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WATER, WATER, NOWHERE: ADAPTING WATER RIGHTS FOR A CHANGING CLIMATE

Caleb Hall*

I. INTRODUCTION

Water supply is increasingly threatened by climate change throughout the West, especially in California. Although California has started regulating groundwater use, the state's current efforts are not likely sufficient to adapt to an ever warming climate.¹ California's latest legal efforts are needed, but are lacking because "it will take years to craft and implement the management plans, the full effect of the regulations — the recovery of...over-pumped basins — won't be felt until at least 2040."²

Meanwhile, recent climate change research predicts that evapotranspiration will increase seven percent in the immediate future.³ By 2050, the median snowpack could be one-third smaller than historical medians, and by 2100 it could be two-thirds smaller.⁴ Such drastic losses in snowmelt will yield less runoff to refill reservoirs leading to more frequent droughts. Other statistics show that by 2100, there may only be a ten percent chance that California's snowpack will equal today's average accumulation.⁵

Considering the dire straits of California's water supply, current legal responses to droughts in the West will fail to respond to worsening droughts because western water law is premised on the assumption that current water use can be maintained.⁶ However, in an unstable climate, that assumption is no longer valid.⁷ Under prior appropriation, water rights are maintained as long as water use is deemed "beneficial."⁸ Although "beneficial use" is considered through the rate and amount of water used, such analysis is still limited to categorical definitions without contextual consideration.⁹ California and the western United States must reconsider the "beneficial use" requirement to adapt to climate change as such treatment is not sustainable in a time of ever-increasing droughts.

This Article begins with an explanation of California's current water use, how the current drought threatens water use, and how climate change will ensure more disastrous drought. A history of development of western water law is offered to describe the current situation. This leads to a discussion of three spectrums of western water law: California's recognizance of both riparian and prior appropriation, Colorado's, recognizance of only prior appropriation, and Kansas' adoption of several unique

legal mechanisms to address drought. The Article concludes by urging that current western water law is not sufficiently prospective for more frequent droughts, but California water law can shift into a temporal, circumstance-oriented requirement if it changes from its current static "beneficial use" requirement.

II. THE GOLDEN, UNSUSTAINABLE STATE

California, the Golden State, is aptly named because of its historic gold resources that precipitated the mass migration towards the American West.¹⁰ In addition to gold, California also has enticing natural splendor, accessible ports, and agricultural productivity, developing it into the eighth largest economic

engine in the world.¹¹ California, recognized as the most productive agricultural state in the United States,¹² leads the nation in production of various crops including almonds, grapes, and tomatoes among others.¹³ All of the aforementioned resources, from gold to crops, require water extraction, transportation,

and sustenance, making "...California's very existence...premiered on epic liberties taken with water."¹⁴ While California's precious water resources should be protected, recent events have shown that is not the case.

California's water use is immense, wasteful, and, possibly worst of all, unmonitored.¹⁵ California, mostly a mixture of dry desert and Mediterranean climate, must divert approximately forty-three million acre-feet annually from melting snowpack and groundwater.¹⁶ Sixty percent of those acre-feet come from reservoirs and other surface waters, while forty percent comes from groundwater.¹⁷ Regardless of the source, an estimated

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eighty percent of California's water use goes towards agriculture,¹⁸ mostly in the Central Valley,¹⁹ with ten and fifteen percent of water devoted to the uniquely thirsty almond and alfalfa crops respectively, even though a great portion of both are exported.²⁰ Of the remaining twenty percent of the entire state's water supply, industrial use consumes six percent, leaving fourteen percent for home and governmental usage.²¹ Within municipalities, water usage is highest in wealthy neighborhoods, reaching half of a domestic water bill in some areas when compared to lower income areas.²² However, there is no accurate way to measure California's overall water use as many regions, especially the arid Central Valley, lack water meters.²³ The absence of water meters deprives California of the ability to monitor water use and increase conservation efforts when necessary.²⁴

The massive water use coupled with little oversight is proving disastrous now in an ever-warming world.²⁵ Studies show that "a persistent region of high atmospheric pressure hovering over the Pacific Ocean that diverted storms away from California" are causing the droughts.²⁶ Such atmospheric conditions are more likely to occur today because of higher concentrations of tropospheric greenhouse gases that are warming the atmosphere.²⁷ Furthermore, a higher frequency of droughts is also likely because a warmer atmosphere holds more moisture than a cooler one.²⁸ Climate change is leading to less precipitation, thus causing California's agriculture to suffer, resulting in \$2.2 billion in direct and indirect costs this year, including the loss of more than seventeen thousand seasonal and part-time jobs.²⁹ Such losses have led the federal government to declare all fifty-eight California counties as "natural disaster areas."³⁰

California's continuing drought from 2013 not only threatens the state's economy, but impacts residents directly.³¹ In the agricultural worker communities of southern California, particularly east Porterville in Tulare County, where temperatures hover over one hundred degrees Fahrenheit during the summer, more than five hundred households "cannot flush a toilet, fill a drinking glass, wash dishes or clothes, or even rinse their hands without reaching for a bottle or bucket."³² Meanwhile, "[g]roundwater levels... have plunged by sixty feet or more in some spots, and tens of thousands of wells are in danger."³³ Aside from the inconvenience to California residents without water, the most recent drought and future droughts will continue to threaten the lives of agricultural workers who are influential in harvesting all of the aforementioned crops.³⁴ This is not simply speculation; if people do not have access to water, it does not matter how much they are paid if they cannot work.

To combat the lack of access to water, California began regulating groundwater use³⁵, but these efforts neglect to factor in the exacerbation of existing drought conditions.³⁶ On September 16, 2014, Governor Edmund Brown signed three bills, Assembly Bill 1739, and Senate Bills 1168 and 1319 to enable local agencies to tailor "sustainable groundwater plans" to address specific, regional economic and environmental issues.³⁷

Assembly Bill 1739 provides for the creation of groundwater sustainability agencies to impose fines for

unreasonable water use, submit groundwater sustainability plans to California's Department of Water Resources ("DWR"), require groundwater use reporting, and grant California's State Water Resources Control Board ("SWRCB") the authority to designate water basins as probationary basins if there are groundwater overdraft problems.³⁸ A probationary basin designation entails an interim sustainability plan with more immediate regulatory action.³⁹

Senate Bill 1168 grants the sustainable use of groundwater for both economic and environmental uses; directs the DWR to designate the water needs of a water basin as a high, medium, low, or very low priority; and requires groundwater sustainability plans to manage all high and medium priority basins.⁴⁰ Senate Bill 1319 enables the SWRCB to designate high and medium priority basins as probationary basins if certain criteria are met after January 31, 2025, and removes local agencies' authority to implement parts of their respective sustainability plans if the SWRCB determines that the current plan is adequate. If a plan is adequate, then a replacement interim plan to meet or help meet the basin's sustainability goal is implemented.⁴¹

These newly approved bills are an improvement, but any benefits as a result of the legal amendments are likely to be too late because the local groundwater management agencies will not be identified until 2017. Moreover, overdrafted groundwater basins will not have sustainability plans until 2020; high and medium priority basins that are not currently overdrafted will not have their respective plans until 2022; and high and medium priority basins are not required to obtain full sustainability until 2040.⁴² As these plans are developed, the western states' water resources are going to be further stressed,⁴³ and California will potentially face more water shortages.⁴⁴ None of the bills address how California will mitigate the demands of vested water rights in the face of an ever-decreasing supply of water. Proposition 1⁴⁵, approved on November 4, 2014, may help alleviate water supply issues with \$7.545 billion in bonds being devoted to water supply infrastructure projects; however, Proposition 1 still does not address the current problem of water rights being guaranteed in a time of drought.⁴⁶

The established and newly created legal protections surrounding water use are not sufficiently adaptable to the growing demands of climate change, and, must therefore be reconsidered if life in California and the western United States is to be sustained. Legal protections must be rethought because the luxury of the status quo is lost in an ever-warming world. Therefore, either prior appropriation's failures are addressed voluntarily now, or under duress in the future. Before postulating what additional legal mechanisms are necessary, one should understand how prior appropriation came to be.

III. WESTERN WATER LAW OR "FIRST IN TIME, FIRST IN RIGHT"

Prior appropriation, the western water law regime recognizing the right to divert water away from its original source, came about because western courts wrestled with the conflict of economic imperatives for growth and limited water resources.⁴⁷

Different western states either partially or exclusively recognize the doctrine, and Kansas has developed unique legal tools to accommodate recognized water rights in times of drought.⁴⁸

A. THE DEVELOPMENT OF THE PRIOR APPROPRIATION DOCTRINE

The western water right doctrine that threatens California's future originated when gold was discovered in the high Sierras at Sutter's Mill on January 24, 1848.⁴⁹ At the time the United States was not exercising any right over the land or water despite its recent purchase,⁵⁰ leaving a legal vacuum wherein the customs of gold miners could supplant established common law.⁵¹

Under Mexican control, a communal framework administered California's waters.⁵² On the other hand, the United States borrowed the English Common Law riparian doctrine where the right to the use stayed with the land, and riparian owners have the right "to have a natural stream through his land continue to flow without diminution or alteration."⁵³ When California became a state, it adopted the riparian common law rules, but also retained some water law notions from Mexico.⁵⁴

The legal systems conflicted with the miners, as gold mining required both the personal acquisition of water for public use, and the diversion of water away from its natural flow.⁵⁵ Furthermore, riparian water law did not satisfy non-irrigated agriculture because fewer than twenty inches of rainfall fall each year west of the hundredth meridian.⁵⁶

California's Supreme Court wrestled with the conflict of law and reality.⁵⁷ The Court resolved the conflict when it implemented the traditions of the gold miners as a model.⁵⁸ Accordingly, the California Supreme Court created the prior appropriation doctrine of "first in time, first in right" where one attains a superior right over other claimants to use water, separate from the source, when one is first to divert the water for a beneficial use.⁵⁹ In promoting use of water for mining purposes, the California Supreme Court stated "the right to appropriate the waters of the streams of this State, for mining and other purposes, has been too long settled to admit of any doubt or discussion at this time."⁶⁰ In siding with new customs of miners, the Court decided that it was "emphatically the law-makers, as respects mining, upon the public lands in the State."⁶¹

Prior appropriation soon spread eastward away from California into the rest of the West, and numerous western states, including Colorado and Nebraska,⁶² enshrined prior appropriation into their constitutions.⁶³ In contrast, states like Kansas opted to be guided through statutes and case law.⁶⁴ The doctrine has consistently developed that a water right requires a diversion of water for a beneficial use, covering both what the water is used for and how much.⁶⁵ Water appropriated for a non-beneficial use was, and still is "waste" and can be grounds for terminating a water right.⁶⁶

Intent to divert and notice of diversion are almost *de facto* elements of any irrigation or other water works project, but the diversion requirement itself has largely been marginalized throughout the twentieth century,⁶⁷ especially as in-stream beneficial uses, such as fish, wildlife habitat, and recreation, became

recognized as a collateral result of the environmental movement in the 1960s.⁶⁸ It is generally agreed that "beneficial use, without waste, is the basis, measure, and limit of a water right."⁶⁹ Without a beneficial use, there is only waste and the resulting forfeiture of a water right without a beneficial use cannot reasonably be considered a taking.⁷⁰

