

COMMENT

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Adapting to Water Scarcity: A Comparative Analysis of Water Harvesting Regulation in the Four Corner States

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I INTRODUCTION

Throughout history, humans have used, stored, and distributed rainwater for agricultural and domestic purposes. In the arid southwestern United States, water is a scarce resource often threatened by pollution from stormwater runoff. However, in parts of the Four Corners region, rainwater and stormwater harvesting are restricted due to the basic tenets of a historic legal doctrine called prior appropriation. In Colorado and Utah, people are just beginning to question regulations based on prior appropriation that have created barriers to harvesting. Conversely, in Arizona and New Mexico, regulators and politicians have been able to incorporate rainwater and stormwater harvesting into state and local conservation programs for many years, even while operating under the same water law doctrine. As we move into an era of increasing water scarcity and population growth, we must amend outdated restrictions on harvesting that persist in some states in the Southwest, apply sustainable water policies throughout the region, and protect downstream users entitled to water based on prior appropriations.

This Article argues that the result of prohibitions on rainwater and stormwater harvesting in Colorado and Utah is less sustainable, making cities ill prepared to deal with an impending shortage of potable water. Moreover, these policies have frustrated the ability to control water pollution and runoff. Finally, while cities in Arizona and New Mexico have achieved a necessary reduction in potable water use through the adoption of sustainable water policies, these policies must be implemented through state legislation and regulation in order to prepare for anticipated severe water shortages facing the entire region.

Section II of this Article will first discuss the basic mechanisms and uses of rainwater and stormwater harvesting. Second, it will describe the legal framework of water policies within the Four Corner states. This framework includes the doctrine of prior appropriation, which some states interpret to prohibit harvesting, and federal legal obligations to control runoff and stormwater discharges. Section III will offer a comparative analysis of the laws governing rainwater harvesting in Utah, Colorado, Arizona, and New Mexico. This section will explain how and why states have come to different conclusions about the legality of water harvesting. It will also detail the statutes and case law surrounding water law in these states, what water is subject to regulation, and the most recent legal developments

affecting harvesting. This analysis will show a growing concern about water availability and the slow shift that is taking place in every state to utilize more rainwater. Section IV will examine the effects of climate change on the Four Corners region and how other countries have adapted their own water use to changing conditions. Finally, in Section V, the Article will offer recommendations for legislative action and explain the need for reporting and measuring requirements. This section should serve as a roadmap for policy makers as they attempt to create a more sustainable future.

II BACKGROUND

A. Rainwater and Stormwater Catchment Systems

There are two types of rainwater catchments: active and passive. Active rainwater catchment systems are usually man-made devices, either attached to a roof or open to the sky, which hold water that is diverted or falls into them.¹ The main distinguishing feature of an active system is that it allows for storage of water for later use.² Active catchment systems are sometimes covered. This helps to prevent accumulation of debris and insects, or access by animals.³ Additionally, active systems often contain pumps and filters to allow increased control over the quality of water and the way in which it is used.⁴ Active systems are especially useful in areas that do not receive

¹ U.S. ENVTL. PROT. AGENCY, GREEN INFRASTRUCTURE IN ARID AND SEMI-ARID CLIMATES 3 (2010) [hereinafter GREEN INFRASTRUCTURE], available at http://www.azwater.gov/AzDWR/waterManagement/documents/10504-08AridClimatesCaseStudy_v2.pdf. These tanks can be made out of plastic, metal, concrete, or wood, which differ in cost, maintenance, and size. TEX. WATER DEV. BD., THE TEXAS MANUAL ON RAINWATER HARVESTING 16 (3d ed. 2005), available at http://www.twdb.state.tx.us/publications/reports/rainwaterharvestingmanual_3rdedition.pdf.

² GREEN INFRASTRUCTURE, *supra* note 1, at 3.

³ Improperly maintained or constructed rainwater catchment devices can pose a threat to human health because standing water can lead to breeding of mosquitoes and other insects, and toxins can accumulate in the water. PATRICIA S. H. MACOMBER, COLL. OF TROPICAL AGRIC. & HUMAN RES., UNIV. OF HAW. AT MĀNOA, GUIDELINES ON RAINWATER CATCHMENT SYSTEMS FOR HAWAII 22 (2010), available at <http://www.ctahr.hawaii.edu/oc/freepubs/pdf/rm-12.pdf>; DAVID A. CUNLIFFE, GUIDANCE ON THE USE OF RAINWATER TANKS 22 (1998), available at <http://www.ircsa.org/factsheets/Cunliffe.pdf>.

⁴ Doug Pushard, *Passive versus Active Rainwater Harvesting*, HARVESTH₂O.COM, http://www.harvesth2o.com/passive_active.shtml (last visited Oct. 14, 2012).

consistent annual rainfall, or in a system that will supply water to indoor areas.⁵

A passive system, by contrast, usually incorporates elevated and depressed areas of land where water can accumulate around vegetation or in ponds.⁶ There are three key components to a passive harvesting system: “a catchment area that collects rainwater, a distribution system that connects the catchment to the receiving landscape area, and a receiving landscape area that can retain and infiltrate water.”⁷ Landscaping plans often incorporate passive harvesting systems, which are very low maintenance.⁸

Both active and passive systems can be used on either a micro- or macro-level. Micro-level rainwater catchment systems are ideal for single-family homes, which can utilize just a few barrels to catch a large amount of water, usually by channeling water from the roof of the house.⁹ In contrast, macro-scale harvesting usually takes place in large-scale developments or agricultural operations, and the systems used are costly to install and maintain due to their relatively large size.¹⁰ Therefore, widespread use of these systems by developers or individuals is not likely to happen unless they are rewarded with government incentives, such as tax-breaks or refunds, or regulations require the systems. However, some developers and city planners have utilized passive macro-scale systems because they reduce the amount of runoff into gutters and parking lots and make maintenance of vegetation easier.¹¹

Modern macro-systems sometimes incorporate stormwater catchment devices into structural designs, which are usually large structures that can hold tens of thousands of gallons of stormwater.¹² The systems receive stormwater from various points surrounding a development.¹³ Often, designers intend these systems to merely hold

⁵ *Id.*

⁶ *Id.*

⁷ GREEN INFRASTRUCTURE, *supra* note 1, at 2.

⁸ Pushard, *supra* note 4.

⁹ For each square foot of catchment area, such as a roof, one inch of rainfall will result in .6 gallons of water. AM. RAINWATER CATCHMENT SYS. ASS'N, RAINWATER HARVESTING: THE FORGOTTEN RESOURCE (2010), available at http://www.arcса.org/files/ARCSA_v1rev2_lowres.pdf.

¹⁰ GREEN INFRASTRUCTURE, *supra* note 1, at 3.

¹¹ *Id.* at 2–3.

¹² *Id.* at 3.

¹³ *Id.*

the stormwater so it can percolate into the ground.¹⁴ However, once a system harvests stormwater, it can be treated or filtered and used on the property.¹⁵ The benefits of using rainwater and stormwater harvesting systems are well understood, but the legal doctrine called prior appropriation that governs water allocation in the southwest can create obstacles to their use.

B. Prior Appropriation

Western water law is based on the doctrine of prior appropriation. While regulation and enforcement of the doctrine differs in each state, in general, this system of water governance allows for use of diverted water for a beneficial use and prioritizes diversions based on the time of the first diversion from the water source.¹⁶ In this context, “[b]eneficial use is the basis, the measure and the limit of an appropriative right.”¹⁷ In general, a use is considered beneficial if the use is permissible in the area and is not wasteful.¹⁸ However, if an individual has established a beneficial use and acquired a permit, the doctrine does not guarantee that there will always be water to satisfy the permitted amount.¹⁹ When there is scarcity, senior appropriators receive water until their rights have been satisfied; junior appropriators are satisfied last, if at all.²⁰ Diverted water can be transported and used anywhere, but is typically used within the basin where the water originates.²¹

¹⁴ *Id.* (noting that “[t]hese structures require soils with adequate percolation rates,” so they may “not [be] appropriate for all urban areas”).

¹⁵ DEP’T. OF ENV’T & CONSERVATION NSW, MANAGING URBAN STORMWATER: HARVESTING AND REUSE 2–3 (Apr. 2006) [hereinafter MANAGING URBAN STORMWATER], available at <http://www.environment.nsw.gov.au/resources/stormwater/managedstormwater06137.pdf>.

¹⁶ The so-called “first in time, first in right” system. JOSEPH L. SAX ET AL., LEGAL CONTROL OF WATER RESOURCES 126 n.5 (Thomson/West, 4th ed. 2006).

¹⁷ *Id.* at 152.

¹⁸ *See id.* at 153. Uses such as irrigation, manufacturing, and domestic and municipal uses are the basic historically recognized beneficial uses. *Id.* at 155. Some states categorize specific uses as beneficial or non-beneficial by statute. *Id.* Waste in the context of prior appropriation has generally focused on preventing excessive water application or loss through irrigation methods. *See id.* at 159.

¹⁹ *Id.* at 126.

²⁰ *Id.*

²¹ There are some exceptions to this statement, but they are not relevant to this discussion. *See generally id.* at 234–38.

The arid climate of the West led to the development of this prior appropriation system of allocating water rights.²² The doctrine allowed for population growth and agricultural development in a desert region, which would otherwise have been unable to support large-scale human development due to water scarcity.²³ Cities such as Denver, Colorado; Salt Lake City, Utah; and Phoenix, Arizona, exist today in large part because of the development of the prior appropriation system of water allocation. The system has worked well in these areas because it prevents continuous disputes over water resources and limits water waste by imposing a requirement of beneficial use.

