*.), 53 P.3d 1165, 1167 (Colo. 2002); Opening Brief of the State Engineer and the Division Engineer for Water Division 1 at 45, *Wolfe v. Sedalia Water & Sanitation Dist*., No. 14SA12 (Colo. filed Apr. 25, 2014); Order Re: Black Hawk and Coors' Motion for Determination of Questions of Law Concerning Previously Changed Water Rights at 2, *In re Application for Water Rights of City of Black Hawk*, No. 12CW303 (Colo. Water Ct. Div. No. 1 May 29, 2014).
[xi] *See, e.g., Concerning The Matter Of The Rules Governing New Withdrawals Of Ground Water In Water Division No. 3 Affecting The Rate Or Direction Of Movement Of Water In The Confined Aquifer System Aka "Confined Aquifer New Use Rules For Division 3*," Case No. 04CW24 (Water Div. No. 3, Nov. 9, 2006).

[xii] Report of the Water Court Committee of the Colorado Supreme Court, Report to the Chief Justice, at 1 (Aug. 1, 2008).
[xiii] The Irrigation Systems Analysis Model ("ISAM") is a peer-reviewed computer program developed by DWR to compare monthly water budgets of surface water irrigation systems with and without an improvement in order to evaluate the impacts of an improvement to a surface water irrigation system located in the Lower Arkansas Basin. DWR developed ISAM over a couple of years with input from an advisory committee of over a dozen water engineers. It has been in use for four years to analyze irrigation changes for over 100 farms annually, and eliminated the need for individual modeling of each farm. *In the Matter of the Proposed Compact Rules Governing Improvements to Surface Water Irrigation Systems in the Arkansas River Basin in Colorado*, Case No. 09CW110 (Water Div. No. 2, Oct. 25, 2009). The Lease Fallowing Tool ("LFT") is another computational model and predictive tool developed by DWR and the Colorado Water Conservation Board with a technical committee consisting of approximately 20 water engineers. The LFT is used to implement ag-municipal water sharing pursuant to HB 13-1248. It employs a number of conservative assumptions, e.g., irrigation efficiency, surface runoff and deep percolation, specific aquifer yield, that together underestimate historical consumptive use (HCU) and overestimate return flows by at least 5 to 10 percent or more according to the consulting water engineers involved in its development. The use of the LFT for the Catlin Pilot Project dramatically reduced the engineering costs and disputes over injury, especially as compared to a nearly identical substitute water supply plan (SWSP) proposed in 2012 using traditional engineering modeling. http://cwcb.state.co.us/water-management/water-projects-programs/Documents/FallowLease/FallowingLeasingCriteria%2020131119.pdf
[xiv] *In the Matter of the Proposed Compact Rules Governing Improvements to Surface Water Irrigation Systems in the Arkansas River Basin in Colorado*, Case No. 09CW110 (Water Div. No. 2, Oct. 25, 2009); *Concerning The Matter Of The Rules Governing New Withdrawals Of Ground Water In Water Division No. 3 Affecting The Rate Or Direction Of Movement Of Water In The Confined Aquifer System Aka "Confined Aquifer New Use Rules For Division 3*," Case No. 04CW24 (Water Div. No. 3, Nov. 9, 2006).
[xv] CRS 37-92-305 (12) exempting from replacement historical natural depletion caused by pre-existing vegetative cover.
[xvi] CRS 37-90-105(1); 37-92-602(1); 37-92-602(3)(b)(II)(A).
[xvii] CRS 37-90-103(10.5) (defining nontributary ground water); CRS 37-90-137(9)(c.5) (requiring augmentation of Denver Basin wells).
[xviii] *Clear Springs Foods, Inc. v. Spackman*, 252 P.3d 71 (Id. 2011) (noting that the margin of error was probably much higher than 10 percent, but the conflicting testimony supported use of a 10 percent margin of error as a minimum).
[xix] CRS 37-90-103 (10.5).
[xx] 2 CCR 408-2 8e.
[xxi] CRS 37-90-137(9)(c.5).
[xxii] Draft "Rules Governing the Withdrawal of Ground Water in Water Division No. 3, at ¶ 7.2 (Aug 11,2014); http://water.state.co.us/DWRIPub/San%20Luis%20Valley%20Advisory%20Committee/Ground%20Water%20Rules%20for%20Division%203%20Working%20Draft%20August%2011,%202014.pdf.
[xxiii] The water court has considerable authority regarding terms and conditions to prevent injury to vested water rights. CRS § 37-92-305(3) and (4).
[xxiv] CRS § 37-92-502(2)(a).
[xxv] *Weibert v. Rothe Bros., Inc*., 200 Colo. 310, 618 P.2d 1367, 1370 (Colo. 1980).
[xxvi] *City of Thornton v. Bijou Irrigation Co*., 926 P.2d 1, 88 (Colo. 1996).
[xxvii] *Burlington Ditch Reservoir & Land Co. v. Metro Wastewater Reclamation Dist*., 256 P.3d 645, 662 (Colo. 2011).