It is unclear what exactly a beneficial use is because most western states have no statutory guidance regarding the requirement, leaving the beneficial use concept up to judiciary discretion.⁷¹ Often the result is that a beneficial use is "socially acceptable," which allows industrial and exploitative uses of water. However, beneficial use also extends into in-stream uses of water and other environmental concerns.⁷²

With beneficial use being so malleable yet crucial to water rights, any climate change adaptation in water law must address this definitional issue. Ironically, with "beneficial" being a subjective and inherently value-laden term, courts and legislators could have conceived ecology to be within the beneficial use requirement at its outset just as development is equated with benefit. Unlike California, which recognizes both the riparian and prior appropriation doctrine,⁷³ Colorado rejects the riparian doctrine outright, opting to rely solely on prior appropriation.⁷⁴ This leads to a split among the western states depending on whether they follow California's or Colorado's model. However, beyond this dichotomy, unique water law mechanisms are emerging in Kansas.⁷⁵

B. CALIFORNIA WATER LAW

California's constitution guarantees its citizens the ability to appropriate water, with the appropriation guiding it in a "manner prescribed by law."⁷⁶ Water use must be both reasonable and beneficial, and conversely there is no right to waste water unreasonably or in a non-beneficial manner.⁷⁷ California is also free to enact laws to further limit water use to beneficial purposes.⁷⁸ Thus, California's constitution does not guarantee that one may always have access to water, but instead only guarantees beneficial uses and directs the State to decide what distinguishes benefit from waste.⁷⁹

In 1914, California's SWRCB oversaw the Water Commission Act of 1914 establishing California's modern water permit process.⁸⁰ Subsequently, the Board has broad authority to allocate water resources reasonably and prevent waste.⁸¹ When approving or transferring a water right, the Board takes "into account all prior rights and the availability of water in the basin."⁸² Under this review, riparian users have priority over prior appropriators.⁸³ The SWRCB also considers flows necessary for in-stream uses such as recreation and wildlife habitat.⁸⁴ The approval process entails the water appropriator's application specifying the "proposed project's source, place of use, purpose, point(s) of diversion and quantity to be diverted," an environmental review under the California Environmental Quality Act, a public notice and comment period, and a permit granting the water right.⁸⁵ A quasi-governmental irrigation district then monitors water use.⁸⁶

California's courts guide the state's water use by stressing reasonable and beneficial purposes⁸⁷, and that there is no vested property right to waste water unreasonably.⁸⁸ California's courts also recognize that the State may validly limit the property interest of a water right to reasonable use, going so far as allowing the full deprivation of water rights.⁸⁹

The state's power is judicially sanctioned so far as to also apportion waters under the public trust doctrine.⁹⁰ The doctrine says states must guarantee control and access to all its navigable waters and submerged lands.⁹¹ The doctrine is limited to navigability, but in California the water right approval process may also contemplate "commerce, fishing, recreation, or ecological use[s] relating to the source stream," to ensure that new water uses do not interfere with the public trust or other's lawful water rights.⁹² Though the doctrine is rarely used, it can impede multi-million dollar water development projects if evoked.⁹³

California recognizes waste as diverting an amount of water that "exceeds the amount reasonably necessary for beneficial purposes," following the "general custom of the locality" as opposed to the "most scientific method known."⁹⁴ The standard of waste is biased towards finding no waste as general customs serve as the litmus. Appropriators need not use the best methods available to prevent waste.⁹⁵ Instead, a party challenging a water right only needs to demonstrate both the technological feasibility of a less wasteful option and that such an amount still comports with local customs.⁹⁶ However, courts only stop the most overly superfluous of water uses, as the law bends the common law to suit utility and custom.⁹⁷

California law's inherent bias towards the utilization of all water available and deference to custom makes the State's existing legal framework inadequate in the face of climate change.⁹⁸ This is true despite a critique of California's recent water law reformations.⁹⁹ California's current problems will only worsen as local customs summarily equate agriculture and other goals with beneficial use if local customs continue shaping what is seen as reasonable and wasteful.

Optimists may want to turn to the public trust doctrine to adapt to climate change, but such reliance is likely misplaced. Though the public trust doctrine enables the state to consider ecological and other holistic notions to ensure "the greatest number of beneficial users that the water supply can support," the doctrine is still "subject to the rights of those with lawful priority to the water."¹⁰⁰ Even if California courts use the public trust doctrine to prevent further unsustainable water development, the doctrine fails to address vested, uneconomic and unsustainable water rights.¹⁰¹ Therefore, California must turn to solutions beyond its current and updated water law jurisprudence to adapt to ever more demanding droughts.

C. COLORADO WATER LAW

If California's own hybrid legal framework, combining riparian and prior appropriation, cannot enable the State to adapt to its current water crisis and climate change, then perhaps it should consider other western water law regimes. Following California's water law development, the United States Congress, via the 1866

Mining Act and 1877 Desert Lands Act, approved that states and territories can change their legal systems to develop unappropriated water on and off the federal lands secured with the Treaty of Guadalupe Hidalgo.¹⁰² Like California, Colorado had to resolve multiple conflicting water law doctrines at the time of its statehood.¹⁰³ The conflict arose between Spanish-American settlers who brought their communitarian approach to water law where one's right of access was qualified by the needs of others,¹⁰⁴ and early Mormon settlers who hold that groups, not individuals can own water rights.¹⁰⁵

The early Kansas Territorial government largely adopted the Spanish and Mormon water law doctrines, but conflict arose shortly after achieving statehood in 1861 when Colorado had the choice of adopting the common law riparian doctrine or the newly developed prior appropriation custom.¹⁰⁶ Unlike California where the courts simply adopted the customs of industry to justify legal changes¹⁰⁷, Colorado courts relied on the newly codified support for prior appropriation in Colorado's constitution.¹⁰⁸ Therefore, the Colorado Supreme Court did not have to recognize a new legal doctrine to conclude that Colorado was a purely prior appropriation state.¹⁰⁹ The irony of the Colorado's Supreme Court decision did not escape the critical gaze of the late Joseph Sax who described the Court's reasoning as nothing more than, "judicial revisionism in reading the Territorial legislature's riparian statutes."¹¹⁰

Regardless of the Colorado Supreme Court's probable oversight, prior appropriation was readily incorporated into "the policy... that there should be maximum utilization of water and that the maximum utilization doctrine be integrated into the law of vested rights."¹¹¹ In 1884, just two years after the Court's endorsement of the doctrine, over a million acres of Colorado land was irrigated due to prior appropriation's ready ability to secure private property rights.¹¹² For decades, State overseers relied on the words of individual appropriators to determine priority and the establishment of water rights leading to many supply problems.¹¹³ As Kansas Assistant Attorney General and water lawyer explains:

"Most appropriators did not know how much water they were diverting, how much they had even claimed, or how much their lands needed.... They had no regard whatsoever for future water needs, and made grossly excessive claims. They posted different claims of water to the same tract of land, either in competition with one another or by mistake. These errors produced a problem as old as prior appropriation itself: that of over-appropriation where the quantities set forth in decreed water rights vastly exceeded the supply the stream could give, even in wet years."¹¹⁴

In response, Colorado created a system of water courts with the Water Right Determination and Administration Act of 1969.¹¹⁵ The Act divided Colorado into Divisions, wherein water judges and division engineers oversee the claims of potential appropriators and resolve disputes.¹¹⁶

Today, a water right applicant provides the division's water clerk with "a verified application setting forth facts supporting the ruling sought," including showing all the elements of prior appropriation.¹¹⁷ Afterwards, "the appropriator can receive a judicially awarded final decree, with a priority backdated to the time the 'first step' was taken provided that the work toward appropriation continued with reasonable diligence."¹¹⁸ Once a final decree and a continued diversion for beneficial and reasonable use is obtained, the appropriator acquires a vested right.¹¹⁹ An applicant can also reach the same result by acquiring a conditional decree from a water court, which enables an appropriator to acquire a priority date on a yet to be completed waterworks project.¹²⁰

Once such a right is acquired, Colorado's courts rely on the State's constitution to give an inordinate amount of deference towards protecting that right from governmental interference.¹²¹ The Colorado Supreme Court has held that these constitutional provisions are meant to preserve the prior appropriation system rather than conserve water for the public or future.¹²²

This is not to say that Colorado water users are free to act without any restraints. Like every western state, one can only obtain a water right through prior appropriation if the water diverted is "of a specified quantity of water to an actual beneficial use."¹²³ Groundwater is also included within the "beneficial" and "reasonable" use requirements that must be maintained

lest a water right be divested.¹²⁴ However, it is not always apparent what qualifies as a beneficial use because Colorado lacks extensive statutory guidance.¹²⁵ The State's constitution does provide that domestic, agricultural, and manufacturing purposes are beneficial uses, but otherwise leaves the definition of beneficial use to court discretion.¹²⁶ Storage itself is not a beneficial use, though subsequent usage is, and neither is an excessive water diversion, though that is almost by definition unreasonable as well.

Colorado's water courts grant such deference to applicants that they rarely find a non-beneficial or unreasonable use. Water rights are frequently divested or limited as between complaining plaintiffs and defendants,¹²⁷ but courts still grant water rights when the application is late or when collateral business documents are not properly filed.¹²⁸ Interstate compacts, retroactive legislation, or "the uncontrolled discretion of state engineers" will not limit water rights in Colorado.¹²⁹

It is because of Colorado's policy of maximized water use, with an extreme amount of deference towards appropriators, that its water law provides no help to adapt to climate change

demands.¹³⁰ In Colorado, "[a] decreed priority to the use of water for irrigation is not only a property right, it is a freehold."¹³¹ But with drought conditions throughout the West predicted to worsen, a Colorado water right will soon be a freehold in nothing.¹³² In finding categorical beneficial uses with little to no judicial scrutiny, Colorado's legal regime is a race to the bottom, with every appropriator driving his straw down to get the last drop. Colorado's current water law regime is deficient in the face of climate change and more adaptable methods should be planned.