All states hold unappropriated water until someone acquires the right to use it under state law.²⁴ States, especially those in the Four Corners region, are concerned with ensuring they can account for all unused water in the state to make sure no one is appropriating it without a permit or in violation of the law. This is important because state agencies must be able to determine if unappropriated water exists in a stream to give to future users,²⁵ make sure that senior appropriators are receiving water first,²⁶ and ensure that in-state appropriations do not negatively affect interstate water agreements.²⁷ A significant change in the amount of water in a stream or lake could spell disaster for irrigators and other water users, and lead to costly and lengthy legal battles. Much of the fear surrounding rainwater and

²² Riparian law, which governs water distribution in the Eastern United States, allows, with slight modification, anyone that owns land bordering a waterway to withdraw and use water. *Id.* at 28–37. Without the prior appropriation system, there would have been a halt to further development in the arid West because only those with land on a river would have been able to benefit from the water, and there would have been continual fighting over water in times of scarcity.

²³ The average annual amount of precipitation in the Four Corners area is about 13.5 inches. *Climate Maps of the United States*, U.S. DEP'T OF THE INTERIOR, <http://nationalatlas.gov/printable/climatemap.html#list> (last visited Oct. 14, 2012) (calculated by taking the average of the annual rainfall totals in Arizona, Colorado, New Mexico, and Utah as reported by the U.S. Geological Survey). By creating a structured system that clearly delineated rights, prior appropriation allowed for investment and creation of water-dispensing systems that allowed agriculture and cities to grow beyond the banks of a river.

²⁴ SAX ET AL., *supra* note 16, at 124.

²⁵ *Id.* at 139.

²⁶ *Id.* at 126.

²⁷ *Id.* at 842–43. Interstate water agreements take on many different forms and contain a variety of different provisions. See UTTON TRANSBOUNDARY RES. CTR., UNIV. OF N.M. SCH. OF LAW, UTTON CENTER MODEL COMPACTS PROJECT: COMPACT REVIEW SUMMARIES (2005), available at http://uttoncenter.unm.edu/pdfs/MC_Review_Summary.pdf.

stormwater harvesting comes from the potential legal and political ramifications that could arise from any damage to senior water rights.²⁸ This fear has fueled regulation and prohibition of rainwater harvesting in some states. However, these regulations and prohibitions frustrate and contradict federal regulations and recommendations for water quality maintenance, as well as state and national programs promoting sustainable development.

C. The Federal NPDES Stormwater Permitting Program

Federal regulation of stormwater “run-off” adds another layer of complexity to state water regulation. “Stormwater is rain and snow melt that runs off surfaces such as rooftops, paved streets, highways, and parking lots.”²⁹ In the Four Corners region, intense storms release high volumes of rainwater in brief amounts of time. All this rainwater does not just absorb into the ground or run into local streams. Rather, it falls onto streets and parking lots, eventually running into storm drains, picking up pollutants, soil, and trash along the way. The startling fact is that “[u]rban stormwater rivals and in some cases exceeds sewage plants and large factories as a source of damaging pollutants.”³⁰ Stormwater pollution can negatively affect human health, drinking water resources, water quality generally, and animal habitats.³¹ This presents a serious problem in the southwest because it contributes to pollution of an already scarce resource.

In order to control water pollution throughout the country, Congress passed the Clean Water Act (CWA), section 402 of which authorized the creation of a permitting system by the Environmental Protection Agency (EPA) to control discharges of pollutants into waterways.³² The Act created the National Pollution Discharge Elimination System (NPDES) permitting program.³³ The NPDES

²⁸ SAX ET AL., *supra* note 16, at 126.

²⁹ *Water Quality: Stormwater*, WA. STATE DEPT. OF ECOLOGY, <http://www.ecy.wa.gov/programs/wq/stormwater/index.html> (last visited Oct. 24, 2012).

³⁰ *The Problem of Urban Stormwater Pollution*, NATURAL RES. DEF. COUNCIL (Nov. 11, 2000), <http://www.nrdc.org/water/pollution/fstorm.asp>.

³¹ *Water Quality: Stormwater*, *supra* note 29.

³² 33 U.S.C. § 1342(a) (2011).

³³ *National Pollutant Discharge Elimination System (NPDES)*, U.S. ENVTL. PROT. AGENCY (Mar. 12, 2009), <http://cfpub.epa.gov/npdes> [hereinafter *NPDES*]. This system can be administered by individual states, so long as a state submits a program to regulate discharges that is approved by the Administrator of the EPA. 33 U.S.C. § 1342(b). New Mexico is the only state within the Four Corners region that does not have an approved

program requires any person or entity that creates a point source of pollution to obtain a permit for the pollution discharge.³⁴ Municipal stormwater facilities, which channel and filter stormwater into water bodies, are point sources of pollution that must receive one of these permits.³⁵

Under the NPDES program, “[m]unicipal stormwater programs are . . . required to reduce the discharge of pollutants to the ‘maximum extent practicable’ and satisfy the water quality requirements of the Clean Water Act.”³⁶ The main goals of the stormwater permitting program are “to prevent stormwater runoff from washing harmful pollutants into local surface waters such as streams, rivers, lakes or coastal waters”³⁷ and to “reduce pollutant discharges to the maximum extent practical, prohibit illicit discharges . . . and protect water quality.”³⁸ One of the ways that the EPA has recommended that cities can meet their permitting requirements, as well as decrease the pollutant load in stormwater, is through incorporation of “green infrastructure.”³⁹ The EPA touts both rainwater and stormwater harvesting as components of green infrastructure.⁴⁰ The benefit of

state program, meaning its NPDES program is administered by the EPA with help from state agencies. *Civil Enforcement: Clean Water Act Action Plan*, U.S. ENVTL. PROT. AGENCY (May 1, 2012), <http://www.epa.gov/oecaerth/civil/cwa/cwaenfplan.html>.

³⁴ *NPDES*, *supra* note 33.

³⁵ *Id.* The NPDES stormwater permits apply when a city uses Municipal Separate Storm Sewer Systems (MS4s), as opposed to cities that use Combined Sewer Overflow (CSO) systems. *National Pollutant Discharge Elimination System (NPDES): Combined Sewer Overflows: CSO Control Policy*, U.S. ENVTL. PROT. AGENCY (Sept. 12, 2002), http://cfpub.epa.gov/npdes/cso/cpolicy.cfm?program_id=5. MS4s have separate systems to deal with municipal sewer discharges and stormwater discharges, whereas CSOs have antiquated sewer systems that also take on stormwater runoff. *Id.* The regulation of CSOs is outside of the scope of this article, but it should be noted that it is different than the NPDES program discussed here.

³⁶ U.S. ENVTL. PROT. AGENCY, EVALUATING THE EFFECTIVENESS OF MUNICIPAL STORMWATER PROGRAMS 1 (Jan. 2008), *available at* http://water.epa.gov/lawsregs/lawguidance/cwa/tmdl/upload/region3_factsheet_swmp.pdf.

³⁷ *National Pollutant Discharge Elimination System (NPDES): Stormwater Basic Information*, U.S. ENVTL. PROT. AGENCY (Mar. 20, 2012), <http://cfpub.epa.gov/npdes/stormwater/swbasicinfo.cfm>.

³⁸ EVALUATING THE EFFECTIVENESS OF MUNICIPAL STORMWATER PROGRAMS, *supra* note 36.

³⁹ *Water: Green Infrastructure*, U.S. ENVTL. PROT. AGENCY (July 19, 2012), <http://water.epa.gov/infrastructure/greeninfrastructure/index.cfm>.

⁴⁰ U.S. ENVTL. PROT. AGENCY, GREEN INFRASTRUCTURE CASE STUDIES: MUNICIPAL POLICIES FOR MANAGING STORMWATER WITH GREEN INFRASTRUCTURE 3 (Aug. 2010), *available at* http://www.epa.gov/owow/NPS/lid/gi_case_studies_2010.pdf; GREEN INFRASTRUCTURE, *supra* note 1, at 3.

using harvesting to comply with NPDES permits is that it helps “infiltrate runoff close to its source and help prevent pollutants from being transported to nearby surface waters,” allowing it to infiltrate soils which can naturally filter many common pollutants.⁴¹

It is evident that rainwater and stormwater harvesting policies have a tremendous effect on the ability of municipalities to effectively control stormwater run-off. However, the policies that cities develop to address their obligations under the CWA are limited by restrictions on stormwater and rainwater use under state water laws.

III

STATE WATER LAWS AND REGULATION OF RAINWATER AND STORMWATER HARVESTING

The states that comprise the Four Corners region of the southwest are Colorado, Utah, Arizona, and New Mexico. Each of these states has approached water law and allocation based on prior appropriation in slightly different ways. This section will explore the historical development of prior appropriation within these states, how current application of that doctrine affects rainwater and stormwater harvesting, and recent attempts, some successful and others not, to change the legal framework affecting the right to harvest.

A. Colorado

In June of 2009, a *New York Times* headline proclaimed, “It’s Now Legal to Catch a Raindrop in Colorado.”⁴² This statement vastly oversimplified the actual state of affairs. In reality, Colorado law is the most hostile to rainwater or stormwater harvesting of all the Four Corner states, and recent changes have only slightly opened the door to very limited rainwater harvesting. Understanding why these changes were worth a full story in the *Times* requires understanding the history of water allocation in the state. The Colorado state Constitution provides the basis for all state water law. The relevant constitutional provision states that “[t]he water of every natural stream, not heretofore appropriated . . . is hereby declared to be the property of the public, and the same is dedicated to the use of the

⁴¹ NPDES, *supra* note 33.