[xxviii] *See, e.g., Empire Lodge Homeowners' Ass'n v. Moyer*, 39 P.3d 1139, 1158 (Colo. 2001).
[xxix] A recent example is S.B 15-212 (enacted May __, 2015), which requires, for stormwater detention and infiltration facilities, an objector to prove material injury to their water right by the modification of the amount or timing of water that would have been available for diversion by the water right under hydrologic conditions that existed as of the water right's priority date. *See* C.R.S. § 37-92-602(8)(c) (2015).
[xxx] *See, e.g.,* Taussig, at 141-42.
[xxxi] *Shirola v. Turkey Canon Ranch Ltd. Liab. Co*., 937 P.2d 739, 747 (Colo. 1997).
[xxxii] CRS § 37-92-302(b).
[xxxiii] *Kobobel v. State Dep't of Natural Res*., 249 P.3d 1127, 1134 (Colo. 2011) (*citing* Colo. Const. art. XVI, § 5).

Appendix 4: A Brief Note on the Australian Water Marketing Model

The emphasis on water transfers in Australia, and especially the Murray-Darling Basin, has been researched extensively (*see* Squillace and McLeod, forthcoming). There, legal reforms have focused on making water entitlements (rights) highly fungible in several ways: e.g., by severing water rights from any particular land or use; by treating all rights equally—as opposed to our western US priority system which elevates the strength of some over others; by minimizing restrictions on the time-scale or geographic-scale (including interstate) of transfers; and so on. Perhaps equally as important, efforts have been made to minimize the transactions costs of transfers, by promoting uniform rules among jurisdictions, by providing real-time disclosure of water trading activity and prices, and by quick administrative reviews of proposed transfers.

By almost any measure, the market in the Murray-Darling Basin is robust (Squillace and McLeod, forthcoming). For example, in 2011-2012, over 15,000 transactions resulted in the movement of roughly 3.6 million acre-feet (MAF) of water, most in temporary transfers, and through processes that typically take less than 20 days. The ease of marketing conserved water has proven effective in spurring significant investments in on-farm efficiencies, a trend augmented by the availability of massive appropriations (multi-billion dollar) of public money to purchase water for the environment and to achieve desired "caps" on depletions as established through basin plans.

Some elements of the Australian approach have been turbulent—e.g., the buy-back of water for the environment is currently facing a significant political backlash—and some features are not practicably transferrable to the western US—e.g., largely abandoning the seniority element in a prior appropriation right. It is unlikely the western states will ever attempt to make all water rights as fungible as they are in Australia. Nonetheless, it may be possible to limit restrictions on the movement of *conserved water*. Similarly, the Australian commitment to reducing transactions costs by providing good information, market-aiding organizations and processes, and predictable and quick administrative reviews, are all areas where progress in the US should be possible.

Appendix 5: Moving Waters: The Legacy of Buy-and-Dry and the Challenge of Lease-Fallowing in Colorado's Arkansas River Basin (Executive Summary)

- This is the unedited Executive Summary of the thesis, authored by Brian Devine. For further references and additional information, refer to the complete thesis, available from the University of Colorado library or directly from the author (at brian.devine@colorado.edu; 303-877-6736).

Introduction

Transferring water from agricultural users to municipal providers is expected to be a major component of meeting the West's future water needs (Western Governors' Association 2012). Urban populations grow at a rapid rate, and there remain few additional sources of water to develop in the region in order to supply them. Meanwhile, irrigated agriculture accounts for the vast majority of the water use in the West, and holds attractive and reliable senior water rights on most western rivers. Many growing cities have purchased agricultural water rights and transferred them to municipal use, but these purchases may take several legal forms and create outcomes of varying desirability in the farming communities that depend on irrigation as their economic and social thread. Recognition of the potential for damaging vulnerable rural areas is almost as old as the practice of transferring water itself (National Research Council 1992).