D. KANSAS WATER LAW

Kansas has adopted several novel legal adaptations to drought that may be extendable to other western states. After entering statehood in 1861, Kansas adopted riparian common law,¹³³ and then recognized prior appropriation via statute in 1876.¹³⁴ Thus, Kansas subscribes to the California doctrine, continuing to recognize the riparian doctrine alongside prior appropriation today.¹³⁵

State courts refused to solely recognize prior appropriation even as Kansas' Division of Water Resources ("DWR") was forming in 1917.¹³⁶ However, after the ravaging Dust Bowl of the 1930s, prior appropriation and deeper wells grew into higher esteem as water resources became more critical to economic security.¹³⁷

The doctrine did not receive constitutional regard as it did in other

states¹³⁸, but Kansas recognized that prior appropriation was necessary to develop the western half of the state and accordingly passed the Kansas Water Appropriation Act ("KWAA") of 1945, extending prior appropriation to all waters, both surface and groundwater.¹³⁹ The KWAA also recognized water rights as property rights, provided the mechanism for acquiring new water rights, designated waters rights established by or before June 28, 1945 as vested rights, and granted the chief engineer the ultimate authority over the enforcement of rights and allocation of water resources "for the benefits and beneficial uses of all of its inhabitants," not just water right owners.¹⁴⁰ The 1957 KWAA amendments further protected interests of water appropriators through classification of impairment as an unreasonable interference or degradation of the water's quality "beyond a reasonable economic limit."¹⁴¹

As a result of the KWAA, Kansas now administers water rights similarly to other western states.¹⁴² Applicants must state that they wish to divert water for a reasonable beneficial use and then have the chief engineer and Kansas' DWR perform an

"The Colorado Supreme Court has held that these constitutional provisions are meant to preserve the prior appropriation system rather than conserve water for the public or future."

inspection before a certificate guaranteeing the water right's priority date is issued.¹⁴³ Applicable beneficial uses are enumerated as fourteen distinct categories, most of them entailing domestic, irrigation, and industrial uses of water.¹⁴⁴ When two conflicting appropriators have the same priority, favored beneficial uses will have priority.¹⁴⁵ Today, like California, Kansas devotes eighty-five percent of its water towards agriculture.¹⁴⁶ However, the chief engineer may suspend a water right if the use becomes so excessive as to be unreasonable and wasteful.¹⁴⁷ Factors considered when determining if a water use constitutes waste include, but are not limited to, minimum desirable streamflows, groundwater recharge rate, the priority of existing claims, and the amount of each competing claim.¹⁴⁸

Unfortunately, this legal system alone leads to frequent overdraw problems.¹⁴⁹ Kansas statutes do not further define "beneficial use" or "waste," and its view of impairment is rooted in economics as opposed to a hydrology.¹⁵⁰ Consider all of that with an overzealous desire to develop the State's water, and the cruel irony of the KWAA becomes apparent. The KWAA allows an exponential increase in the number of granted rights,¹⁵¹ even though the law was enacted with the purpose of preventing over-drawing of groundwater.¹⁵² Since the KWAA's enactment, water right applications increased from 334 between 1945 and 1950 to 5,730 during the 1950s, 6,433 during the 1960s, and 16,226 in the 1970s.¹⁵³ However, none of those numbers accurately indicate the amount of water the State uses, as the chief engineer does not need to be informed of domestic wells.¹⁵⁴ Meanwhile, the Ogallala Aquifer, the main source for appropriated water in the State, went from three percent depletion in 1960 to thirty percent depletion today.¹⁵⁵ As such, agriculture does not receive the majority of water appropriation, as much as it is mined,¹⁵⁶ with the Ogallala Aquifer predicted to be sixty nine percent depleted by 2060.¹⁵⁷

In response to these depletion trends, Kansas has created three legal innovations, unique to western states, to address drought and declining water reserves.¹⁵⁸ The first legal innovation was the chief engineer's new authority, granted in 1978, to designate certain areas as intensive groundwater use control areas ("IGUCA").¹⁵⁹ The chief engineer may establish an IGUCA upon his or her own volition, or under his or her discretion after the requisite amount of demand within a groundwater management district, a multi-county governmental within the DWR.¹⁶⁰ The conditions necessary for the formation of an IGUCA include when:

"(a) Groundwater levels in the area in question are declining or have declined excessively; or (b) the rate of withdrawal of groundwater within the area in question equals or exceeds the rate of recharge in such area; or (c) preventable waste of water is occurring or may occur within the area in question; (d) unreasonable deterioration of the quality of water is occurring or may occur within the area in question; or (e) other conditions exist within the area in question which require regulation in the public interest."¹⁶¹

Eight such IGUCAs are now existent using the aforementioned basis.¹⁶² Once established, the chief engineer may preempt all new water rights applications, set a permissible total groundwater withdrawal level, reduce the amount of permissible groundwater withdrawal, require a rotation in groundwater use, or any necessary provision to "protect the public interest."¹⁶³

Second, in 1991 the Kansas Legislature granted the chief engineer the authority to require water right applicants to formulate a conservation plan to preserve water resources.¹⁶⁴ Such authority is discretionary, and can only be evoked if there is a finding that the conservation plan will "assure public benefit and promote public interest."¹⁶⁵

Third, and most recently in 2012, the Kansas Legislature enabled local communities to establish stricter water use standards in Local Enhanced Management Areas ("LEMA").¹⁶⁶ Whenever an area within a groundwater management district is designated as an IGUCA, community members, who presumably realize that their unregulated actions threaten the common groundwater resource, may restrict their water rights within further circumscribed areas in the IGUCA. Entering into a LEMA is completely voluntary, and subject to the chief engineer's approval.¹⁶⁷

All of Kansas' efforts to adapt to drought and dwindling resources are commendable, but likely will be insufficient in light of climate change. IGUCAs allow established, yet still unsustainable, agricultural practices to continue, never questioning if water usage is truly beneficial if it is being applied to thirsty corn.¹⁶⁸ Enabling the chief engineer to require conservation plans likewise sounds promising, but being subject to the complete discretion of the chief engineer makes the measure almost meaningless when the chief engineer's discretion is biased through the long standing myth that western water use can and should be maximized. Personal views also undermine the LEMA efforts, for as long as they entirely voluntary then it will always be immediately more economical for an individual appropriator to continue drilling, rather than limit his or her own use with the hope that neighbors will do likewise.¹⁶⁹

With recent legal adaptations to drought being lackluster, the inherent problems with prior appropriation are not addressed. Beneficial use in Kansas is still categorically defined, waste is practically undefined as unreasonable as measured by custom, and water rights still implicitly assume that a finite resource can be extracted ad infinitum. Current Kansas political leadership is unlike to address a response to any of those problems in prior appropriation are not as it is now legitimately considering the construction of an aqueduct, bringing the Missouri River to Dodge City¹⁷⁰ despite the legal and technical infeasibility of such an endeavor.¹⁷¹ Therefore, none of the currently existing models of water law can remedy California's water woes, in of themselves. Instead, the problems inherent in prior appropriation must be addressed to adapt to climate change, and new legal approaches should be considered.

IV. A CLIMATE CHANGE ADAPTIVE WATER LAW

Prior appropriation developed not as a logical extension of established common law, but as a discrete, unprecedented incident to accommodate the needs and desires of early California miners and farmers.¹⁷² As such, prior appropriation implicitly assumed that water could be utilized like any hard or soft rock mineral, with extraction levels remaining relatively constant. This system of water allocation may have seemed appropriate from the latter half of the nineteenth century and into the twentieth as the population of western U.S. cities exploded¹⁷³; however, with the circumstances surrounding climate change becoming grimmer.

It is clear that prior appropriation relies on false assumptions when the circumstances surrounding climate change become grimmer. It is reasonable to foresee more climate change induced drought, which will increasingly stress a resource that is consistently dropping in supply.¹⁷⁴ As there are no expectations that the West's water supply will increase, water supply, agricultural productivity, and other economic endeavors, are inversely related and antagonistic towards each other.¹⁷⁵ Thus prior appropriation, which enables resource exploitation based on temporal priority, is doomed to drain what water remains.¹⁷⁶

Prior appropriation must adapt if life, not just agriculture, in the western United States is to be sustained. Expanding the legal conceptions of beneficial use from a categorical, individual viewpoint to a more societal, ecological one will help make this trend occur.

A. ADAPTING PRIOR APPROPRIATION

Case law and precedent supports the changing the nature of the beneficial use element of prior appropriation.¹⁷⁷ As long as a water right is reasonably utilized for a statutorily approved, judicially sanctioned, or constitutionally protected use, then the use is not waste¹⁷⁸, and the water right is not subject to forfeiture.¹⁷⁹ The amount of water diverted must still be reasonable, but the reasonableness of a water project's use is not judged.

Extremely water intensive agricultural projects can continue because they are agricultural. Prior appropriation's shortsightedness is not surprising, considering that the doctrine was designed to do nothing more guarantee property rights with maximal water use.¹⁸⁰ Such certainty is no longer possible in a changing climate. One need only look at California's current drought to understand the prior appropriation doctrine's inflexibility to satisfy climate change's ecological demands.¹⁸¹

Despite prior appropriation's inherent problems, it is important to note that the California Supreme Court justifies

the curtailment of water rights because, "the protection and conservation of the natural resources of the state [is] in the general welfare and serve[s] a public purpose, and so constitute[s] a reasonable exercise of the police power."¹⁸² Relying on that justification, a California appellate court reasons that, "a diversion of water may be for a purpose 'beneficial' in some respect . . . does not make such use 'reasonable' when compared with demands, or even future demands, for more important uses."¹⁸³ Likewise, the Ninth Circuit Appellate Court agrees that the "beneficial use [requirement] expresses a dynamic concept, which is a 'variable according to conditions', and therefore over time."¹⁸⁴ Even the Idaho Supreme Court recognizes that "conditions might so change that [previously acceptable uses] would be an unjustifiable use of water needed for other purposes."¹⁸⁵ Thus, the concept of beneficial need not be limited to the status quo.

The fluid nature of beneficial use should not be controversial. Prior appropriation was itself a seemingly unprecedented

legal change that was necessary at the time.¹⁸⁶ Both the beneficial use and waste doctrines of water law have even changed over time, finding new uses of water not to be waste as the new methods became accepted over time.¹⁸⁷ Similar to how the "the morality of an act is a function of the state of the system at the time it is performed," the reasonableness, wastefulness, or benefit of a water project

cannot be measured unconditionally.¹⁸⁸ Rather, the water right approval process can and should consider that water projects that were once beneficial may no longer be so today.

This view of beneficial use envisions no categorical definitions of beneficial uses. Beneficial use should instead "weigh relative values and priorities."¹⁸⁹ Accordingly, agricultural, industrial, and similar water uses are not treated as de facto beneficial. Instead, individual state statutes may direct state engineers and agencies to consider future water needs before deeming a use beneficial and entitled to a water right. State courts may also act by finding proposed and current water usages wasteful, just as the courts recognized that once non-beneficial uses could become beneficial.¹⁹⁰

State statutes could also entail ranking certain crops, providing deference to more water efficient crops, and designating other crops as wasteful based on the state where appropriators wish to grow them. For example, corn in western Kansas may be unreasonable in a drought, while wheat production may be beneficial.¹⁹¹ In California, some crop productions may never again be considered beneficial as the effects of climate change worsen.¹⁹² Since "the right to water in the West is premised upon

"It is clear that prior appropriation relies on false assumptions when the circumstances surrounding climate change become grimmer."

use,” then already established, and unsustainable, water rights may be rightfully forfeited once the water use is deemed to be no longer beneficial.¹⁹³

Western states should adopt this more holistic consideration of beneficial use. California’s constitution allows for water rights to be circumscribed by statute, and California’s courts recognize that beneficial use need not be a static trait.¹⁹⁴ Idaho,¹⁹⁵ Washington,¹⁹⁶ Montana,¹⁹⁷ New Mexico,¹⁹⁸ Wyoming,¹⁹⁹ North Dakota,²⁰⁰ South Dakota,²⁰¹ and Nebraska²⁰² are similarly situated, and thus can likewise adopt a context specific concept of beneficial use. In Kansas there is no reason to believe that beneficial use could not be further redefined because water rights therein have repeatedly been restricted by statute.²⁰³ For the same reason, a context specific beneficial use doctrine should be applicable in Oregon,²⁰⁴ Nevada,²⁰⁵ Utah,²⁰⁶ and Oklahoma.²⁰⁷ Of course, there are limitations to this argument.