⁴² Kirk Johnson, *It’s Now Legal to Catch a Raindrop in Colorado*, N.Y. TIMES, June 29, 2009, at A1, available at <http://www.nytimes.com/2009/06/29/us/29rain.html>.

people of the state.”⁴³ Colorado’s Constitution further stipulates that allocation of water is to follow the doctrine of prior appropriation.⁴⁴ These provisions are the most specific and inflexible underpinnings for a state water law framework within the Four Corners region.

Waters that are subject to the appropriation doctrine in Colorado include “[t]he water of every natural stream . . . includ[ing] all the water occurring within the state . . . which is in or tributary to a natural surface stream.”⁴⁵ Colorado courts have created a “presumption that all flowing water finds its way to a stream.”⁴⁶ More importantly, state law “declares that the state of Colorado claims the right to all moisture suspended in the atmosphere which falls . . . within its borders.”⁴⁷ However, this statute fails to take into account what actually happens to rain that falls within the state. According to a study completed in 2007 in Douglas County, Colorado, the maximum amount of rainwater that returns to a stream is 15%.⁴⁸ On

⁴³ COLO. CONST. art. XVI, § 5.

⁴⁴ *Id.* § 6.

The right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied. Priority of appropriation shall give the better right as between those using the water for the same purpose; but when the waters of any natural stream are not sufficient for the service of all those desiring the use of the same, those using the water for domestic purposes shall have the preference over those claiming for any other purpose, and those using the water for agricultural purposes shall have preference over those using the same for manufacturing purposes.

Id.

⁴⁵ COLO. REV. STAT. ANN. § 37-82-101 (West 2011).

⁴⁶ *Peterson v. Reed*, 369 P.2d 981, 983 (Colo. 1962) (holding that waters tributary to a creek belonged to senior appropriators on the creek).

⁴⁷ COLO. REV. STAT. ANN. § 36-20-103. This statutory language became law through the passage of the Weather Modification Act of 1972. § 36-20-101. In Colorado, weather modification takes two forms: (1) ground-based wintertime cloud seeding, and (2) hail cannons. COLO. DEP’T OF REGULATORY AGENCIES, OFFICE OF POLICY, RESEARCH & REGULATORY REFORM, 2010 SUNSET REVIEW: WEATHER MODIFICATION ACT OF 1972, at 5 (Oct. 15, 2010), available at <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22Weather+Modification+Act+of+1972+-+2010+Sunset+Review.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251815550673&ssbinary=true>. Both of these processes are used to increase rain or snowfall. *Id.* This statute is important because it is explicitly relied upon by the Colorado Division of Water Resources as reasoning for the limits on rainwater harvesting in the state. COLO. DIV. OF WATER RES., RAINWATER COLLECTION IN COLORADO, available at http://water.state.co.us/DWRIPub/Documents/DWR_RainwaterFlyer.pdf.

⁴⁸ LEONARD RICE ENGINEERS, INC. ET AL., HOLISTIC APPROACH TO SUSTAINABLE WATER MANAGEMENT IN NORTHWEST DOUGLAS COUNTY 1 (Jan. 2007) [hereinafter

average, only 3% of rainwater makes it into a stream either through groundwater or surface water.⁴⁹ Unfortunately, this reality is not reflected in state laws or regulations.

Colorado representatives have acknowledged the scarcity of water in the state and the need for conservation. A declaration from the Colorado general assembly states that “[i]t is the policy of the state to promote the conservation and efficient use of water and to prevent the waste of this valuable resource.”⁵⁰ The general assembly passed that language as part of a bill to require water conservation in state landscaping. However, there is no requirement or mention of rainwater harvesting in achieving that goal.⁵¹ Allowing rainwater to go unused promotes neither conservation nor efficiency. Additionally, the Colorado Supreme Court has stated that it is proper for the state engineer to take into account environmental concerns when formulating rules and regulations governing diversions of tributary water.⁵² As previously discussed, there are many environmental concerns associated with rainwater and stormwater run-off, such as water pollution and habitat destruction.

In 2009, the State General Assembly provided some opportunities for legal rainwater catchment by individuals, which was the focus of the *Times* article. HB 09-1129, which the General Assembly signed into law during the 2009 legislative session, established up to ten “[p]recipitation harvesting pilot projects.”⁵³ Developers will be allowed to incorporate rainwater harvesting into the design of residential housing developments in order to measure the amount of rainfall that reaches natural streams, determine the amount that can be captured and not have an effect on existing water rights, and determine the most efficient system designs.⁵⁴ Developers must apply for a permit to participate in the program and must implement the

WATER MANAGEMENT STUDY], available at http://www.tribesandclimatechange.org/docs/tribes_244.pdf (noting that this amount of return to the stream system only occurs in a wet year, while in a dry year there is no return of any rainwater to the stream system).

⁴⁹ *Id.*

⁵⁰ COLO. REV. STAT. ANN. § 37-96-102(1)(c).

⁵¹ *See id.* § 37-96-103.

⁵² *R.J.A., Inc. v. Water Users Ass’n of Dist. No. 6*, 690 P.2d 823, 828 (Colo. 1984).

⁵³ H.R. 09-1129, 67th Gen. Assemb., 1st Reg. Sess. (Colo. 2009), available at http://www.leg.state.co.us/clics/clics2009a/csl.nsf/fsbillcont3/7EBE1FD8BEB4A0088725753C0061EF02?open&file=1129_enr.pdf (codified at COLO. REV. STAT. § 37-60-115(6) (2012)).

⁵⁴ *Id.*

system in a new development, such as a subdivision or mixed-use project.⁵⁵ The restrictions on the program, and the emphasis on research, show a cautious approach to allowing greater freedom to capture rainwater in a state where many people are still concerned about possible effects on downstream water users.

The other small step referenced in the *Times* article was the 2009 passage of SB 09-080, which allows landowners who have previously been legally entitled to use a well on their property to capture rainwater for domestic use.⁵⁶ This bill created a permit system for those who qualify for the program.⁵⁷ An individual can qualify to receive a rainwater harvesting permit if the following requirements are met: there must be no water supply from a municipality or water district in the area, rainwater can only be collected from a roof, and the water captured can only be used in the same way as allowed on the original well permit.⁵⁸ These limitations effectively limit the number of likely permit seekers to an insignificant number. While there was a push by some within the General Assembly for a general right to capture rainwater throughout the state, these small steps taken in 2009 are the only ones that have been politically feasible.⁵⁹

In spite of this, it seems that many people in Colorado have been using rainwater catchment systems and will likely continue to use them in violation of state law.⁶⁰ Companies legally sell rain-harvesting equipment in the state, and people in Colorado admit to harvesting rainwater.⁶¹ Rainwater-collecting citizens were likely not even aware they were breaking the law, and it is also likely that even with the publicity of the new laws and their restrictions, people will

⁵⁵ *Id.*

⁵⁶ S. 09-080, 67th Gen. Assemb., 1st Reg. Sess. (Colo. 2009), available at http://www.leg.state.co.us/clics/clics2009a/csl.nsf/fsbillcont3/49D4349AC4A73794872575370071F5D4?Open&file=080_enr.pdf (codified at COLO. REV. STAT. § 37-90-105(f) (2009)).

⁵⁷ *Id.* The permitting system merely requires current holders of certain well permits to fill out a form identifying their name, address, the location of the previously permitted well, and a description of the collection system. COLO. DIV. OF WATER RES., INSTRUCTIONS FOR ROOFTOP PRECIPITATION COLLECTION SYSTEM PERMIT APPLICATION (Nov. 2011), available at <http://water.state.co.us/DWRIPub/Documents/gws-78.pdf>.

⁵⁸ See Colo. S. 09-080. The new laws also create a system of fines for those people who are found to be harvesting rainwater without one of these permits. *Id.*

⁵⁹ Nicholas Riccardi, *Who Owns Colorado's Rainwater?*, L.A. TIMES, Mar. 18, 2009, <http://articles.latimes.com/2009/mar/18/nation/na-contested-rainwater18>. Colorado State Senator Chris Romer sponsored a bill to allow water harvesting in 2008, but it failed to pass. *Id.* Romer was a cosponsor of both bills that passed in 2009. *Id.*

⁶⁰ Johnson, *supra* note 42.

⁶¹ *Id.*

continue to harvest rainwater without a permit. Additionally, the Assistant State Engineer has acknowledged that enforcement will be against those who are using macro-scale systems in violation of the law, not homeowners who are using small systems for gardens, lawns, or other purposes.⁶²

The limits on rainwater harvesting in Colorado also affect stormwater management throughout the state. While the Colorado Department of Public Health and Environment has released a stormwater guide that requires municipalities to educate the public about steps they can take to reduce stormwater pollution, there is no mention of rainwater or stormwater harvesting as one of those steps.⁶³ Meanwhile, the City Council of Denver has passed ordinances that acknowledge the fact that “the city is particularly subject to damage from stormwaters” due to “its general terrain and geographical location.”⁶⁴ Additionally, under the Denver Municipal Code, land developers must complete and submit storm drainage plans for the drainage and short-term storage of stormwater runoff.⁶⁵ This requirement is designed to further one of the stated goals of the Denver municipal stormwater ordinances, which is “[t]o encourage and facilitate urban water resources management techniques, including detention of storm runoff, minimization of the need to construct storm drainage facilities, reduction of pollution and the enhancement of the urban environment.”⁶⁶ Therefore, under the current regulations, an individual can detain stormwater to release later, but cannot use that stormwater.

B. Utah

In the last few years, the regulation of rainwater harvesting has shifted in Utah. Previously, a general prohibition on rainwater

⁶² *Id.* The state engineer’s public acknowledgment that the state will not prosecute violators, which are likely harvesting the most rainwater, points to the need for reform of the antiquated system currently in place.