Two particularly good case studies, illustrating the range of options and outcomes, can be found side-by-side in the Arkansas River basin of southeast Colorado. The first is perhaps the most famous example of the "old way" of acquiring water (often called *buy-and-dry*): from 1968 to 1985, multiple cities on the Front Range purchased over 90 percent ownership in the Colorado Canal, which was the sole irrigation facility in Crowley County, and transferred that water permanently into municipal use (MacDonnell 1999). Crowley County has perhaps a dozen operating farms in 2015 and now depends for its tax base and economic livelihood on two prisons that residents desperately sought to attract following the water sales. Just downstream, the farmers of Otero and Bent Counties saw these events transpire with a nervous eye, and, following the drought of 2002, attempted to devise a strategy to provide cities with water while remaining in business and preserving their farm-dependent communities. The result is the Super Ditch project, which aims to rotate the dry-up associated with water acquisition around multiple fields, farms, and even irrigation systems, preserving agricultural operations and the associated small towns; this concept is often referred to as *lease-fallowing* (Nichols 2011). The project is currently providing water to three municipalities as a demonstration project.

This report summarizes research conducted in the Arkansas Basin from 2013 to 2015 as framed by the question *"What areas will be involved in a water transfer, and with what effects?"* There is no simple answer to this question: both the location of water acquisitions and the outcomes that come to pass depend on facts of local geography and the characteristics of local water rights, as well as the economic conditions of the transfer itself. Put plainly, water transfers are more than a theoretical construct to solve abstract water management problems: they depend on the realities of the real world in which they take place. Water transfers therefore demand close examination from policymakers and from state agencies charged with planning for our shared water future.

Key Findings

Research in the Arkansas Basin suggests a few lessons for the likely shape of the future transfer and sharing of water between western farmers and cities:

- The possibility of transferring water, by any legal mechanism, depends on a physical connection (via built infrastructure or natural water flow, or both) between buyer and seller. Furthermore the water in question must be operationally compatible (in timing and location) with the buyer's existing treatment and delivery infrastructure. In other words, some rural areas will be mostly exempt from the practice because of a shortage of potential urban buyers on their river system.
- Because of the importance of physical connections and because water rights vary greatly in reliability, only certain water rights are likely to be bought. This will tend to concentrate rather than disperse agricultural dry-up within fast-growing basins and worsen the undesirable effects thereof. While farms are retired frequently around the West, concentrating that phenomenon has serious effects on farm-dependent businesses in small communities with little economic diversification, who find their customer base has disappeared.
- Buy-and-dry will continue to be the "default" method for cities to acquire valuable water rights; the challenge for lease-fallowing schemes is to prove that they can deliver water to municipal systems as reliably as buy-and-dry tactics have been doing for several decades.
- Because cities rely on existing infrastructure and operational rules that grow around their water rights portfolios, the most attractive water leasing/sharing schemes will be very long-term (several decades of reliable delivery from a single source). It is unreasonable to plan on cities relying on "the water market," i.e. a new source of water every year, for their base needs.

- The proper solution for water shortage will be different in every basin in the West. Some may indeed be lease-fallowing projects; other places, due their hydrology, infrastructure, or available institutional capacity, may wish to rely on other alternatives like water banking, dry-year option contracts, or deficit irrigation.

With these lessons in mind, policymakers could take a few concrete steps *if* they wish to incentivize more flexible management of water through lease-fallowing and/or to lessen the impacts of traditional "buy-and-dry" water transfers:

- Make the process of alternative water transfers, like lease-fallowing, easier for cities and farmers to go through than the current processes for permanent water transfers. Given an identical set of conditions to meet or onerous steps to take, cities will almost universally opt to buy water once, and control the supply outright, than buy it for a temporary period and rely on an outside water right owner like a farmer.
    - This could take one of several forms: move to a common modeling platform for temporary water transfers rather than competing models that must be evaluated by a court or official; make the process for temporary transfers less adversarial and expensive; or loosen the legal definition of material injury or speculation in the case of temporary transfers.
- Incentivize the construction of small storage projects with their capacity to be shared by potential buyers and sellers of water. Storage enables the release of water to prevent material injury and is essential for operational flexibility from year to year. Furthermore, building more storage projects and associated infrastructure makes more water rights feasible to be purchased or leased, and spreads out the burdens of agricultural dry-up.
- Entities that wish to act as an intermediary between farmers and cities to facilitate the temporary transfer of water will look very different in different basins according to hydrologic and institutional variation, but in any case these entities should operate as independently as possible from other water-related institutions in their watershed to avoid carrying over existing disputes into the water-sharing era.