B. IMPEDIMENTS TO ADAPTATION

Impediments to adaptations will come from takings claims, the particularities of individual states, and the subjective nature of the word “beneficial.” As water rights are property rights, any infringement is likely to run against takings claims arguments.²⁰⁸ Wielding the Fifth Amendment to the U.S. Constitution, protesters are likely to claim that changing the conception of beneficial use will result in property takings without just compensation.²⁰⁹ However, any such takings claims in retaliation of the new beneficial use criteria are more than likely to fail.²¹⁰

Changing the meaning of beneficial use is not likely to violate the first per se taking example, as a water right is not a property interest in the water itself.²¹¹ Instead, a water right is a usufructuary right, entitling only the right to access a certain amount of water.²¹² As the first per se taking involves the state occupying a physical property interest, not usufructuary, this analysis is inapplicable.²¹³ This result is true also for the second per se taking example of deprivation of economic value.²¹⁴

To determine whether a diminution of economic value is a per se taking, a court must also balance the economic impact of the regulation on the property owner, the government’s interference in the property owner’s expectations, and the reasoning behind the regulation.²¹⁵ However, this analysis is tailored by an “extremely deferential” view in favor of the governmental action.²¹⁶ As long as there is a reasonable basis for the regulation, it is likely to be sustained. As changing the nature of beneficial use most definitely has a reasonable basis, it will not be seen as a taking per se.

Regarding the final form of a takings claim, undue total forfeiture is found when all economically beneficial use of a property interest is extinguished as a result of governmental action. A regulation or other enactment with such an effect can survive the total forfeiture analysis “only if the logically antecedent inquiry into the nature of the owner’s estate shows that the proscribed use interests were not part of his title to begin with.”²¹⁷ The governmental limitation “must inhere in the title itself,” being a mere extension of already existing limitations in the property interest in question and established property law.²¹⁸

Though altering beneficial use may manifest as new legislation or state constitutional decree, such changes are still a logical extension of the reason behind the beneficial use requirement. Furthermore, the beneficial use requirement is inherent in a water right’s title and within the background of every western state’s property jurisprudence.²¹⁹ Therefore, the creation of a climate adaptive prior appropriation scheme, even when it restrains “pre-existing uses of rights that were legal when initiated,” should not constitute an unconstitutional taking in any sense.²²⁰

As for the particularities of individual states, a re-envisioned beneficial use requirement will not likely be implemented in

Colorado, Arizona, and Texas. Colorado’s water law jurisprudence is so deferential to appropriators that any new restrictions on obtaining water rights will first have to address the state’s constitution.²²¹ This is also true for Arizona, since the Arizona Supreme Court found the retroactivity of a beneficial use statute upon vested

water rights unconstitutional.²²² Texas provides additional and unique challenges because, even if the climate change adaptive beneficial use doctrine was adopted, the State applies the rule of capture to groundwater while wholly ignoring the reasonable use doctrine.²²³ Thus, to adopt a holistic beneficial use to save groundwater during drought, Texas will have to statutorily abrogate its history of treating water like oil and gas.²²⁴

Finally, the last foreseeable legal impediment to adapting the western water right regime for a warming climate is the subjective nature of the word “beneficial” itself. Even if water law statutes across the West are accordingly amended, state water courts and agencies may still further the implicit bias of progress within natural resources law. Though flood irrigation, or luxury crops, in a drought may not seem beneficial to an environmentalist, they still are to administrative agencies. Therefore, these conflicting views may lead to implementation problems within individual states, and eventually inconsistencies among western states.

However, such problems can be remedied by articulate drafting that demonstrates what “beneficial use” is meant to

“If the western model rights model does not voluntarily change now, it will have to be coerced to do so in the future.”

further: the survival of western water resources. Courts may aid in this matter by rightfully construing prior appropriation statutes in line with long standing precedent that “beneficial use” need not be a categorical attribute.²²⁵ The fact that climate change is drastically reducing the availability of water resources makes any conflicting views on beneficial use irrelevant. If the western model rights model does not voluntarily change now, it will have to be coerced to do so in the future.

V. CONCLUSION

Prior appropriation may have built the West, but prior appropriation’s success relies upon a constant climate, an assumption that is no longer reasonable. The late economist Garrett Hardin lamented that “[t]he law, always behind the times, requires elaborate stitching and fitting to adapt it to this newly perceived aspect of the commons.”²²⁶ Here, to preserve the commons of water and agriculture in America’s west, prior appropriation must be “stitched” to adapt to climate change. California’s current legal structure is promising, but the existence of California’s current drought problems exemplifies how the current state of the law is insufficient. Also, California’s recently enacted amendments will take too long to implement and do not speak to the issue of satisfying vested water right demands as the water supply is continually depleted. Colorado’s water law regime of prior appropriation is also not likely to assist the rest of the West considering its extremely deferential stance towards maximized appropriation. As for Kansas, its efforts should be commended, but is unlikely to produce substantially better results because water rationing remains voluntary and the State believes that continuous growth is possible.

Instead, California, and the rest of the West, can readily adapt to climate change by utilizing an equally adjustable definition of beneficial use. This new vision of beneficial use will encompass environmental factors and the sustained continuation of state economies, not just what the water is used for and how much water is used. Thus, the water rights that vest outmoded and unnecessary water projects will be lost to make room for new diversions.

A climate adaptive beneficial use requirement can be adopted easily via statute in California and other states that shape the guarantees of prior appropriation with statutes and judicial oversight. However, such a solution is not likely to work in Colorado, where its water court system seemingly demands that water reserves be drained; Arizona, where the State’s Supreme Court has strictly interpreted Arizona’s authority over established water rights; and Texas, which applies the rule of capture to ground water. It is improbable that creating a more holistic beneficial use element will be free of implementation inconstancies as “[t]he irrigation lobby still has a few things going for it, mainly sentimentality, tradition, and law.”²²⁷ Thus, subjective biases will always determine what is considered a beneficial use.

Nonetheless, the legal conception of beneficial use must change, not “should.” The West simply does not have enough water to maintain constant economic growth and to keep farm-worker communities alive.²²⁸ Climate change will foreseeably deprive California’s Central Valley, the United States’ hearth of agriculture, of one of life’s most basic necessities.²²⁹ In a way, this will be a fitting end; prior appropriation, at least as it conceived today, may begin to die in the state where it was erratically conceived.



ENDNOTES: WATER, WATER, NOWHERE: ADAPTING WATER RIGHTS FOR A CHANGING CLIMATE

¹ See Lois Kazakoff, *Thank the Drought for Historic California Water Law*, S.F. CHRONICLE, Sept. 16, 2014, <http://blog.sfgate.com/opinionshop/2014/09/16/thank-the-drought-for-historic-california-water-law/>.

² Melanie Mason, *Brown Signs Bill to Regulate Pumping of Underground Water*, L.A. TIMES, Sept. 16, 2014, <http://www.latimes.com/local/politics/la-me-pol-water-brown-20140917-story.html>.

³ INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS 44 (2013), available at http://www.climatechange2013.org/images/report/WG1AR5_SummaryVolume_FINAL.pdf; Justin Gillis, *Panel’s Warning on Climate Risk: Worst is Yet to Come*, N.Y. TIMES, Mar. 31, 2014, http://www.nytimes.com/2014/04/01/science/earth/climate.html?_r=0.

⁴ Dan Cayan, et al., *Scripps Researchers Assess the Future of Climate in California*, SCRIPPS INST. OF OCEANOGRAPHY (Aug. 12, 2013), <https://scripps.ucsd.edu/news/8155>; Matt Weiser, *New Research Predicts California Droughts Will Worsen*, THE SACRAMENTO BEE, Oct. 31, 2014, <http://www.sacbee.com/news/local/environment/article3505269.html>.

⁵ Cayan et al., *supra* note 4.

⁶ See *Allen v. Cal. Water & Tel. Co.*, 29 Cal. 2d 466, 488 (1946) (“... the policy inherent in the water law of this state is to utilize all water available.”).

⁷ See Tim Barnett et al., *The Effects of Climate Change on Water Resources in the West: Introduction and Overview*, 62 CLIMATIC CHANGE 1, 6-8 (2004) (“What this work shows is that, even with a conservative climate model, current demands on water resources in many parts of the West will not be met

under plausible future climate conditions, much less the demands of a larger population and a larger economy.”); see also Roger Revelle & Paul Waggoner, *Effects of a Carbon Dioxide-Induced Climatic Change on Water Supplies in the Western United States*, CHANGING CLIMATE: REPORT OF THE CARBON DIOXIDE ASSESSMENT COMMITTEE 419, 424 (Nat’l Acad. Press 1983) (“For the postulated climatic change, supplies would greatly diminish in all regions, ranging from almost a 76% reduction in the Rio Grande region to nearly 40% in the Upper Colorado, with the result that estimated requirements would exceed supplies in the Missouri, Rio Grande, and Upper and Lower Colorado regions”).

⁸ *Irwin v. Phillips*, 5 Cal. 140, 146 (1855) (resolving a dispute between two water appropriators in favor of the first diverter).

⁹ E.g., Rules and Regulations: Kansas Water Appropriation Act, KAN. ADMIN. REGS. 5-1-1(o) (2014).

¹⁰ *State Symbols*, CAL. STATE LIBRARY, <http://www.library.ca.gov/history/symbols.html> (last visited Nov. 25, 2015).

¹¹ Hunter Schwarz, *California’s Economy is Large Enough it Could be Admitted Into G-8*, WASH. POST (Jul. 8, 2014), <http://www.washingtonpost.com/blogs/govbeat/wp/2014/07/08/californias-economy-is-large-enough-it-could-be-admitted-into-g-8/>.

¹² *California Agricultural Production Statistics*, CAL. DEP’T OF FOOD AND AG. (2014), <http://www.cdfa.ca.gov/statistics/>.