⁶³ COLO. DEP’T OF PUB. HEALTH AND ENV’T, COLORADO’S STORMWATER PROGRAM FACT SHEET app. B (Feb. 2008), available at <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadname1=Content-Disposition&blobheadname2=Content-Type&blobheadvalue1=inline%3B+filename%3D%22FAQ.pdf%22&blobheadvalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251819971706&ssbinary=true>.

⁶⁴ DENVER, COLO., REV. MUN. CODE, ch. 56, art. III, div. 4, § 56-108(a) (2012).

⁶⁵ *Id.* § 56-111, 56-109(1.5).

⁶⁶ *Id.* § 56-108(f)(4).

harvesting existed. This became a hot topic in the summer of 2008 when a Salt Lake City car dealer planned to convert the roof of his dealership into a rainwater catchment device, receiving statewide media coverage in the process.⁶⁷ The city quickly informed the dealer that doing so would be a violation of state law.⁶⁸ The state engineer justified this prohibition, explaining that “if you use the water upstream, it won’t be there for the person to use it downstream.”⁶⁹

Utah follows the prior appropriation doctrine to allocate its water supply.⁷⁰ Under Utah case law, an “appropriator acquires a right to all of the sources of supply of [a] stream whether visible or invisible, or whether underneath or on the surface.”⁷¹ Although prior appropriation has historically focused on diversions from surface water contained in a natural stream or lake, Utah applies the doctrine to all water that runs on the ground. By state statute, “[a]ll waters in [the] state, whether above or under the ground, are . . . property of the public”⁷² Court cases have interpreted this statutory provision in the broadest possible way, including waters that are “diffused, seeping and percolating . . . flowing or stagnant.”⁷³ Rainwater and stormwater fall within this interpretation. Additionally, the state of Utah owns all unappropriated water rights, which are also public property.⁷⁴

Therefore,

Water from the source to the point where the appropriator or user captures or diverts it into his conveying channels or containers is *publici juris*, and others have the same right to use it as the

⁶⁷ John Hollenhorst, *Catching Rain Water is Against the Law*, KSL.COM (Aug. 12, 2008, 11:49 PM), <http://www.ksl.com/?nid=148&sid=4001252>. The dealership building currently utilizes rainwater for washing cars and received a Gold LEED rating, in part because of the rainwater catchment system. Steven Oberbeck, *Utah Buildings Deemed Eco-Friendly, Energy-Efficient*, SALT LAKE TRIB. (July 13, 2009), http://www.sltrib.com/business/ci_12829634.

⁶⁸ Hollenhorst, *supra* note 67.

⁶⁹ *Id.* He was clearly referring to basic tenants of prior appropriation law, which requires all water users to have a permit, and does not allow for substantial changes in use if it will decrease runoff and therefore damage the interests of those expecting that runoff downstream. SAX ET AL., *supra* note 16, at 130.

⁷⁰ “The [Utah] Division of Water Rights is the state agency that regulates the appropriation . . . of water in the state of Utah.” *Water Right Information*, UTAH DIV. OF WATER RIGHTS (July 19, 2011), <http://www.waterrights.utah.gov/wrinfo/default.asp>. A basic requirement for appropriating water in Utah is that the “appropriation may be only made for a useful and beneficial purpose.” UTAH CODE ANN. §73-3-1(4) (West 2010).

⁷¹ *Rasmussen v. Moroni Irrigation Co.*, 189 P. 572, 577 (Utah 1920).

⁷² UTAH CODE ANN. § 73-1-1(1).

⁷³ *McNaughton v. Eaton*, 242 P.2d 570, 573 (Utah 1952).

⁷⁴ *Water Right Information*, *supra* note 70.

appropriator so long as they do not interfere with the appropriator's use, by diminishing his quantity or impairing the quality.⁷⁵

In other words, until an appropriator actually uses the water, it belongs to the citizens of the state. Citizens could use rainwater or stormwater so long as the use does not impair the quantity or quality of water used by appropriators downstream. Whether or not this requirement can be met, especially if the majority of citizens harvest rainwater, is unknown at this time.⁷⁶ However, rainwater and stormwater are an important water resource in a water-scarce state. The Supreme Court of Utah has acknowledged that "water in this arid region is life, and is too valuable to be wasted for any purpose," and that "courts should prevent waste whenever it is possible."⁷⁷ Allowing a precious natural resource such as rainwater to go unused is wasteful.

It has also been noted that "the basic policy of [Utah's] water and irrigation law [is to] facilitat[e] and encourag[e] the conservation, development and continuous application of water resources to useful purposes."⁷⁸ Rainwater harvesting both facilitates and encourages conservation of water resources. Additionally, harvested rainwater would replace the use of potable water, which is the most valuable and scarce water resource, for landscaping needs.

Because of the publicity surrounding the car dealer's predicament, Salt Lake City officials decided to allow the dealer to harvest rainwater through the use of the city's own permit for water rights.⁷⁹ Further, Utah state officials commented that the "agreement could become a blueprint for other [large-scale] rainwater projects" across the state.⁸⁰ Unfortunately, that left homeowners and others who wanted to collect rainwater to water lawns or gardens without a micro-scale solution because the state left in place the existing prohibition on rainwater harvesting.

⁷⁵ *Wrathall v. Johnson*, 40 P.2d 755, 766 (Utah 1935) (emphasis added). This doctrine is still in effect today, and these words are still used to determine whether interference with water rights has occurred. See *Wayment v. Howard*, 144 P.3d 1147, 1150 (Utah 2006) (citing *Adams v. Portage Irrigation, Reservoir & Power Co.*, 72 P.2d 648, 653 (Utah 1937) (quoting *Wrathall*, 40 P.2d at 766)).

⁷⁶ WATER MANAGEMENT STUDY, *supra* note 48.

⁷⁷ *Big Cottonwood Tanner Ditch Co. v. Shurtliff*, 164 P. 856, 862 (Utah 1916).

⁷⁸ *Weber Basin Water Conservancy Dist. v. Gailey*, 328 P.2d 175, 179 (Utah 1958).

⁷⁹ *Hollenhorst*, *supra* note 67.

⁸⁰ *Id.* In other words, the state would consider allowing other entities to use city water rights for private uses.

In 2009, however, the State Water Commission recommended a bill for legislative passage, S.B. 32, which “provide[d] for the collection and use of precipitation without obtaining a water right *under certain conditions*.”⁸¹ S.B. 32 sought to amend Utah’s appropriation law by adding language explicitly allowing a person to capture and store rainwater and put that water to beneficial use on the leased or owned property.⁸² The rainwater could either be stored in an underground storage container or outside in covered storage containers.⁸³ The Utah legislature passed S.B. 32 in 2010 and the law became effective on May 11, 2010.⁸⁴ The bill’s language was codified in Utah’s Code by creation of an entirely new section called “Capture and storage of precipitation.”⁸⁵ The enacted language limits the number of covered storage containers to two, to the limit of each set at 100 gallons, and limits the number of underground storage containers to one, which can hold up to 2,500 gallons.⁸⁶ Further, the law requires that the state engineer maintain a registration website for the new program, as all harvesters must register in order to comply with the law.⁸⁷ There is, however, no requirement for a person to obtain an actual water right, or to have previously received or used a water right.⁸⁸

The interest in rainwater catchment in Utah is not limited to those seeking to water lawns and gardens, or more efficiently wash cars. In January of 2012, Utah State Representative Fred C. Cox introduced a bill to the Utah House of Representatives that sought to amend the new precipitation capture and storage laws to include a provision that will allow commercial, mixed-use, or multifamily housing to create surface or underground catchments designed to “slow, detain, or retain stormwater; or protect watersheds from pollution.”⁸⁹ The intended result of the bill is to encourage developers to create landscaping features and water systems that capture stormwater in

⁸¹ S. 32, 2010 Leg., Gen. Sess. (Utah 2010), *available at* <http://le.utah.gov/~2010/bills/sbillint/sb0032.htm> (emphasis added).

⁸² *Id.*

⁸³ *Id.*

⁸⁴ *Frequently Asked Questions*, UTAH DIV. OF WATER RIGHTS, <http://www.waterrights.utah.gov/wrinfo/faq.asp> (last visited Oct. 24, 2012) [hereinafter *FAQs*].

⁸⁵ UTAH CODE ANN. § 73-3-1.5 (West 2011).

⁸⁶ *Id.* § 73-3-1.5(3)(a)(i), (4).

⁸⁷ *Id.* § 73-3-1.5(5)(a).

⁸⁸ *See FAQs*, *supra* note 84.

⁸⁹ H.R. 67, 2012 Leg., Gen. Sess. (Utah 2012), *available at* <http://le.utah.gov/~2012/bills/hbillint/hb0067.pdf>.

order to decrease the concentration of runoff and the associated pollution.⁹⁰ This is a pressing concern in Utah, which often experiences sudden heavy rainstorms and contains dense urban development with more paved ground than landscaped ground.