Research Methodology

This study was conducted via in-person interviews with Crowley County farmers and officials, including those who sold water rights between 1968 and 1985 and those who chose not to; Super Ditch farmers and organizers; and staff of water utilities who bought Colorado Canal water and who are now the potential customer base for the Super Ditch process. Interviewees were asked about their experience with water transfers, how they made their decisions in transfer proceedings, and the effect of water transfers on their communities. Finally, they were asked

about their expectations for the Super Ditch process and how they decided whether or not to be involved. These interviews were recorded, with the subjects' permission, and transcribed. The transcriptions were coded for references to pre-existing themes like "why buy a water right?" or "what is the role of the Super Ditch?" This procedure is commonplace for case-study research, and allowed each water transfer to be treated as a single unit of analysis, from the decision to undertake it, through the variables that influenced decisions along the way and observed outcomes, to the effects of water transfers themselves (previous studies tended to view these components in isolation).

The Case Studies: Southeast Colorado

The Colorado Canal and Super Ditch make for such a useful comparison because they share a common hydrological, institutional and legal context arising out of their common location in the Arkansas River basin of southeastern Colorado. In each case water was/will be transferred from the same stretch of river into the same reservoir for use by the same few municipalities. The Arkansas River, augmented by diversions from the Colorado River basin, flows out of the Rocky Mountains, through the city of Pueblo, through a developed irrigation region, and into Kansas (Figure 1).

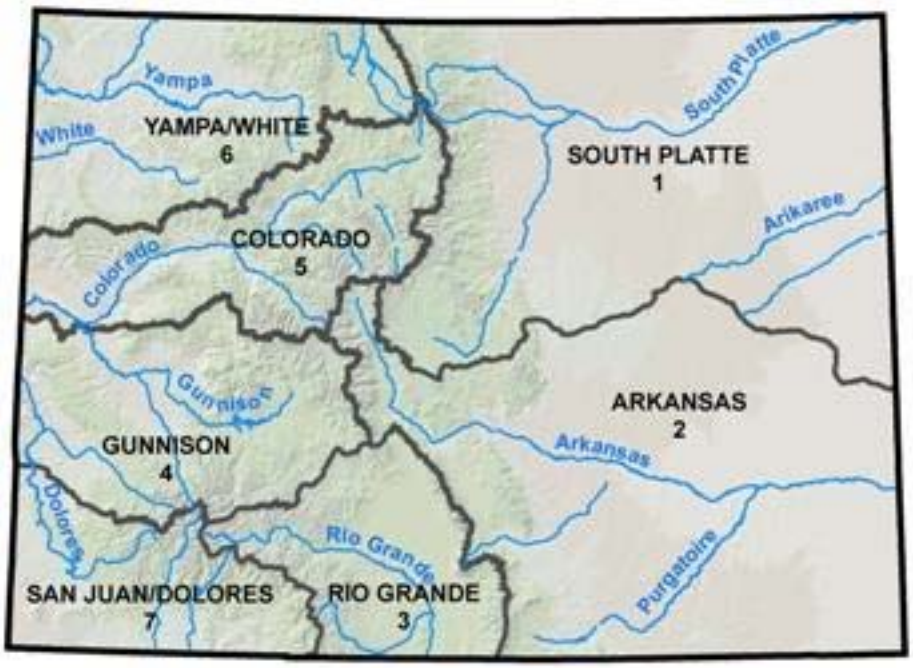

Figure 1: The Arkansas River Basin in Colorado

The basin includes two major metropolitan areas, numerous irrigation systems, and, crucially, two major reservoirs (Figure 2, next page). Pueblo Reservoir, located at the heart of the system

immediately upstream of the City of Pueblo, would prove especially critical to the transfer of water from agriculture to urban accounts.

The Colorado Canal: The Colorado Canal served approximately 50,000 acres of irrigated farmland and was the only irrigation facility in the entirety of Crowley County. Its system included the canal itself, two lakes (Henry and Meredith) at the bottom end of the canal, the Twin Lakes Reservoir, high in the Rockies, and the Independence Pass diversion system, which augmented the storage in Twin Lakes with water from a tributary to the Colorado River. This system made irrigated agriculture and thus intensive human settlement possible in Crowley County, but it was never adequate to reliably supply the massive acreage underneath it. As such, local farmers spent decades eking out a living on the prairie. In 1967, this tenuous existence received its biggest shock when the local sugar mill closed permanently, and farmers were not paid for their sugar beet crops.