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- ¹³ California Agricultural Statistics 2012 Crop Year 1, U.S. DEP'T OF AG. NAT'L AG. STATISTICS SERV. (2012), available at http://www.nass.usda.gov/Statistics_by_State/California/Publications/California_Ag_Statistics/Reports/2012cas-all.pdf (noting California is the most productive state in the United States, leading the nation in almond, avocado, broccoli, carrot, cauliflower, grape, lettuce, milk, onion, pepper, spinach, tomato, walnut, and dozens of other commodities production).
- ¹⁴ ERIC REISNER, *CADILLAC DESERT: THE AMERICAN WEST AND ITS DISAPPEARING WATER* 9 (Penguin Books 1993) (1986).
- ¹⁵ Paul Rogers & Nicholas St. Fleur, *California Drought: Database Shows Big Difference Between Water Guzzlers and Sippers*, SAN JOSE MERCURY NEWS, Feb. 7, 2014, http://www.mercurynews.com/science/ci_25090363/california-drought-water-use-varies-widely-around-state.
- ¹⁶ Eric Holthaus, *The Thirsty West: 10 Percent of California's Water Goes to Almond Farming*, SLATE, May 14, 2014, http://www.slate.com/articles/technology/future_tense/2014/05/_10_percent_of_california_s_water_goes_to_almond_farming.html.
- ¹⁷ REISNER, *supra* note 14.
- ¹⁸ Such a high devotion of water to agriculture is consistent with other arid western states like Nevada and Colorado where seventy eight and up to eighty five percent, respectively, of water use is for irrigated crop production. LORETTA SINGLETARY, UNIV. OF NEV. COOP. EXTENSION, PUBLIC POLICIES AFFECTING WATER USE IN NEVADA: WATER ISSUES EDUCATION SERIES – No. 1, 2009, available at <http://www.unce.unr.edu/publications/files/nr/2005/FS0519.pdf>; COLO. AG. WATER ALLIANCE, MEETING COLORADO'S FUTURE WATER SUPPLY NEEDS: OPPORTUNITIES AND CHALLENGES ASSOCIATED WITH POTENTIAL AGRICULTURAL WATER CONSERVATION MEASURES (2008), available at http://cwrii.colostate.edu/other_files/Ag%20water%20conservation%20paper%20Feb%2011%20%282%29.pdf.
- ¹⁹ *Agricultural Water Use*, CAL. DEP'T OF WATER RES. (2014), <http://www.water.ca.gov/wateruseefficiency/agricultural/>.
- ²⁰ Holthaus, *supra* note 16.
- ²¹ D.J. Waldie, *Drought by the Numbers: Where does California Water Go?*, KCET, Feb. 10, 2014, 2:00 PM, http://www.kcet.org/updaily/socal_focus/commentary/where-we-are/in-a-season-of-drought-where-does-the-water-go.html.
- ²² *Id.*; Rogers & St. Fleur, *supra* note 15.
- ²³ *But see* Rogers & St. Fleur, *supra* note 15 (reporting on a "2004 law mandating meters statewide by 2025").
- ²⁴ *Water Efficiency Strategies*, U.S. ENVTL. PROT. AGENCY (2012), http://water.epa.gov/infrastructure/sustain/wec_wp.cfm.
- ²⁵ Note that from thousands to billions of gallons of water in California are also being repeatedly wasted due to years of neglected infrastructure. *See, e.g.*, Jonathan Lloyd & Kevin LaBeach, *Water Main Breaks Near LAX*, NBC4 S. CAL., Oct. 3, 2014, <http://www.nbclosangeles.com/news/local/Water-Main-Break-LAX-Century-Aviation-LADWP-278003492.html>; *Water Main Break Flood's Sunset Strip in West Hollywood*, CBS L.A., Sept. 26, 2014, <http://losangeles.cbslocal.com/2014/09/26/crews-respond-to-water-main-break-on-sunset-boulevard-in-weho/>; Lisa Krieger, *California Drought: Bay Area Loses Billions of Gallons to Leaky Pipes*, SAN JOSE MERCURY NEWS, Aug. 16, 2014, http://www.mercurynews.com/drought/ci_26350962/california-drought-bay-area-loses-billions-gallons-leaky. This waste is particularly concerning when compounded with the drought of 2013 summer going into 2014 being the worst in recorded history. Daniel Swain et al., *The Extraordinary California Drought of 2013/2014: Character, Context, and the Role of Climate Change*, 95 BULLETIN OF THE AM. METEOROLOGICAL SOC'Y No. 9 (Special Supp.) S3-S7 (2014).
- ²⁶ *See* Swain et al., *supra* note 25 at S3-S7.
- ²⁷ *See id.* at S7.
- ²⁸ *See* Kevin Trenberth, *Changes in Precipitation with Climate Change*, 47 CLIMATE RESEARCH 123 (2011), available at http://www.int-res.com/articles/cr_oa/c047p123.pdf.
- ²⁹ *See* Richard Howitt et al., *Economic Analysis of the 2014 Drought for California Drought*, UNIV. OF CAL. DAVIS CTR. FOR WATERSHED SCIENCES. (Jul. 23, 2014), available at https://watershed.ucdavis.edu/files/biblio/DroughtReport_23July2014_0.pdf.
- ³⁰ Ker Than, *Causes of California Drought Linked to Climate Change*, *Stanford Scientists Say*, STAN. NEWS, Sept. 30, 2014, <http://news.stanford.edu/news/2014/september/drought-climate-change-092914.html> (citing *Drought Impact Study: California Agriculture Faces Greatest Water Loss Ever Seen*, UNIV. OF CAL. DAVIS NEWS AND INFO., Jul. 15, 2014, http://www.news.ucdavis.edu/search/news_detail.lasso?id=10978).
- ³¹ *See* Gregg Garfin et al., *Chapter 20 Southwest*, CLIMATE CHANGE IMPACTS IN THE U.S. 462, 463-67 (NAT'L CLIMATE ASSESSMENT 2014), available at <http://nca2014.globalchange.gov/report/regions/southwest#statement-17096>.
- ³² Jennifer Medina, *With Dry Taps and Toilets, California Drought Turns Desperate*, N.Y. TIMES, Oct. 2, 2014, http://www.nytimes.com/2014/10/03/us/california-drought-tulare-county.html?_r=0; *see also* East Porterville Residents Without Water as Wells Go Dry During California Drought, CBS SACRAMENTO, Aug. 27, 2014, <http://sacramento.cbslocal.com/2014/08/27/porterville-residents-without-water-as-wells-go-dry-during-california-drought/>; *see also* Paul Rogers, *California Drought: 17 Communities Could Run Out of Water Within 60 to 120 Days, State Says*, SAN JOSE MERCURY NEWS, Jan. 28, 2014, http://www.mercurynews.com/science/ci_25013388/california-drought-17-communities-could-run-out-water.
- ³³ Diana Marcum, *'Hi, Do You Have Water?' In a Central California Town, Answer is Often No*, L.A. TIMES, Sept. 18, 2014, <http://www.latimes.com/local/great-reads/la-me-cl-east-porterville-20140918-story.html#page=1>.
- ³⁴ *See* Toby Ault et al., *Assessing the Risk of Persistent Drought Using Climate Model Simulations and Paleoclimate Data*, 27 J. CLIMATE 20 7529 (2014); *see also* Cayan, et al., *supra* note 4; *see also* Garfin et al., *supra* note 33; *see also* Maria Stoecklin-Marais, *Heat-Related Illness Knowledge and Practices among California Hired Farm Workers in the MICASA Study*, 51 INDUS. HEALTH 47 (2013).
- ³⁵ *See* Kazakoff, *supra* note 1.
- ³⁶ *See* Weiser, *supra* note 4.
- ³⁷ Press Release, Office of Governor Edmund G. Brown Jr., Governor Brown Signs Historic Groundwater Legislation (Sept. 16, 2014), <http://www.gov.ca.gov/news.php?id=18701>.
- ³⁸ *See* Assembly Bill 1739, ch. 347, 2013-2014, Reg. Sess. (Cal. 2014).
- ³⁹ *See id.*
- ⁴⁰ *See* Senate Bill 1168, ch. 346, 2013-2014, Reg. Sess. (Cal. 2014).
- ⁴¹ *See* Senate Bill 1319, ch. 348, 2013-2014, Reg. Sess. (Cal. 2014).
- ⁴² *See* Assembly Bill 1739; *see also* Senate Bill 1168; *see also* Senate Bill 1319.
- ⁴³ *See* Eric Holthaus, *Welcome to the Thirsty West*, SLATE (Mar. 6, 2014), http://www.slate.com/articles/technology/future_tense/2014/03/drought_crisis_arizona_may_be_california_s_future.html.
- ⁴⁴ *See* Cayan et al., *supra* note 4.
- ⁴⁵ *See* Proposition 1, Assemb. B. 1471, 2013-2014, Reg. Sess. 14, 26 (Cal. 2014), available at <http://vig.cdn.sos.ca.gov/2014/general/en/pdf/text-of-proposed-law-prop1.pdf> (finding "This measure provides funding to implement the three objectives of the California Water Action Plan which are more reliable water supplies, the restoration of important species and habitat, and a more resilient and sustainably managed water infrastructure").
- ⁴⁶ *See id.* at 17.
- ⁴⁷ *See* Irwin v. Phillips, 5 Cal. 140, 146 (1855).
- ⁴⁸ *See* Burke Griggs, *Lessons from Kansas: A More Sustainable Groundwater Management Approach*, STAN. WOODS INST. FOR THE ENV'T, (Aug. 18, 2014), <http://waterinthewest.stanford.edu/resources/forum/lessons-kansas-more-sustainable-groundwater-management-approach>.
- ⁴⁹ Michael Toll, *Reimagining Western Water Law: Time-Limited Water Right Permits Based on a Comprehensive Beneficial Use Doctrine*, 82 U. COLO. L. REV. 595, 599 (2011) (explaining the origin and evolution of prior appropriation).
- ⁵⁰ The United States acquired possession of California shortly after in the Treaty of Guadalupe Hidalgo, but California would not become a state for two more years. *City of Berkeley v. Superior Court*, 26 Cal. 3d 515, 521 (1980); *Standard Oil Co. of Cal. v. Johnson*, 10 Cal. 2d 758, 760 (1938).
- ⁵¹ *See* Samuel Wiel, *WATER RIGHTS IN THE WESTERN STATES* 4-7 (Bancroft-Whitney Co. 1908) (1878), available at <http://babel.hathitrust.org/cgi/pt?id=uc1.b4160067;view=1up;seq=79>.
- ⁵² Lux v. Haggin, 69 Cal. 255, 313 (1884) ("the running waters of California were not dedicated to the common use of all the inhabitants in such sense that they could not be deprived of the common use.").
- ⁵³ *Id.* at 259-60.
- ⁵⁴ *Id.*; Wiel, *supra* note 51, at 4-5.
- ⁵⁵ Wiel, *supra* note 51, at 7.

⁵⁶ Toll, *supra* note 49.

⁵⁷ Eddy v. Simpson, 3 Cal. 249, 253 (1853) (noting the court adhered strictly to riparian water law despite “the novel questions growing out of the peculiar enterprises in which many of the people of this state are embarked.”).

⁵⁸ In mining, the first person to find a valuable mineral gains the rights to exploit it, and exclude others. See Irwin v. Phillips, 5 Cal. 140, 146 (1855) (reasoning that recent mining customs “have so firmly fixed as that they have come to be looked upon as having the force and effect of *res judicata*. Among these the most important are the rights of miners to be protected in the possession of their selected localities, and the right of those who, by prior appropriation, have taken the water from their natural beds . . . to supply the necessities of gold diggers, and without which the most important interests of the mineral region would remain without development”).

⁵⁹ *Id.*

⁶⁰ Hill v. King, 8 Cal. 336, 338 (1857) (holding that a prior appropriator’s water quality concerns may preempt subsequent miners’ wishes to operate).

⁶¹ Jennison v. Kirk, 98 U.S. 453, 457 (1878) (finding that a senior water right holder causes no injury to a junior right holder simply by diverting the water entitled to the former).

⁶² Though Nebraska may not normally be described as a western state, it is included within this paper’s consideration as Nebraska straddles the 100th meridian, the traditional dividing line between the eastern and western halves of the United States. This treatment will likewise be extended to North Dakota, South Dakota, Kansas, Oklahoma, and Texas.

⁶³ COLO. CONST. art. XVI, § 6; NEB. CONST. art. XV, § 6.

⁶⁴ KAN. STAT. ANN. § 82a-714 (2014).

⁶⁵ Montana v. Wyoming, 131 S. Ct. 1765, 1772 (2011) (holding that Wyoming did not breach the Yellowstone River Compact with Montana by allowing pre-1950 water right holders to switch from flood to sprinkler irrigation).

⁶⁶ See Janet Neuman, *Beneficial Use, Waste, and Forfeiture: the Inefficient Search for Efficiency in Western Water Use*, 28 ENVTL. L. 919, 920 (1998).