In speaking about the proposed bill, Rep. Cox emphasized that stormwater reuse and control was “something that we should actually be encouraging, not discouraging,” and that state law should not prohibit best practices for stormwater management.⁹¹ In order to accomplish this, the bill would have allowed commercial and large residential projects to put 2,500 cubic feet of captured stormwater to beneficial use without acquiring a water right, while allowing unlimited amounts of stormwater to merely percolate into the ground.⁹²

While individuals can currently harvest some rainwater for beneficial use, Rep. Cox’s bill would expand the law to allow for capture and beneficial use of stormwater.⁹³ Under current law, county requirements for stormwater and flood control are accomplished by storing or trapping the water and then slowly releasing it.⁹⁴ No one can put the stormwater to beneficial use, so it eventually makes its way into stormdrains.⁹⁵ The state engineer has discretion to interpret what the term “beneficial use” means.⁹⁶ Therefore, the state engineer could decide that creating landscaping systems to use stormwater before it reaches streets is a beneficial use, and therefore, a violation of state law.⁹⁷ Rep. Cox’s bill would have eliminated the need for

⁹⁰ *Stormwater Capture Amendments: Hearing on H.B. 67 Before the H. Pub. Utils. & Tech. Standing Comm.*, 2012 Leg., Gen. Sess. (Utah 2012) [hereinafter *Hearing on H.B. 67*] (statement of Rep. Fred C. Cox), available at http://utahlegislature.granicus.com/MediaPlayer.php?view_id=35&clip_id=332.

⁹¹ *Id.* at 1:06:23.

⁹² Utah H.R. 67. This would be a 7.5% increase over the amount of rainwater that can currently be stored underground under the recently passed legislation, which only allowed for 2,500 gallons of water in underground storage.

⁹³ *Id.*

⁹⁴ See generally *Hearing on H.B. 67*, *supra* note 90.

⁹⁵ *Id.* at 1:03:15.

⁹⁶ “The state engineer shall be responsible for the general administrative supervision of the waters of the state and the measurement, appropriation, apportionment, and distribution of those waters.” UTAH CODE ANN. § 73-2-1(3)(a) (West 2010). Additionally, “[t]he state engineer may make rules . . . governing . . . the determination of water rights.” *Id.* § 73-2-1(5).

⁹⁷ The uncertainty arises because if creating landscaping to utilize stormwater was considered a beneficial use, this would be illegal under current law. *Hearing on H.B. 67*,

developers or businesses—that have created landscaping to utilize rainwater to prevent flooding before it reaches a storm drain—to worry whether their landscaping plans were illegal.⁹⁸ This bill would have structured the law so that developers and businesses could have efficiently used stormwater to prevent flooding and conserve water resources.⁹⁹

As Rep. Cox noted in his testimony before the House Public Utilities and Technology Committee, it does not make sense to be using “culinary water” for landscaping or watering lawns when stormwater could just as easily be used.¹⁰⁰ Meanwhile, the City of Salt Lake has indicated that it is more concerned about public safety hazards and impacts on existing rights than any potential positive impact on stormwater management.¹⁰¹ The problem is that there is no clear documentation in Utah of how much rainwater eventually makes it to streams that have allocated rights, or what the actual effect of large-scale harvesting would be on the availability of water for diversion. Rep. Cox’s bill never made it out of committee, leaving the future of stormwater harvesting uncertain in the state at this time.

C. Arizona

While the approach to rainwater harvesting in Arizona has been a hodgepodge of city-level ordinances and policy implementations, policy makers in the state are far ahead of those in Utah and Colorado in acceptance of rainwater and stormwater harvesting. There are no state statutes that require, or specifically address, rainwater harvesting. However, cities within Arizona have created their own regulations and city code sections addressing the issue. For instance, the city of Tucson encourages, and in some instances mandates rainwater catchment.¹⁰² According to the Tucson city government,

supra note 90, at 1:04:02. The state of Utah has essentially decided that stormwater and rainwater are two separate and unique water resources, only one of which may be beneficially used under state law.

⁹⁸ *See id.* at 1:06:46–1:07:41.

⁹⁹ *Id.* at 1:07:09–1:07:45.

¹⁰⁰ *Id.* at 1:06:04.

¹⁰¹ *Id.* at 1:31:10–1:32:20 (statement of Rusty Vetter, Salt Lake City Attorney’s Office). The city is concerned with making sure polluted stormwater does not contaminate other water supplies. *Id.*

¹⁰² *See* TUCSON, AZ., CODE ch. 6, art. viii (2010) (requiring rainwater harvesting in development plans for commercial, non-residential sites); *Rainwater Harvesting*, CITY OF TUCSON, <http://cms3.tucsonaz.gov/water/harvesting> (last visited Sept. 15, 2012) [hereinafter *Rainwater Harvesting*].

“[a]ll you need for a water harvesting system is rain and a place to put it.”¹⁰³ Some of the reasons Tucson has taken this approach to rainwater harvesting are “to conserve energy, water, and other natural resources, . . . [r]educe soil erosion by slowing stormwater runoff . . . [and] [a]ssist in groundwater recharge.”¹⁰⁴ Capturing the rainwater in barrels or underground storage containers is legal in Tucson, and the Tucson Land Use Code emphasizes structuring the landscape to capture stormwater runoff, even requiring that landscape plans use *all* stormwater, which can be accomplished by creating depressed or elevated land to channel and hold water.¹⁰⁵

On a macro-harvesting level, the City requires that “[a]ll commercial development and site plans submitted after June 1, 2010 . . . include a rainwater harvesting plan.”¹⁰⁶ Further, no later than three years after a development has been occupied, 50% of each year’s annual water budget for landscaping must come from rainwater harvested on-site.¹⁰⁷ The definition of rainwater harvesting is not included in the ordinance, but based on other Tucson government publications, a rainwater plan could most likely include both storage systems and landscape engineering used to channel and capture water on the ground.¹⁰⁸ Other cities in Arizona are now considering similar ordinances,¹⁰⁹ which make sense if they have similar goals and water usage rates.¹¹⁰

¹⁰³ *Rainwater Harvesting*, *supra* note 102.

¹⁰⁴ TUCSON, ARIZ., CODE ch. 23, LAND USE CODE § 3.7.1.1(A) (1995), *available at* <http://cms3.tucsonaz.gov/sites/default/files/planning/codes/luc/Complete%20LUC.pdf>.

¹⁰⁵ *Id.* § 3.7.4.3; CITY OF TUCSON, DEP’T OF TRANSP., STORMWATER MGMT. SECTION, WATER HARVESTING GUIDANCE MANUAL 4–13 (Oct. 2005) [hereinafter GUIDANCE MANUAL], *available at* <http://dot.tucsonaz.gov/stormwater/downloads/2006WaterHarvesting.pdf>.

¹⁰⁶ TUCSON, AZ., CODE ch. 6, art. viii, § 6-182(A).

¹⁰⁷ *Id.* § 6-183(B).

¹⁰⁸ *See* GUIDANCE MANUAL, *supra* note 105.

¹⁰⁹ BLUE RIBBON PANEL ON WATER SUSTAINABILITY, FINAL REPORT 10 (Nov. 30, 2010), *available at* http://www.azwater.gov/AzDWR/waterManagement/documents/BRP_Final_Report-12-1-10.pdf (noting that Flagstaff and Oro Valley are among those cities considering rainwater harvesting ordinances).

¹¹⁰ TUCSON, ARIZ., ORDINANCE NO. 10597 (2008), *available at* <http://cms3.tucsonaz.gov/files/water/docs/rainwaterord.pdf> (stating that “water conservation constitutes a legitimate and critical public health, safety, welfare, economic, and sanitation concern,” and that “Tucson Water estimates that 45% of all water usage in its service area is dedicated to outdoor purposes”).

On a statewide level, the approach to rainwater harvesting has been to encourage the practice through tax-incentives.¹¹¹ Individuals and corporations could receive tax credits to cover the cost of installing “water conservation system[s] for the collection of rainwater or residential graywater” through 2011.¹¹² This tax credit allowed for up to \$1,000 in credit, which residents could claim once or in smaller amounts over many years for the same residence.¹¹³ However, some questioned the effectiveness of the program, because in 2009, residents used less than half of the available credits.¹¹⁴

The Arizona state legislature has only recently started to examine how to better utilize rainwater harvesting, but not without misgivings. The state has long allowed underground storage of water for the purpose of aquifer replenishment,¹¹⁵ but the state legislature has not passed laws giving the Arizona Department of Water Resources (ADWR) the authority to regulate captured and stored rainwater used for other purposes. In early 2011, Arizona State Senator Steve Pierce introduced a bill, SB 1522, to amend the water laws of the state, which would have defined “harvested rainwater” as a new type of water source, which could be regulated by the ADWR.¹¹⁶ SB 1522 would have limited the amount of rainwater that could be captured and then withdrawn for use to 50% of the base amount of water harvested.¹¹⁷ It further required that the ADWR “adopt rules pertaining to recovery of harvested rainwater that has been captured and stored for future use[, which] must include a method to calculate,

¹¹¹ *Gray Water and Rainwater Harvesting for Residents*, ARIZ. DEPT. OF WATER RES. (Oct. 28, 2011), http://www.azwater.gov/azdwr/StatewidePlanning/Conservation2/Residential/Graywater_Rainwater_Harvesting.htm.

¹¹² *Water Conservation Systems*, ARIZ. DEPT. OF REVENUE, <http://www.azdor.gov/TaxCredits/WaterConservationSystems.aspx> (last visited Sept. 15, 2012); ARIZ. REV. STAT. ANN. § 43-1090.01(A) (2011).

¹¹³ ARIZ. REV. STAT. ANN. § 43-1090.01(B).

¹¹⁴ BLUE RIBBON PANEL ON WATER SUSTAINABILITY, SUMMARY OF PROPOSED RECOMMENDATIONS § I-25 (Oct. 22, 2010), available at <http://www.azwater.gov/AzDWR/waterManagement/documents/BRPSummaryofProposedRecommendations10-25-2010.pdf>.