The following year, the Crowley Land and Development Company (CLADCO) began offering to purchase farms for far more than they had ever been worth, and quickly snapped up land. CLADCO claimed to be interested in growing Christmas trees, but upon acquiring control of 67 percent of the Colorado Canal system, they unilaterally amended the company's bylaws to permit the sale of water to municipal interests. They sold the Twin Lakes portion of the system to several different municipal utilities rapidly, and the rest of the system eventually followed. Local farmers now own less than ten percent of the company, and Crowley County's agricultural economy and tax base were severely degraded; meanwhile, the dewatered lands became host to invasive weeds, a nuisance to the few remaining farmers, and serious dust storms that threaten public safety. The County now relies heavily on two prisons, one public and one private, for economic activity, tax payments, and the operation of its municipal water supplies.

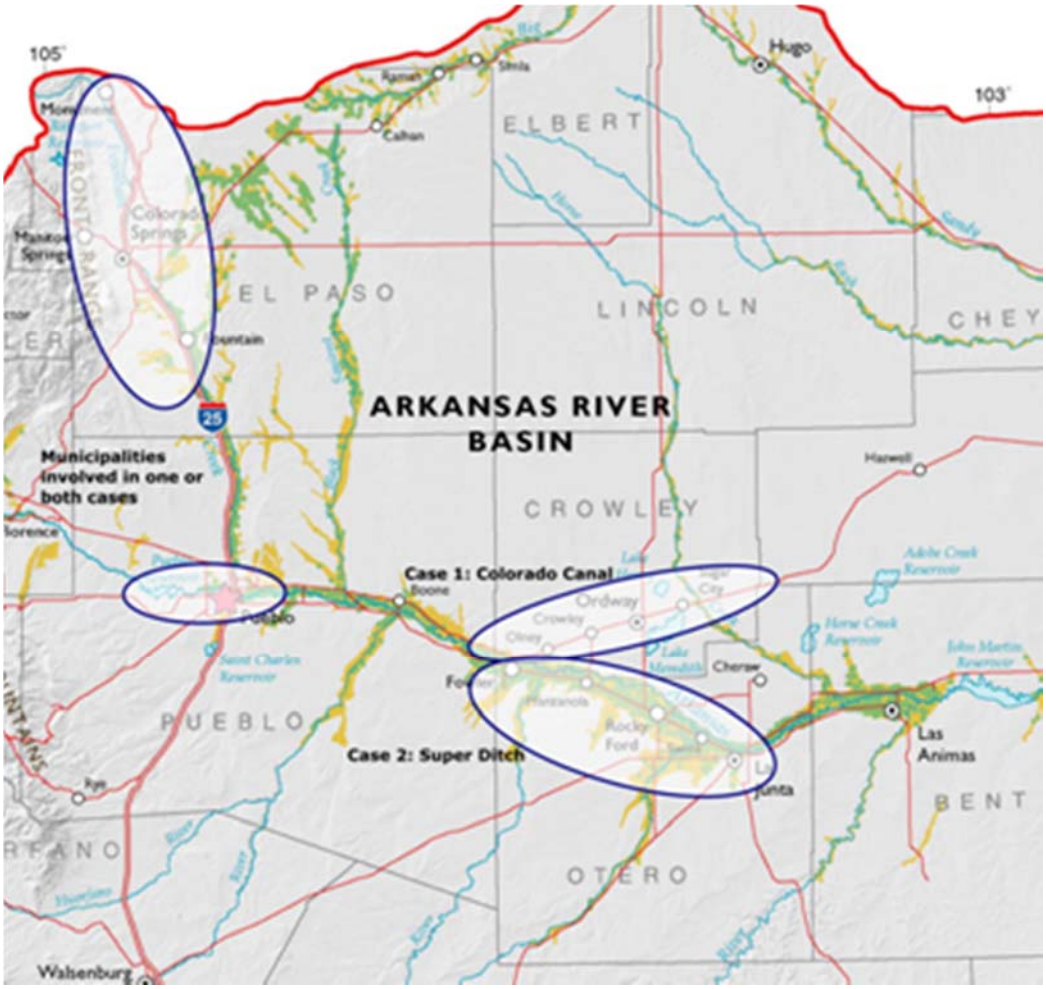

Figure 2: Location of cases in the Arkansas River basin

Municipal utilities found the Colorado Canal, especially its Twin Lakes components, very attractive as an addition to their water supply portfolios, for several reasons:

- Twin Lakes water is imported from another basin and is therefore fully reusable under Colorado law, unlike native Arkansas River water.
- Twin Lakes is located upstream of Pueblo Reservoir, and water can be released to the municipal intakes there with no pumping cost.
- The canal was attached to two lakes; storage in these lakes allowed for maximum operational flexibility between wet and dry years and allowed for the *upstream exchange* of water into Pueblo Reservoir, wherein water would be withheld at Pueblo, where it was needed, and other water would be released from the Colorado Canal system to prevent injury to downstream users in accordance with Colorado law.
- The canal delivered water reliably from year to year for purposes of municipal storage, but not reliably enough to reduce the economic pressure on its farmers.