⁶⁷ Christine Klein, *The Constitutional Mythology of Western Water Law*, 14 VA. ENVTL. L.J. 343, 364–67 (1995).

⁶⁸ See, e.g., Stevenson v. Steele, 453 P.2d 819, 826 (1969) (respecting the non-diversionary water right guaranteeing winter livestock watering); see also Diane Brownlee, *The Public Vote in the Game of Water Wars: An Unquenchable Thirst to Define and Implement “Public Values” in Western Water Laws*, 70 UMKC L. Rev. 647, 655 (2002) (discussing the changing public goals of western water law); see *id.* at 349 (“It is beneficial use, and not diversion, that is the constitutional hallmark of a water right”).

⁶⁹ Neuman, *supra* note 66, at 923–24; see also, e.g., NEV. REV. STAT. § 533.035 (1929); N.M. STAT. ANN. § 72-1-2 (1997); OR. REV. STAT. § 540.610(1) (2005); WYO. STAT. ANN. § 41-3-101 (1981); N.D. CENT. CODE ANN. § 61-04-01.2 (1997); UTAH CODE ANN. § 73-1-3 (1943); OKLA. STAT. tit. 82, § 105.2(A) (1988); S.D. CODIFIED LAWS § 46-1-8 (1960).

⁷⁰ Toll, *supra* note 49, at 617.

⁷¹ *Id.* at 603-04; see also Neuman, *supra* note 66, at 925.)

⁷² See, e.g., Dep’t of Parks v. Idaho Dep’t of Water Admin., 530 P.2d 924, 927-28 (Idaho 1974) (allowing Idaho to reserve a water right in in-stream use to preserve the aesthetic and recreational aspects of the water for posterity); see also Klein, *supra* note 67, at 349 (“beneficial use has a flexible meaning, generally reflecting the dominant public interests of the time,” and therefore, “uses considered beneficial today may not be so regarded in the future”).

⁷³ Mark Kanazawa, *Efficiency in Western Water Law: The Development of the California Doctrine, 1850 – 1911*, 27 J. OF LEGAL STUDIES 159, 159 (1998).

⁷⁴ Coffin v. Left Hand Ditch Co., 6 Colo. 443, 447 (Colo. 1882).

⁷⁵ Griggs, *supra* note 48.

⁷⁶ CAL. CONST. art. X, § 5; see also CAL. WATER CODE § 102 (1943).

⁷⁷ See CAL. CONST. art. X, § 2; CAL. WATER CODE § 100 (1943); City of Barstow v. Mojave Water Agency, 5 P.3d 853, 869 (Cal. 2000) (holding that a court may not ignore priority or vested rights when adjudicating water disputes in a drought); Imperial Irrigation Dist. v. State Water Res. Control Bd., 225 Cal. App. 3d 548, 572 (1990) (affirming that a court may give deference to the state agency’s determination that a water district was water unreasonably).

⁷⁸ See CAL. CONST. art. X, § 2.

⁷⁹ Such direction has often come in the form of statutes and judicial opinions. See, e.g., CAL. WATER CODE § 1058 (1970); City of Barstow, 5 P.3d at 863-64.

⁸⁰ See *The Water Rights Process*, CAL. ENVTL. PROT. AGENCY, STATE WATER RES. CONTROL BD. (2014), http://www.waterboards.ca.gov/waterrights/board_info/water_rights_process.shtml.

⁸¹ See CAL. WATER CODE § 100 ET SEQ.; Light v. State Water Res. Control Bd., 226 Cal. App. 4th 1463, 1482 (2014) (supporting the determination in Cal.

Farm Bureau Fed’n v. State Water Res. Ctrl. Bd., 247 P.3d 112, 118 (Cal. 2011), that the Board’s role is acting “. . . to prevent unreasonable and wasteful uses of water, regardless of the claim of right under which the water is diverted.”).

⁸² CAL. ENVTL. PROT. AGENCY, *supra* note 80; see also CAL. WATER CODE § 386 (1982).

⁸³ See CAL. ENVTL. PROT. AGENCY, *supra* note 80.

⁸⁴ See *id.*

⁸⁵ *Id.*

⁸⁶ See *California Water Districts & Associations*, UNIV. OF CAL. RIVERSIDE (Aug. 8, 2014), <http://library.ucr.edu/wrca/grants/districts.html> (listing the currently existing irrigation districts); see also CAL. DEP’T OF WATER RES., IRRIGATION AND WATER STORAGE DISTRICTS IN CALIFORNIA: 1964 (1965), available at http://www.water.ca.gov/waterdatalibrary/docs/historic/Bulletins/Bulletin_21/Bulletin_21__1964.pdf (detailing the irrigation districts that existed in California in 1964).

⁸⁷ See, e.g., City of Barstow v. Mojave Water Agency, 5 P.3d 853, 864 (Cal. 2000) (reiterating that “no one can have a protectable interest in the unreasonable use of water, and that holders of water rights must use water reasonably and beneficially”).

⁸⁸ See, e.g., *id.*; see also Turlock Irrigation Dist. v. Zanker, 140 Cal. App. 4th 1047, 1052, 1060 (2006) (limiting a town’s water use to that which is reasonable); Imperial Irrigation Dist. v. State Water Res. Control Bd., 225 Cal. App. 3d 548, 573 (1990).

⁸⁹ See Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist., 45 P.2d 972, 988 (Cal. 1935) (holding that vested water rights may be validly forfeited for unreasonable or non-beneficial use); Gin S. Chow v. City of Santa Barbara, 22 P.2d 5, 16 (Cal. 1933) (recognizing that a state may validly limit water uses to those that are beneficial).

⁹⁰ See Nat’l Audubon Soc’y v. Superior Court, 658 P.2d 709, 712 (Cal. 1983) (holding that the State must consider ecological values of Mono Lake when determining whether the city of Los Angeles may divert water therefrom).

⁹¹ See *id.* at 718.

⁹² *Id.* at 709.

⁹³ See *id.*

⁹⁴ Tulare Irrigation Dist., 45 P.2d at 997.

⁹⁵ See Witherill v. Brehm, 279 P. 432, 435 (Cal. 1929) (affirming that an individual appropriator need not divert water in a way prescribed by other appropriators); Joerger v. Pac. Gas & Elec. Co., 276 P. 1017, 1030 (Cal. 1929) (recognizing that an appropriator is only bound to make reasonable and beneficial use of the water, not to appropriate it by any certain method); Barrows v. Fox, 32 P. 811, 812 (Cal. 1893) (holding that an appropriator cannot be compelled to use iron pipes as opposed to ditches).

⁹⁶ See Joerger, 276 P. at 1030 (“While an appropriator can claim only the amount which is necessary to properly supply his needs, and can permit no water to go to waste, he is not bound, as here claimed, to adopt the best method for utilizing the water or take extraordinary precautions to prevent waste. He is entitled to make a reasonable use of the water according to the custom of the locality and as long as he does so, other persons cannot complain of his acts.”).

⁹⁷ Compare Stinson Canal & Irrigation Co. v. Lemoore Canal & Irrigation Co., 188 P. 77, 82 (Cal. App. 3d 1919) (recognizing that water diversion projects customarily lose up fifty percent of their water from evaporation and seepage), with Erickson v. Queen Valley Ranch Co., 22 Cal. App. 3d 578, 585 (1971) (deeming a water project, that would lose over eighty percent of its water due to seepage, to be wasteful).

⁹⁸ See Allen v. Cal. Water & Tel. Co., 176 P.2d 8, 19, 20-21 (Cal. 1946).

⁹⁹ See *supra* text accompanying notes 39-45.

¹⁰⁰ City of Barstow v. Mojave Water Agency, 5 P.3d 853, 869 (Cal. 2000).

¹⁰¹ Note also that even if the public trust doctrine were to be used to alleviate California’s current drought, such solution would not be possible for the rest of the West where the doctrine’s application in ecological realms has been largely rejected. See Phillips Petroleum Co. v. Mississippi, 484 U.S. 469, 487 (1988) (explaining that courts have consistently limited the public trust doctrine to navigability and other transportation issues).

¹⁰² See Gregory J. Hobbs, Jr., *Colorado Water Law: An Historical Overview*, 1 U. DENV. WATER L. REV. 1, 6 (1997).

¹⁰³ See Michael Brescia, *Spanish Water Law*, ENCYCLOPEDIA OF THE GREAT PLAINS (2011), <http://plainshumanities.unl.edu/encyclopedia/doc/egp.wat.030> (explaining early influences of Spanish water law on Colorado before English Common Law was introduced).

¹⁰⁴ See *id.*

¹⁰⁵ Burke W. Griggs, *Beyond Drought: Water Rights in the Age of Permanent Depletion*, 62 U. KAN. L. REV. 1263, 1272 (2014).