¹¹⁵ See Ariz. Rev. Stat. Ann. §§ 45-801.01 to 857.01. Aquifer replenishment refers to the process by which water on the surface of the ground slowly seeps back into water aquifers deep underground, which have been created over thousands, if not millions, of years. See Matthew Nier, *Groundwater Replenishment Methods* (Spring 2004), <http://academic.evergreen.edu/g/grossmaz/NIERMM>.

¹¹⁶ S. 1522, 50th Leg., 1st Reg. Sess. (Ariz. 2011), available at <http://www.azleg.gov/legtext/50leg/1r/bills/sb1522p.pdf>.

¹¹⁷ *Id.*

measure and verify the base amount of rainfall harvested over a five year period.”¹¹⁸ Essentially, this would allow developers and others to create aquifer recharge systems that could store large amounts of water, of which they could use half.¹¹⁹

The aim of SB 1522 was to allow macro-scale rainwater harvesting projects, which water-scarce cities would use to supplement their water supplies.¹²⁰ It would have also been unique from rainwater legislation in other states, in that it would have created a separate category of water called “harvested water” that could be allocated for use.¹²¹ Unfortunately, SB 1522 was amended to instead call for a “macro-harvested water joint legislative study committee” to “study, analyze and evaluate issues arising from the collection and recovery of macro-harvested water.”¹²² Under the proposed language, the committee would have been responsible for issuing a report of its findings by 2012.¹²³ While SB 1522 died in committee,¹²⁴ the legislature did pass HB 2363 in 2012, which created a study committee with the same goal.¹²⁵ The committee’s findings and recommendations must be released by September 30, 2013.¹²⁶ Hopefully this report provides information that can be used to lay the foundation for widespread macro-harvesting projects in Arizona.

¹¹⁸ SENATE RESEARCH, FACT SHEET FOR S.B. 1522 (2011), http://www.azleg.gov/FormatDocument.asp?inDoc=/legtext/50leg/1r/summary/s.1522wlurd.doc.htm&Session_ID=102.

¹¹⁹ See Joanna Dodder Nellans, *New Rainwater-Harvesting Bill Could be the Answer to the Prescott Area’s Water Problems*, DAILY COURIER, Mar. 5, 2011, <http://prescottdailycourier.com/main.asp?SectionID=1&SubSectionID=1&ArticleID=91358>.

¹²⁰ *Id.* The article goes on to note that Prescott, Arizona, which is represented by Senator Pierce, is reliant on groundwater, which is rapidly being depleted. Due to groundwater depletion, Prescott is exploring alternatives such as large-scale water transport projects, which are costly and possibly detrimental to other river systems.

¹²¹ Ariz. S. 1522.

¹²² COMM. ON AGRIC. & WATER, SB 1522 (Mar. 23, 2011), available at http://www.azleg.gov/FormatDocument.asp?inDoc=/legtext/50leg/1r/summary/h.sb1522_03-23-11_aw.doc.htm&Session_ID=102. This would essentially create a new type of water that individuals would need a right to use.

¹²³ *Id.*

¹²⁴ Apparently because Representative Jerry Weiers, the Chair of the Committee, does not like study committees. Joanna Dodder Nellans, *Fireworks, Rainwater Harvesting Bills Don’t Make It Into Law*, PRESCOTT VALLEY TRIB. (May 4, 2011, 10:44 AM), <http://pvtrib.com/Main.asp?SectionID=1&SubSectionID=1&ArticleID=54053>.

¹²⁵ H.R. 2363, 50th Leg., 2d Reg. Sess. (Ariz. 2012), available at http://www.azleg.gov/FormatDocument.asp?inDoc=/legtext/50leg/2r/laws/0095.htm&Session_ID=107.

¹²⁶ *Id.* § 1(C)(5).

The hesitancy of the Arizona legislature makes sense in light of the concerns raised by ADWR and SRP. The SRP is a large water supplier for the state. The SRP expressed concerns that large-scale rainwater harvesting would affect water rights of those with senior rights in rivers where rainwater runoff may flow.¹²⁷ However, both Senator Pierce and Yavapai County Supervisor Carol Springer argued that studies already completed show that at least 97% of rainwater evaporates and never makes it to a waterway.¹²⁸ Further, as Senator Pierce has noted, the original bill allowed the ADWR to work to “inspect, review or otherwise determine appropriate water harvesting practices that may be used for storing harvested water,” giving them the authority to regulate the program after studying potential consequences.¹²⁹ However, this would have been an expensive process for ADWR to undertake, which likely contributed to the amendment to the bill.

Meanwhile, parts of Arizona face the pressing issue of how to deal with water scarcity. Both Senator Pierce and Supervisor Springer expressed the need for urgent action of some kind in Prescott, where there is no surface water to supply the city, and where it has been known for some time that significant groundwater mining is occurring.¹³⁰ The City of Prescott established the Vision 2050 Water Committee to outline goals and strategies to make sure water resources are responsibly managed and available into the future.¹³¹ In drafting its goals, the committee acknowledged that “[t]o achieve these objectives legal changes will be required to state water law in

¹²⁷ *Hearing on S.B. 1522 Before the Committee on Agriculture and Water*, 50th Leg., 1st Reg. Sess. (Ariz. 2011) [hereinafter *Hearing on S.B. 1522*] (statement of Rep. Peggy Judd, Member, H. Comm. on Agri. & Water), available at http://azleg.granicus.com/MediaPlayer.php?view_id=13&clip_id=8967.

¹²⁸ *Id.* (statement of Sen. Pierce); Prescott AMA Water Supply Mass Balance, Macro-Rainwater Harvesting and Evaporation Interception, Civiltec Eng'g Inc., <http://www.civiltec.com/downloads/MacroRainwater.ppt> (last visited Oct. 24, 2012) (finding that in Prescott, Arizona, 98.4% of rainwater was lost to evapotranspiration).

¹²⁹ *Hearing on S.B. 1522*, *supra* note 127 (statement of Sen. Pierce); S. 1522, 50th Leg., 1st Reg. Sess. (Ariz. 2011), available at <http://www.azleg.gov/legtext/50leg/1r/bills/sb1522p.pdf>.

¹³⁰ *Hearing on S.B. 1522*, *supra* note 127 (statements of Sen. Pierce and Supervisor Springer). “Groundwater mining” is defined as “[t]he process . . . of extracting groundwater from a source at a rate in excess of the replenishment rate such that the groundwater level declines persistently, threatening exhaustion of the supply. . . .” *Groundwater Glossary*, CAL. DEP’T OF WATER RES. (July 30, 2009), http://www.water.ca.gov/groundwater/groundwater_glossary.cfm#gg.

¹³¹ CITY OF PRESCOTT, ARIZONA, *Vision 2050 Water Committee* (last visited Oct. 24, 2012), http://www.cityofprescott.net/_d/gpvision2050water.pdf.

order for Prescott . . . to successfully maintain, restore and enjoy the natural resources within its boundaries.”¹³² These changes would have to include the ability for macro-scale stormwater and rainwater harvesting for aquifer recharge.¹³³

Unfortunately, at this time there has been no progress to either define rights to harvest rainwater on a large scale, or study the effects of large-scale rainwater harvesting in the state. While the study committee created by HB 2363 may be a slow start toward a solution for Arizona’s growing water scarcity, it has at the least started the discussion about macro-scale harvesting projects, and is likely only the beginning of legislative efforts to deal with increasing concern about the future of water in the state. While Senator Pierce has called the plan in his original bill “futuristic,”¹³⁴ it will take a creative approach like his to meet the water needs of the state’s growing population.

D. New Mexico

Like Arizona, New Mexico does not have a statute that directly prohibits or allows rainwater harvesting. The statute defining natural waters, which are subject to the regulations governing prior appropriation, is more narrowly drawn than the statutes in some other states, such as Colorado.¹³⁵ Natural waters are considered to be those “flowing in streams and watercourses,” while a watercourse is defined as “any river, creek, . . . or any other channel having definite banks and bed with visible evidence of the occasional flow of water.”¹³⁶ This definition of watercourse does not include diffuse surface water or natural precipitation, and as of now, the legislature has not acted to create specific rights or limitations on the use of rainwater. As in Colorado, the New Mexico Constitution specifies that the state must allocate water based on the prior appropriation system.¹³⁷ Interestingly, the New Mexico state legislature previously passed a

¹³² *Id.*

¹³³ *Id.* Additionally, the City has expressed reluctance to bring in more outside water to meet its needs. *Id.*

¹³⁴ *Hearing on S.B. 1522, supra* note 127 (statement of Sen. Pierce).

¹³⁵ N.M. STAT. ANN. § 72-1-1 (West 2011).

¹³⁶ *Id.*

¹³⁷ “The unappropriated water of every natural stream . . . is hereby declared to belong to the public and to be subject to appropriation for beneficial use Priority of appropriation shall give the better right.” N.M. CONST. art. XVI, § 2.

law that is very similar to the Weather Modification Act passed in Colorado, which gave Colorado ownership of all precipitation in the state.¹³⁸ Specifically, “the state of New Mexico claims the right to all moisture in the atmosphere which would fall so as to become a part of the natural streams or percolated waters of New Mexico, for use in accordance with its laws.”¹³⁹ However, New Mexico does not use this statute to prevent rainwater harvesting within the state. In fact, the state has taken the opposite approach. The Office of the State Engineer, which regulates water within New Mexico, has released a report that details the ways in which people in New Mexico can utilize rainwater harvesting and recognizes that “[i]n a dry state such as New Mexico, it makes sense to explore ways to get the maximum use of natural precipitation.”¹⁴⁰

Cities within New Mexico have formed their own policies based on conservation goals. The state imposes only one restriction on rainwater harvesting: it “should not reduce the amount of runoff that would have occurred from the site in its natural, pre-development state.”¹⁴¹ Additionally, according to the regulations of the State Engineer, residents may only harvest rainwater from “roof surfaces for on-site landscape irrigation and other on-site domestic uses.”¹⁴² In order to meet conservation goals and reduce stormwater runoff, Santa Fe offers a rebate program for rain barrel retrofits or the installation of a water harvesting system.¹⁴³ Additionally, the city has passed ordinances requiring the use of rainwater harvesting to be included in landscaping plans for subdivisions, development plans, master plans, and building permit applications for structures with floor plans greater

¹³⁸ COLO. REV. STAT. ANN. § 36-20-103 (West 2011); Weather Control Act, N.M. STAT. ANN. § 75-3-1 to 15.