- Farmers under the Colorado Canal were highly motivated to sell; they had higher debts than those under neighboring ditches, had not been paid for their sugar beets, and had less productive soils than some of their neighbors. The canal system, unlike some others, was probably trying to serve too much land for the amount of water reliably delivered. Finally, some farmers expected to receive cheap and plentiful replacement water from a forthcoming Bureau of Reclamation project; this project ultimately did not even come close to meeting those expectations.

These factors set the Colorado Canal apart from its neighbors and served to concentrate rather than evenly distribute the effects of buy-and-dry across the Arkansas basin; even in 2015 the Colorado Canal represents the vast majority of the water that has been transferred out of Arkansas valley agriculture.

The Super Ditch: Having seen the Colorado Canal situation unfold, and fearful that the same fate would befall their own communities, leaders of the Arkansas valley took two important steps to secure their water future: in 2002, they created the (public, tax-supported) Lower Arkansas Valley Water Conservancy District (Lower Ark) to oppose future water transfers in court and to buy conservation easements on farms, and in 2006, seven of the dozens of ditches below Pueblo Reservoir formed the (private) Super Ditch Company to facilitate the leasing of water to municipalities. The operating theory of the Super Ditch is to provide water to cities on the farmers' terms, because the cities have the economic muscle to buy out farmers if they are not presented with another option, and to keep farmers and the firms that depend on them in business.

Super Ditch has attempted to begin a leasing program on several occasions, and had failed every time until 2015. They have been stymied by the State of Colorado on anti-speculation grounds, by opponents from further downstream, and once by the farmers themselves. Given these difficulties, the Super Ditch and the Lower Ark proposed a bill (HB 13-1248) to move the approval of "pilot" lease-fallowing projects from the (adversarial and expensive) water court system to the administrative approval of the Colorado Water Conservation Board, a policymaking body that has advocated for alternatives to "buy-and-dry." This approval process now involves the use of a common technical model whose assumptions are developed by the parties collaboratively in advance of the approval hearing; the traditional process in water court allows each party to submit the findings of conflicting models with varying parameters and proprietary internal mechanics. Under this streamlined, less adversarial process, the Super Ditch is now leasing a small amount of water to the municipalities of Fountain, Security and Fowler.

The principle challenges of leasing water in the Arkansas Basin can be summarized as follows:

- Cities see the appropriate role of the Super Ditch Company as a "wholesaler" delivering water into Pueblo Reservoir without the cities having to do the legwork of negotiating with individual farmers and calculating how to prevent injury to other water users (and they are willing to deal with such an entity), but farmers see Super Ditch's appropriate role as more of a "cartel," improving their own negotiating position and driving up the price of water. This disagreement has led some basin cities to decline to work with Super Ditch and continue pursuing water sources via the traditional model.
- Cities fear that they could lose the water they have been leasing at the expiration of a lease term. In the interim they will have developed infrastructure and operating rules around the leased supply, and come to depend on it in the same way they depend on the water they own.
- Technically speaking, it is more complicated to move water in a rotating fashion then it is to move it from the same farm or ditch every year. The number of engineering calculations required is multiplied by the number of years involved. This further complicates the modeling required in the legal approval process and provides additional assumptions that can be challenged by transfer opponents.
- Leased water has not been demonstrated to be sufficiently reliable or cost-effective given the availability of water for purchase. Cities know how to buy water already and will only shift to a different tactic if given a good reason.
- Some interpersonal conflicts have developed between the Super Ditch and its potential customers, perhaps because the Super Ditch is subsidized by the Lower Ark, an entity who fights the cities when they try to buy water. The relationship between the two is so close that city staffers frequently refer to them as the same entity, despite local efforts to differentiate them, and the Lower Ark employees who vigorously oppose water sales in court and in the press are the exact people handling negotiations for prospective leasing projects.

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