- ¹⁰⁶ See Gregory A. Hicks & Devon G. Peña, *Community Acequias in Colorado's Rio Culebra Watershed: A Customary Commons in the Domain of Prior Appropriation*, 74 U. COLO. L. REV. 387, 399 (2003).
- ¹⁰⁷ See Irwin v. Phillips, 5 Cal. 140, 146 (1855).
- ¹⁰⁸ See Hicks & Peña, *supra* note 106; see also COLO. CONST. art. XVI, §§ 5–6.
- ¹⁰⁹ See Coffin v. Left Hand Ditch Co., 6 Colo. 443, 447 (Colo. 1882) (“The territorial legislature in 1864 expressly recognizes [prior appropriation] . . . This provision remained in force until the adoption of the constitution; it was repealed in 1868, but the repealing act re-enacted it verbatim.”).
- ¹¹⁰ Joseph L. Sax, *The Constitution, Property Rights and the Future of Water Law*, 61 U. COLO. L. REV. 257, 268 (1990).
- ¹¹¹ A-B Cattle Co. v. United States, 196 Colo. 539, 545 (1978) (finding that one has no claim to rely on the natural silt that would come with a free flowing stream).
- ¹¹² See Griggs, *supra* note 105, at 1273.
- ¹¹³ See *id.* at 1274.
- ¹¹⁴ *Id.*
- ¹¹⁵ See Water Right Determination and Administration Act of 1969, COLO. REV. STAT. ANN. § 37-92-101 (1969).
- ¹¹⁶ See COLO. REV. STAT. ANN. § 37-92-201(1)(a-g) (2009); see also Colo. Rev. Stat. Ann. § 37-92-203(a) (1983).
- ¹¹⁷ COLO. REV. STAT. ANN. § 37-92-302(1)(a) (2012).
- ¹¹⁸ James N. Corbridge, Jr., *Historical Water Use and the Protection of Vested Rights: A Challenge for Colorado Water Law*, 69 U. COLO. L. REV. 503, 505 (1998).
- ¹¹⁹ *Id.*
- ¹²⁰ See COLO. REV. STAT. ANN. § 37-92-103(6) (2014).
- ¹²¹ See COLO. CONST. art. XVI, §§ 5–6 (providing that “[t]he water of every natural stream . . . is . . . declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation . . .,” and that “[t]he right to divert the unappropriated waters of any natural stream to beneficial uses shall never be denied.”).
- ¹²² See People v. Emmert, 198 Colo. 137, 142 (1979) (holding that “section 5, Article XVI of the Colorado Constitution was primarily intended to preserve the historical appropriation system of water rights upon which the irrigation economy in Colorado was founded, rather than to assure public access to waters for purposes other than appropriation.”).
- ¹²³ *Burlington Ditch Reservoir & Land Co. v. Metro Wastewater Reclamation Dist.*, 256 P.3d 645, 661 (Colo. 2011).
- ¹²⁴ See COLO. REV. STAT. § 37-90-102(1) (2003).
- ¹²⁵ See, e.g., COLO. REV. STAT. ANN. § 37-92-103(4) (2014) (providing only that the beneficial use of water is a reasonable and adequate amount without waste; such uses include an impoundment for storage, wildlife, recreation, and that limited amount necessary to maintain minimum desirable stream flows).
- ¹²⁶ See COLO. CONST. art. XVI, § 6.
- ¹²⁷ E.g., *Cache La Poudre Reservoir Co. v. Water Supply & Storage Co.*, 25 Colo. 161, 170 (1898) (resolving a dispute in favor of a downstream appropriator that took abandoned water).
- ¹²⁸ *Mun. Subdistrict, N. Colorado Water Conservancy Dist. v. Getty Oil Exploration Co.*, 997 P.2d 557, 563 (Colo. 2000); *Gardner v. State*, 200 Colo. 221, 226 (1980).
- ¹²⁹ *La Plata River & Cherry Creek Ditch Co. v. Hinderlider*, 25 P.2d 187, 188 (1933).
- ¹³⁰ See *A-B Cattle Co. v. United States*, 589 P. 2d 57, 61 (Colo. 1978).
- ¹³¹ *Hinderlider*, 25 P.2d at 132.
- ¹³² See JEFF LUKAS ET AL., UNIV. OF COLO., CLIMATE CHANGE IN COLORADO: A SYNTHESIS TO SUPPORT WATER RESOURCES MANAGEMENT AND ADAPTATION 84 (2d ed. Aug. 4, 2014), available at http://www.colorado.edu/climate/co2014report/Climate_Change_CO_Report_2014_FINAL.pdf (“Most projections of future hydrology for Colorado’s river basins show decreasing annual runoff and less overall water supply”).
- ¹³³ Jon Peck, *Property Rights in Groundwater – Some Lessons from the Kansas Experience*, 12 KAN. J. L. & POL’Y 493, 495 (2003).
- ¹³⁴ Kan. Statutes, ch. 58. (1876).
- ¹³⁵ Griggs, *supra* note 105, at 1275–76.
- ¹³⁶ *Id.*
- ¹³⁷ *Id.* at 1276; Robert Adler, *Drought, Sustainability, and the Law*, 2 SUSTAINABILITY 2176, 2182–83 (2010).
- ¹³⁸ See, e.g., Cal. Const. art. X, § 5; see also Colo. Const. art. XVI, §§ 5–6.
- ¹³⁹ Kan. L. 1945, ch. 390, § 1; Griggs, *supra* note 109, at 1279.
- ¹⁴⁰ See Kan. Stat. Ann. § 82a-714; see also Kan. Stat. Ann. § 82a-701(d), (g) (2009); see also Kan. Stat. Ann. § 82a-706 (1957).
- ¹⁴¹ Kan. Stat. Ann. § 82a-711 (1999).
- ¹⁴² See, e.g., Idaho Code Ann. § 39-3607 (2013); see also Cal. Water Code § 123 (1957); Wash. Rev. Code Ann. §§ 90.03.010 (1917).
- ¹⁴³ Kan. Stat. Ann. § 82a-714(a).
- ¹⁴⁴ Kan. Admin. Regs. 5-1-1(o).
- ¹⁴⁵ The preferred beneficial uses are domestic, municipal, irrigation, industrial, recreational, and water power uses, respectively. Kan. Stat. Ann. § 82a-707(b) (2009).
- ¹⁴⁶ *Water Use Reporting*, KAN. DEP’T OF AG., <http://agriculture.ks.gov/divisions-programs/dwr/water-appropriation/water-use-reporting> (last visited Nov. 14, 2014).
- ¹⁴⁷ Kan. Stat. Ann. § 42-306 (1891); Kan. Admin. Regs. 5-5-7 (1990).
- ¹⁴⁸ Kan. Stat. Ann. § 82a-711(b).
- ¹⁴⁹ See Lindsay Wise, *A Drying Shame: With the Ogallala Aquifer in Peril, the Days of Irrigation for Western Kansas Seem Numbered*, KAN. CITY STAR, July 24, 2015, <http://www.kansascity.com/news/state/kansas/article28640722.html> (recounting how water overdraw has led to forced restrictions and increased pumping prices for Kansas farmer); see also Amy Bickel, *Western Kansas Farmers Worry as Ogallala Aquifer Disappears*, TOPEKA CAPITAL J., July 22, 2014, <http://cjonline.com/news/business/2014-07-22/western-kansas-farmers-worry-ogallala-aquifer-disappears> (connecting Kansas’ rural depopulation with overdrawn water reserves).
- ¹⁵⁰ Note that the categorical beneficial uses recognized in Kansas prioritize development, agricultural in particular, whereas recreational beneficial uses, which could potentially encompass ecologically minded projects, are the second to the last in preference. See Kan. Stat. Ann. § 82a-707(b).
- ¹⁵¹ John Peck, *Groundwater Management in Kansas: A Brief History and Assessment*, 15 KAN. J. L. & POL’Y 441, 442–43 (2006).
- ¹⁵² Griggs, *supra* note 105, at 1280.
- ¹⁵³ *Id.* at 1285 (citing John Peck, *Groundwater Management in Kansas: A Brief History and Assessment*, 15 KAN. J. L. & POL’Y 441, 443 (2006)).
- ¹⁵⁴ KAN. STAT. ANN. § 82a-714(d).
- ¹⁵⁵ David Steward et al., *Tapping Unsustainable Groundwater Stores for Agricultural Production in the High Plains Aquifer of Kansas, Projections to 2110*, 110 PROCEEDINGS OF THE NAT’L ACAD. OF SCIENCES OF THE U.S. OF AM. E3477, E3478 (2013).
- ¹⁵⁶ Peck, *supra* note 151, at 494.
- ¹⁵⁷ Steward et al., *supra* note 155, at E3478–E3479.
- ¹⁵⁸ KAN. STAT. ANN. § 82a-1041 (2012); KAN. STAT. ANN. § 82a-733(a) (1991); KAN. STAT. ANN. § 82a-1036 et seq. (1978).
- ¹⁵⁹ KAN. STAT. ANN. § 82a-1036 et seq. (1978); Fact Sheet, Kan. Dep’t of Ag., 2009, available at <http://agriculture.ks.gov/docs/default-source/igucas/igucas-factsheet.pdf?sfvrsn=2>.
- ¹⁶⁰ KAN. STAT. ANN. §§ 82a-1036, 82a-1038(a) (2010).
- ¹⁶¹ *Id.* at § 82a-1036.
- ¹⁶² Fact Sheet, KAN. DEP’T OF AG., *supra* note 165 (recounting the history of McPherson, Pawnee Valley, Burrton, Lower Smoky Hill, Arkansas, Upper Smoky Hill, Hays, and Walnut Creek IGUCAs).
- ¹⁶³ KAN. STAT. ANN. § 82a-1038(b).
- ¹⁶⁴ *Id.* at § 82a-733(a).
- ¹⁶⁵ *Id.*
- ¹⁶⁶ KAN. STAT. ANN. § 82a-1041.
- ¹⁶⁷ *Id.*
- ¹⁶⁸ See Meg Wilcox & Courtney Piper, *New Report: Water and Climate Risks are a Growing Threat to U.S. Corn Production*, CERES, Jun. 11, 2014, <http://www.ceres.org/press/press-releases/new-report-water-and-climate-risks-are-a-growing-threat-to-u.s.-corn-production>; see also Mark Bittman, *Unsustainable Living*, N.Y. TIMES, Apr. 25, 2014, http://www.nytimes.com/2014/04/27/books/review/the-ogallala-road-by-julene-bair.html?_r=0.
- ¹⁶⁹ For further evidence that voluntary restraints are not enticing, consider that there is only one LEMA in Kansas. *Local Enhanced Management Areas*, KAN. DEP’T OF AG., <https://agriculture.ks.gov/divisions-programs/dwr/managing-kansas-water-resources/local-enhanced-management-areas> (last visited Oct. 27, 2015).
- ¹⁷⁰ Tim Carpenter, *Kansas’ 50-Year Water Plan Nears Completion*, TOPEKA CAPITOL J., Nov. 12, 2014, <http://cjonline.com/news/state/2014-11-12/kansas-50-year-water-plan-nears-completion>.
- ¹⁷¹ John Peck, *Legal Constraints on Diverting Water from Eastern Kansas to Western Kansas*, 30 KAN. L. REV. 159, 193–214 (1982).
- ¹⁷² Irwin v. Phillips, 5 Cal. 140, 146 (1855) (holding that prior appropriation, rather than riparian law, controls in a dispute between miners because California has “heartily encouraged” mining).

¹⁷³ REISNER, *supra* note 14.

¹⁷⁴ See Barnett et al., *supra* note 7; see also Robert Adler, *Climate Change and the Hegemony of State Water Law*, 29 STAN. ENVTL. L.J. 1, 10 (2010) (arguing that “both legal and technological institutions governing water law and management will have to respond in ways that are sufficiently flexible to address a wide range of possible future outcomes”).

¹⁷⁵ See Garrett Hardin, *The Tragedy of the Commons*, 162 SCI. 1243, 1243–43 (1968).

¹⁷⁶ See Donald MacIntyre, *The Prior Appropriation Doctrine in Montana: Rooted in Mid-Nineteenth Century Goals—Responding to Twenty-First Century Needs*, 55 MONT. L. REV. 303, 304 (1994) (explaining that the assumptions of plentiful underlying prior appropriation are no longer reasonable, and that appropriators are now relying on finite water resources).

¹⁷⁷ *United States v. Alpine Land & Reservoir Co.* (Alpine Land), 697 F.2d 851, 855 (9th Cir. 1983) (citations omitted), cert. denied sub nom., *Pyramid Lake Paiute Tribe v. Truckee-Carson Irrigation Dist.*, 464 U.S. 863 (1983) (holding that Nevada State Engineer can consider farmers’ applications to change the place of diversion, or manner or place of use, despite the federal government’s objections); *Dep’t of Parks v. Idaho Dep’t of Water Admin.*, 530 P.2d 924, 931 (Idaho 1974); *Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist.*, 45 P.2d 972, 988 (Cal. 1935).

¹⁷⁸ See generally Brownlee, *supra* note 68, at 649.

¹⁷⁹ See Neuman, *supra* note 66.

¹⁸⁰ Toll, *supra* note 49, at 616 (referencing Steven J. Shupe, *Waste in Western Water Law: A Blueprint for Change*, 61 OR. L. REV. 483, 483 (1982)).

¹⁸¹ See Weiser, *supra* note 4 (quoting John Laird, secretary of the California Natural Resources Agency, “Unless we take strong action, we won’t have the existing water be reliable for the future”).

¹⁸² *Tulare Irrigation Dist.*, 45 P.2d at 988.

¹⁸³ *Imperial Irrigation Dist. v. State Wat. Res. Control Bd.*, 275 Cal. Rptr. 250, 266 (Cal. Ct. App. 1990).