¹³⁹ N.M. STAT. ANN. § 75-3-3.

¹⁴⁰ NATE DOWNEY, N.M. OFFICE OF THE STATE ENG’R ROOF-RELIANT LANDSCAPING: RAINWATER HARVESTING WITH CISTERN SYSTEMS IN NEW MEXICO (2009), available at <http://www.ose.state.nm.us/water-info/conservation/pdf-manuals/Roof-Reliant-Landscaping/Roof-Reliant-Landscaping.pdf>.

¹⁴¹ *Rainwater/Snowmelt Harvesting Policy*, N.M. OFFICE OF THE STATE ENG’R (Nov. 24, 2004), http://www.ose.state.nm.us/wucp_policy.html. This standard is open to wide interpretation but has not been subject to any type of judicial review, so it is unclear exactly how a person would violate this guideline.

¹⁴² *Id.*

¹⁴³ *Rainwater Harvesting Rebate*, CITY OF SANTA FE, N.M., <http://www.santafenm.gov/index.aspx?NID=2558> (last visited Oct. 24, 2012). Individuals claiming the rebate must be current customers of Sangre de Cristo Water within the city and can claim up to \$50/rain barrel, depending on size, or \$0.25/gallon capacity if installing a water harvesting system. *Id.*

than 1000 square feet.¹⁴⁴ The rainwater harvesting utilized to fulfill this requirement can be active, passive, or incorporate elements of each.¹⁴⁵

Elsewhere in the state, similar water conservation requirements have been very successful. Albuquerque, New Mexico, is quite possibly the city with the most sustainable water use in the southwest. The city, working in conjunction with the Albuquerque Bernalillo County Water Utility Authority, has achieved water conservation through a combination of water use regulations and financial incentives.¹⁴⁶ Since 1996, the city has successfully saved over 100 billion gallons of water.¹⁴⁷ While rainwater harvesting is only one piece of the complete water conservation strategy implemented by the city, it is a necessary part of the comprehensive plan because outdoor water use accounts for 40% of potable water use.¹⁴⁸

Some other cities in the state have also encouraged stormwater harvesting. Santa Fe has passed city stormwater management ordinances intended “to protect, maintain and enhance the health, safety and general welfare of the citizens and natural environment of Santa Fe.”¹⁴⁹ When planning for development, the city requires that development plans “treat stormwater runoff as a valuable natural resource in . . . a community that is prone to drought, by encouraging water collection and infiltration on site.”¹⁵⁰ Further, control for runoff “may include . . . active . . . and passive water harvesting techniques.”¹⁵¹

¹⁴⁴ SANTA FE, N.M., CITY CODE § 14-8.4(B) (2011).

¹⁴⁵ *Id.* § 14-8.4(E)(1).

¹⁴⁶ See *Watering Restrictions*, ALBUQUERQUE BERNALILLO CNTY. WATER UTIL. AUTH. (October 12, 2012), <http://www.abcwua.org/content/view/234/433>; *Rebates Indoor*, ALBUQUERQUE BERNALILLO CNTY. WATER UTIL. AUTH. (Sept. 10, 2010), <http://www.abcwua.org/content/view/134/229>.

¹⁴⁷ *100 Billion Gallons Saved Through Conservation*, CITY OF ALBUQUERQUE, <http://www.cabq.gov/council/news/100-billion-gallons-saved-through-conservation> (last visited Oct. 14, 2012) (noting that “per-person usage [in the city] is approximately 165 gallons, compared with 252 gallons in 1994,” while aquifer pumping has decreased from “40 billion gallons annually in 1994 to 31 billion gallons today—in spite of population growth”) (emphasis omitted).

¹⁴⁸ *Saving Water Outdoors*, ALBUQUERQUE BERNALILLO CNTY. WATER UTIL. AUTH. (Mar. 27, 2008), <http://www.abcwua.org/content/view/70/60> (listing a variety of ways to reduce outdoor water use and dependence on the city water supply).

¹⁴⁹ SANTA FE, N.M., CITY CODE § 14-8.2(A).

¹⁵⁰ *Id.* § 14-8.2(A)(6).

¹⁵¹ *Id.* § 14-8.2(D)(4)(b)(ii) (emphasis omitted).

Comparing the relative approaches of the Four Corner states shows both successes and failures. In Colorado, recent legislation has allowed some to harvest rainwater, but the limited scope of the legislation means there will be no real effect on state water resources. In Utah, the door has opened to residential rainwater use, but it is unclear how many people will actually take advantage of the new law. Further, there has been pushback from the agricultural community to opening the door to further rainwater or stormwater use. Meanwhile, in Arizona, cities continue to show leadership in confronting concerns about water scarcity with ordinances and regulations that encourage rainwater and stormwater harvesting. However, there is little action on the state level to incorporate best practices into state planning and regulations, and, as in other states, there has been pushback from agricultural interest groups. In New Mexico, the situation mirrors that of Arizona, and it is unclear how the state's prior appropriation system may limit future policies to promote water harvesting.

IV

CLIMATE CHANGE, SCARCITY, AND INTERNATIONAL PERSPECTIVES

Rainwater harvesting may seem like just one more conservation step now, but it will become increasingly important as the southwestern United States begins to feel the effects of both climate change and increased population.¹⁵² The most likely detrimental effect of climate change on Western state water resources will be a decrease in snow, and a resulting decrease in snowmelt which supports most streams and rivers.¹⁵³ The potential decrease in snowmelt will create even greater pressure to ensure that water rights holders get their fair share. The increased tension will create political pressure to ensure that the state is allocating water to the most important uses. This will

¹⁵² Current estimates by the U.S. Census Bureau project a population of at least 67 million people in the Southwest by 2030 and a potential for the current population of 50 million to double within 50-100 years. Lauren Morello, *Scientists See the Southwest as First Major U.S. Climate Change Victim*, N.Y. TIMES, Dec. 14, 2010, available at <http://www.nytimes.com/cwire/2010/12/14/14climatewire-scientists-see-the-southwest-as-first-major-78170.html> (noting that analysts recommend that part of the solution to increased population growth will be "encouraging the development of untraditional water sources").

¹⁵³ D.P. Lettenmaier et al., *Water Resources*, in THE EFFECTS OF CLIMATE CHANGE ON AGRICULTURE, LAND RESOURCES, WATER RESOURCES, AND BIODIVERSITY 121, 129 (Margaret Walsh ed., 2008), available at <http://www.sap43.ucar.edu/documents/Water.pdf>.

undoubtedly create conflict between citizens living in urban population centers and rural agricultural users. Agricultural use of water has been steadily decreasing in the past decades, and analysts expect it to continue to decrease.¹⁵⁴ Moreover, cities dealing with increasing populations have started to pull water away from agricultural users.¹⁵⁵ Additionally, urban use is expected to continue to grow.¹⁵⁶ Therefore, how urban residents use and conserve water will become a pressing concern.

Even as we debate the issue in the Southwest United States, other countries have already forged ahead to utilize more rainwater. In India, New Delhi went from having two rainwater harvesting structures to more than 300, and “now requires all new buildings to collect, clean, and send into the aquifer any rainwater that falls on the footprint of the building.”¹⁵⁷ In the heavily populated and dense urban environment of New Delhi, it makes good sense to use all water available to recharge aquifers for later use because otherwise the water will end up dirty and polluted in a stream where someone else will have to purify it. It also highlights the way in which cities that depend on aquifers need to make sure that water is reaching those aquifers. Otherwise, instead of relying on the water right below, large and costly transport systems for water will need to be constructed.

In Australia, which recently faced the most severe drought in the nation’s history,¹⁵⁸ there is wide acceptance and support for rainwater harvesting.¹⁵⁹ In 2011, the Victorian State government decided to implement a policy that creates rebates up to \$1,000(AUD) for

¹⁵⁴ Paul Hirt et al., *The Mirage in the Valley of the Sun*, 13 ENVTL. HIST. 482, 487 (2008).

¹⁵⁵ Sandra L. Postel, *Entering an Era of Water Scarcity: The Challenges Ahead*, 10 ECOLOGICAL APPLICATIONS 941, 942 (2000).

¹⁵⁶ *Id.*

¹⁵⁷ CHARLES FISHMAN, *THE BIG THIRST* 253 (2011).

¹⁵⁸ David Hambling, *Weatherwatch: Australia’s ‘Big Drought’ Officially Over After a Decade*, THE GUARDIAN, May 11, 2012, <http://www.guardian.co.uk/news/2012/may/11/weatherwatch-drought-australia-floods>. While the “Big Dry” may be over, Australian scientists “expect droughts to become more severe and more frequent.” Andy Coghlan, *Australia’s decade-long drought ends*, NEWSIDENTIST, May 1, 2012, <http://www.newscientist.com/article/dn21765-australias-decadelong-drought-ends.html>.

¹⁵⁹ CUNLIFFE, *supra* note 3, at 8 (noting that a 1994 study showed that 13% of Australians also use rainwater for drinking water).

rainwater tanks connected to laundry and toilet facilities.¹⁶⁰ Additionally, stormwater harvesting is widespread throughout the country.¹⁶¹ Local governments within the country have funded macro-scale harvesting projects and have recognized that stormwater “offer[s] both a potential alternative water supply for non-drinking uses and a means to further reduce stormwater pollution in our waterways.”¹⁶² Based on the seriousness of the climate changes in Australia and their widespread effect on the country, there is no debate about these policies within the country. Unfortunately, this type of widespread drought and water scarcity may be the future for the Four Corners region. For this reason, cities and states should look to international examples, such as Australia’s and New Delhi’s successes, when creating their own rainwater harvesting policies.

V

RECOMMENDATIONS

There are three key reasons why states need to make rainwater harvesting a priority in water conservation and sustainability programs. First, as previously discussed, in the Four Corners region, citizens use a large portion of potable water for watering lawns and gardens. As populations increase, there is going to be less water to go around because the amount of fresh water available is essentially finite. Additionally, cities will face increasing costs to maintain and increase infrastructure for drinking water delivery and stormwater management.¹⁶³ In terms of sustainable planning and conservation, it is poor public policy to continue to allow people to water lawns with clean drinking water, while allowing stormwater to pollute rivers and streams.

Second, state and city regulations currently create an inefficient model for regulating rainwater harvesting and stormwater runoff. While cities in Utah and Colorado suggest ways to capture and release stormwater and ways to create landscapes that reduce runoff,

¹⁶⁰ *Rebates on Water-Efficient Products for All Victorians*, STATE GOV’T OF VICTORIA, AUSTL. (June 29, 2011), http://www.water.vic.gov.au/resources/news_items/news_items_folder/rebates-on-water-efficient-products-for-all-victorians.

¹⁶¹ See generally MANAGING URBAN STORMWATER, *supra* note 15.

¹⁶² *Id.* at iii.

¹⁶³ Ronnie B. Levin et al., *U.S. Drinking Water Challenges in the Twenty-First Century*, 110 ENVTL. HEALTH PERSPECTIVES 43, 43 (2002) (reporting that the EPA and other studies estimate that public water utilities will need to spend hundreds of billions of dollars to maintain and improve existing water infrastructure).

they cannot suggest the easiest way to help lessen stormwater runoff: harvesting and using it. Meanwhile, in Arizona and New Mexico, cities have taken huge leaps forward to reduce runoff and increase rainwater conservation and use. State agencies and legislatures, however, have not adopted these practices on a statewide level. All water within a state is connected and state agencies should uniformly regulate it. Moreover, government and corporate planning would benefit from consistent regulations and requirements.

Finally, climate change and increasing population will put additional strains on water supplies. We should look to Australia and India to see how this affects populations and how they have adapted. The conditions they are experiencing will likely be replicated in the Four Corners region. Scientists and policy makers have already acknowledged that water supplies in the Southwest “will become increasingly scarce.”¹⁶⁴ These models show that rainwater harvesting will be a key tool to deal with changing weather patterns. With these issues in mind, we must examine ways to increase productive and sustainable use of rainwater and stormwater.

A. State Legislative Action

Battling special interest groups concerned with possible effects on senior water rights will continue to be a challenge for any state senators or representatives hoping to enact smarter rainwater harvesting laws. However, recent momentum in Utah, Colorado, and Arizona demonstrate that the next few years could be key to passing legislation designed to encourage or require smarter water management policies. While action in cities has been positive, statewide regulations and incentives are needed in order to create uniformity.

Consistent state action will ensure smart conservation throughout states, instead of only in progressive areas. Additionally, it will assist businesses that work around the state in meeting the requirements without additional expense. It is important that state legislative action incorporate best practices from throughout the region. There is no

¹⁶⁴ U.S. GLOBAL CHANGE RESEARCH PROGRAM, REGIONAL HIGHLIGHTS FROM GLOBAL CLIMATE CHANGE IMPACTS IN THE UNITED STATES: SOUTHWEST (2009), available at <http://www.globalchange.gov/images/cir/region-pdf/SouthwestFactSheet.pdf> (predicting that water scarcity in the area will lead to increasing competition and potential conflict among current users over water resources).

reason to start from scratch when many successful policies can be copied and improved upon. States and cities throughout the Four Corners should use Albuquerque and Tucson as models.

Tax incentives and rebate programs should be a part of state action. States could provide tax incentives to businesses that incorporate rainwater use into building plans and to developers that find ways to utilize rainwater and stormwater in development plans. For individuals, states could provide tax credits or rebates on water bills for installing rain barrels or other rainwater harvesting equipment and shifting to landscaping that utilizes stormwater. States can build upon the model used by Arizona; the state was innovative in creating such a tax credit and limiting the amount of money for which filers could receive credit, but lack of participation made many question its effectiveness. States can learn from this experience to create a tax incentive system that actually incentivizes behavior and creates realistic goals.

One benefit of incorporating tax incentives or rebates into a strategy to encourage harvesting is that they are often easier to sell politically than increased regulation. They also encourage participation of all income levels and demographics. While state budgets may not have much flexibility to include these programs, it is important to recognize that failing to create more sustainable cities now will create additional costs down the road, which may be borne by those least able afford them.

States also need to draft new laws to incorporate rainwater harvesting and stormwater use into existing water law. Utah's recently enacted rainwater harvesting law should serve as a model. Specifically, these statutes should provide for the use of rainwater without having previously obtained or needing to acquire a water right.¹⁶⁵ Further, the Utah system places limits on the amount of water that residents can capture and use. These types of limits may be able to facilitate compromise between urban water users and agricultural users. The laws should also limit the use of the rainwater or

¹⁶⁵ It is important to note, however, that a prior appropriation right system of some sort may have to be established in Colorado in order for a program like this to work. The Colorado Supreme Court has made a point to note that it "express[ed] no opinion on the constitutional permissibility of any legislative scheme permitting rights to be acquired in tributary water . . . on some basis other than of priority of appropriation." *R.J.A., Inc. v. Water Users Ass'n of Dist. No. 6*, 690 P.2d 823, 829 n.9 (Colo. 1984). It is possible that because prior appropriation is included in the state's constitution, any water use program would need to incorporate prior appropriation.

stormwater to the parcel of land on which it is collected. This will ensure that any groundwater recharge will still take place.

While Utah has taken great strides in allowing for personal use of rainwater harvesting, most of the problems associated with stormwater runoff, such as water pollution and habitat degradation, are still an issue. State legislatures should use Representative Cox's bill, and others like it, to take a small first step to allow for more sustainable development throughout the Four Corners region. Senators and Representatives in Colorado, Arizona, and New Mexico should work on drafting similar bills that allow for beneficial use of stormwater, as opposed to mere capture and release. This will prevent downstream pollution, improve water quality, prevent flooding, and allow beneficial use of an otherwise wasted water resource.

Meanwhile, cities within these states should pass ordinances that require management of stormwater and rainwater to be included as part of development planning. Even in Utah and Colorado, where stormwater cannot be used, it can be stored and slowly released to eliminate pollution and erosion. This will also allow municipal water works to better and more efficiently comply with their NPDES permit requirements. Furthermore, cities should actively lobby for less stringent state rainwater and stormwater regulations. Urban areas will experience the highest population growth in the coming decades, creating a higher demand on city water resources. It would be prudent for cities to make sure they have the ability to adequately meet future needs and incorporate conservation and sustainable practices into city planning and development. Otherwise, city governments will need to increase the amount of water they are allowed to allocate, pump in water from other areas, or invest in costly water reuse and filtration systems. Cities may need to incorporate some or all of these projects into a comprehensive sustainable water plan in the future, but it is possible to decrease the use of potable water right away.

B. Registration and Reporting Programs

One of the problems with rainwater harvesting and stormwater use, as well as with water use in general, is a lack of knowledge by the state as to how much water is actually being used. This ignorance contributes to fears by appropriators that rainwater harvesting will affect their rights. Therefore, a key component of any program implementing rainwater or stormwater harvesting will be to authorize the state agency in charge of water to create registries where

harvesters must submit information about how much water they are using, as well as the method of collection. State agencies already have the authority to allocate water, but requiring reporting and record keeping will help increase knowledge about rainwater harvesting practices and allow the state to examine any impacts. Utah currently requires citizens to submit this kind of information before starting rainwater harvesting, and Colorado requires that well owners who start collecting rainwater submit additional forms. Other state agencies could create simple online registries that eliminate the hassle associated with filing permit applications. Additionally, water users should be required to submit reports every few years to update the state on what they are doing. This should complement the current permitting processes in these states and create more transparency. Additionally, once states better understand consumer water use patterns, they can shape policies aimed at conservation that have a better chance of success.

VI CONCLUSION

Today, the states in the Four Corners region have not yet had to face severe water shortages or restrictions on water use. However, based on predictions for the next 100 years, it is only a matter of time before population pressure and climate change result in decreased water supplies. Currently, states in the region face water pollution problems from stormwater runoff. Under the doctrine of prior appropriation, which has been in place since the beginning of the development of the Western United States, all waters flowing on the land are considered property of the state. While Arizona and New Mexico have narrowly construed this doctrine to allow for rainwater harvesting so long as there is no evidence that others' rights to water are being affected, Utah and Colorado have broadly applied the doctrine to include rain and stormwater. The time has come to re-examine the restrictions on harvesting, and implement new laws and regulations that take into account the realities of water use and scarcity in the Southwest. Rainwater and stormwater harvesting should be key components of a comprehensive sustainable water policy in all of the Four Corner states.