¹⁸⁴ *United States v. Alpine Land & Reservoir Co.* (Alpine Land), 697 F.2d 851, 855 (9th Cir. 1983) (citations omitted), cert. denied sub nom. (quoting *Farmers Highline Canal & Reservoir Co. v. City of Golden*, 272 P.2d 629, 634 (1954); *Pyramid Lake Paiute Tribe v. Truckee-Carson Irrigation Dist.*, 464 U.S. 863 (1983) (holding that Nevada State Engineer can consider farmers’ applications to change the place of diversion, or manner or place of use, despite the federal government’s objections)).

¹⁸⁵ *Dep’t of Parks v. Idaho Dep’t of Water Admin.*, 530 P.2d 924, 931 (Idaho 1974).

¹⁸⁶ See *Irwin v. Phillips*, 5 Cal. 140, 146 (Cal. 1855); see also *Coffin v. Left Hand Ditch Co.*, 6 Colo. 443, 447 (Colo. 1882).

¹⁸⁷ See Klein, *supra* note 67, at 350; see also *Dep’t of Parks*, 530 P.2d at 931 (extending the beneficial use requirement to include recreation).

¹⁸⁸ Hardin, *supra* note 175, at 1245.

¹⁸⁹ Toll, *supra* note 49, at 619.

¹⁹⁰ See *United States v. Alpine Land & Reservoir Co.*, 697 F.2d 851, 855 (9th Cir. 1983); *Dep’t of Parks*, 530 P.2d at 932.

¹⁹¹ See Wilcox & Piper, *supra* note 168.

¹⁹² See Holthaus, *supra* note 16.

¹⁹³ Klein, *supra* note 67, at 347.

¹⁹⁴ See CAL. CONST. art. X, § 5; see also *Tulare Irrigation Dist. v. Lindsay-Strathmore Irrigation Dist.*, 45 P.2d 972, 988 (Cal. 1935); *Imperial Irrigation Dist. v. State Wat. Res. Control Bd.*, 275 Cal. Rptr. 250, 266 (Cal. Ct. App. 1990).

¹⁹⁵ See IDAHO CONST. art. XV, § 3; see also IDAHO CODE ANN. § 39-3607 (2013); see also *Dep’t of Parks*, 530 P.2d at 931 (Bakes, J. concurring).

¹⁹⁶ See WASH. CONST. art. XXI, § 1; see also WASH. REV. CODE ANN. §§ 90.03.010 (LexisNexis 1917), 90.14.020 (LexisNexis 1967), 90.46 et seq.; *Lummi Indian Nation v. State*, 241 P.3d 1220, 1231 (Wash. 2010) (confirming that the State may statutorily modify water rights so as to codify once unrecognized interests); *In re Determination of Rts. of Use of Surface & Ground Waters of Marshall Lake Etc.*, 852 P.2d 1044, 1049 (Wash. 1993) (stating that water rights are limited to beneficial uses).

¹⁹⁷ See MONT. CONST. art. IX, § 3; see also MONT. CODE ANN. § 85-2-101(1) (1997); see also *In re Adjudication of Water Rts. of Clark Fork River*, 833 P.2d 1120, 1122 (Mont. 1992) (citing *Ranch, Inc. v. Pitsch*, 666 P.2d 215, 217 (Mont. 1983) (“It is a fundamental principle in Montana that appropriation of water is based on its beneficial use; when the owner of the water right abandons or ceases to use the water for its beneficial use, the right ceases”).

¹⁹⁸ N.M. CONST. art. XVI, § 3; see also N.M. STAT. ANN. § 72-1-2 (1953); *Jicarilla Apache Tribe v. United States*, 657 F.2d 1126, 1133 (10th Cir. 1981)

(explaining that New Mexico’s beneficial use requirement is meant to ensure that water use is preserved for maximum benefit); *State ex rel. Erickson v. McLean*, 308 P.2d 983, 988 (N.M. 1957) (concluding that a water appropriation right is lost for non-beneficial use); see also Bliss, *State ex rel. v. Dority*, 225 P.2d 1007, 1017 (N.M. 1950) (holding that state control extends to the protection of groundwater).

¹⁹⁹ See WYO. CONST. art. I, § 31, art. VIII, §§ 1, 3; see also WYO. STAT. ANN. §§ 41-3-101, 41-3-102(a) (1957); see also *Basin Elec. Power Co-op. v. St. Bd. of Ctrl.*, 578 P.2d 557, 564–67 (Wyo. 1978) (holding that beneficial use consideration may be done during a change-of-use proceeding).

²⁰⁰ See N.D. CONST. art. XI, § 3; see also N.D. CENT. CODE ANN. § 64-04-01.2; *McDonough v. Russell-Miller Milling Co.*, 165 N.W. 504, 505 (N.D. 1917) (“The question whether a reasonable or unreasonable use of the water is being made, having regard to the common rights of others, is to be determined by the circumstances of each particular case . . .”).

²⁰¹ See S.D. CONST. art. XXI, 7; see also S.D. CODIFIED LAWS § 46-1-8 (1960); *Belle Fourche Irrigation Dist. v. Smiley*, 204 N.W.2d 105, 107-08 (S.D. 1973) (affirming that water rights are limited to the beneficial use requirement as prescribed by the State).

²⁰² See NEB. CONST. art. XV, § 4–6; see also NEB. REV. STAT. § 46-229 (2004); *Cent. Platte Natural Res. Dist. v. Wyoming*, 513 N.W.2d 847, 855 (Neb. 1994) (stating that each water appropriation must be limited to beneficial uses).

²⁰³ See KAN. STAT. ANN. § 82a-714; see also KAN. STAT. ANN. § 82a-706 (1957); see also KAN. ADMIN. REGS. 5-1-1(o).

²⁰⁴ See OR. REV. STAT. ANN. § 540.610; see also *Bennett v. City of Salem*, 192 Or. 531, 544 (1951) (recognizing that water rights are limited to beneficial uses, and that there is no valid claim to divert more than necessary for said use).

²⁰⁵ See NEV. REV. STAT. ANN. § 533.035; see also *United States v. Alpine Land & Reservoir Co.*, 697 F.2d 851, 855 (9th Cir. 1983).

²⁰⁶ See UTAH CODE ANN. § 73-1-3; *Gossner v. Utah Power & Light*, 612 P.2d 337, 341 (Utah 1980) (presupposing that “beneficial use is the basis, the measure, and the limit of all rights to the use of the public water . . .”).

²⁰⁷ See OKLA. STAT. ANN. tit. 82, § 105.2(A); see also Franco-Am. Charolaie, Ltd. v. Oklahoma Water Res. Bd., 855 P.2d 568, 576 (OK 1990) (asserting that the State may restrict water rights for the preservation of the public interest without compensating the property owners).

²⁰⁸ See, e.g., *La Plata River & Cherry Creek Ditch Co. v. Hinderlider*, 25 P.2d 187, 188 (Colo. 1933) (detailing a typical takings claim in the water right context).

²⁰⁹ See U.S. CONST. amend. V; see, e.g., *Lucas v. S.C. Coastal Council*, 505 U.S. 1003, 1027 (1992) (holding that a taking without due compensation may be found where “the logically antecedent inquiry into the nature of the owner’s estate shows that the proscribed use interests were not part of his title to begin with.”); see also *Loretto v. Teleprompter Manhattan CATV Corp.*, 458 U.S. 419, 426 (1982) (noting that an ad hoc, factual inquiry must be used to determine “whether compensation is constitutionally due for a government restriction of property”).

²¹⁰ Critics may be quick to contradict this statement by citing a recent Texas case, holding that reducing water use to conserve supply is a taking, and thus assert that the taking analysis above is flawed. See *Edwards Aquifer Auth. v. Bragg*, 421 S.W.3d 118, 146 (Tex. App. 2013). However, the *Bragg* case lacks binding authority on the cases used in this takings analysis, and better reflects the unique nature of water law in Texas as opposed to the West as a whole. The novel problems of reforming “beneficial use” in Texas will be further addressed in this subsection.

²¹¹ See, e.g., *Lucas*, 505 U.S. at 1015 (denoting the permanent, physical invasion of private property as an example of a per se taking).

²¹² *Allegretti & Co. v. Cnty. of Imperial*, 42 Cal. Rptr. 3d 122, 129 (Cal. Ct. App. 2006), cert. denied, 549 U.S. 1113 (2007).

²¹³ See *Loretto*, 458 U.S. at 425.

²¹⁴ See *Lucas*, 505 U.S. at 1015-016 (giving a government regulation that neither substantially advances a legitimate state interest nor leaves any economic use of a property as the second example of a per se taking).

²¹⁵ *Penn Cent. Transp. Co. v. New York City*, 438 U.S. 104, 124 (1978).

²¹⁶ Toll, *supra* note 49, at 634 (citing *Sax*, *supra* note 110, at 263).

²¹⁷ *Lucas*, 505 U.S. at 1027.

²¹⁸ *Id.* at 1029.

²¹⁹ See Klein, *supra* note 67.

²²⁰ *Sax*, *supra* note 110, at 260; see also Toll, *supra* note 49, at 633–35; see also Dan Tarlock, *Takings, Water Rights, and Climate Change*, 36 VT. L. REV. 731, 740 (2012) (“the consensus (and more accurate characterization of water rights) is that they are a different form of property right, and thus the

Constitution affords water-right holders *comparatively less* protection to land owners”).

²²¹ See COLO. CONST. art. XVI, §§ 5–6; *see also* *People v. Emmert*, 597 P.2d 1025, 1028 (Colo. 1979) (deferring to Colorado’s Constitution which “simply and firmly establishes the right of appropriation in this state.”).

²²² *San Carlos Apache Tribe v. Superior Court ex rel. Cnty. of Maricopa*, 972 P.2d 179, 189 (Ariz. 1999)

²²³ *See Edwards Aquifer Auth. v. Day*, 369 S.W.3d 814, 829 (Tex. 2012); *see also Sipriano v. Great Spring Waters of Am., Inc.*, 1 S.W.3d 75, 78 (Tex. 1999).

²²⁴ *See Edwards Aquifer*, 369 S.W.3d at 829 (stating that both natural gas and groundwater are regulated under the rule of capture); *see also Sipriano*, 1 S.W.3d at 78 (recognizing that groundwater is regulated “within the common-law tort framework established by the rule of capture” regardless of reasonable use restrictions).

²²⁵ *See United States v. Alpine Land & Reservoir Co.*, 697 F.2d 851, 855 (9th Cir. 1983); *see Dep’t of Parks v. Idaho Dep’t of Water Admin.*, 530 P.2d 924, 931 (Idaho 1974); *see Imperial Irrigation Dist. v. State Water Res. Control Bd.*, 275 Cal. Rptr. 250, 266 (Cal. Ct. App. 1990).

²²⁶ *Hardin*, *supra* note 175, at 1245.

²²⁷ *REISNER*, *supra* note 14, at 517.

²²⁸ *Lawrence J. MacDonnell, Out-of-Priority Water Use: Adding Flexibility to the Water Appropriation System*, 83 NEB. L. REV. 485, 486 (2004) (“Moreover, the historical function of prior appropriation law—to make an initial allocation of the West’s water resources among potentially competing claimants—has been largely completed. Little unallocated surface water remains; and the costs of its development, both financial and environmental, have grown sharply”).

²²⁹ *Cayan et al.*, *supra* note 4.

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