

Unauthorized water use in the American West

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Abstract: The Western United States (US) is facing a water scarcity crisis.¹ Population growth and the effects of climate change are driving up demand and decreasing supply of water in the region, with no signs of the problem abating. State governments maintain authority over managing water rights and face increasing occurrences of unauthorized water use. However, little research has examined the issue of unauthorized water use, how states respond, and why states vary in their responses. This paper addresses these issues by clarifying what unauthorized water use is and examines the current data collection practices on unauthorized water use in the American West. This research argues that the demand for water accountability in the Western US will result in states taking steps to address unauthorized water use including implementing stiffer penalties for violations and metering requirements of water users. However, only a handful of states are prepared to move in this direction. The current data confirms the hypothesis that unauthorized water use is on the rise.

Key words: Water management; unauthorized water use; American West; climate change.

1. INTRODUCTION

Water scarcity is a global concern, and people across the world are reacting to this scarcity in diverse ways, including states who often clash over water management policy (Mahapatra and Ratha 2016). Obtaining water illegally is one common response. For example, Kenya (Nier 2012), India (Aman 2015), and Brazil (Bevins 2014) are just a few of the countries experiencing increased rates of water theft as supplies decrease, and firms and individuals scramble to respond. In the Indian capital of New Delhi, for example, organized crime syndicates control a substantial black market for water, as the government system has proven unreliable. Their activities are draining the city's aquifer, which makes up 85% of the city's water supply (Aman 2014). Such unregulated use of water poses serious risks, and while the case of New Delhi is particularly problematic, such action is not limited to the developing world. Water theft is becoming increasingly common in the western United States (Knotts 2004)². For an illustrative example one only has to look at drought stricken Thousand Oaks, California, where on several occasions between 2013 and 2015 residents noticed that a tanker truck would regularly arrive in the early morning hours to siphon water out a fire hydrant linked to the Calleguas Municipal Water District of Ventura County, California (Covarrubias et al. 2015). The water district hired an investigator and concluded that the actor Tom Selleck, most famous for his portrayal of the gumshoe detective Thomas Magnum in the 1980's TV show *Magnum P.I.*, was behind the water theft, using it for his nearby ranch. In Madera County, some 250 miles away, the District Attorney David Linn instituted a Water Crime Task Force in the summer of 2015, to address the growing problem of water theft there,³ while in Calaveras County a hotline was established where residents can call to report water theft. But California is not alone;

¹ Western states is defined as Washington, Oregon, California, Arizona, Nevada, Idaho, Montana, Utah, Wyoming, Colorado and New Mexico.

² Water theft has been reported in non-western states such as Iowa and West Virginia, however, mainly in residential zones.

³ See the Office of the District Attorney County of Madera's press release on March 4, 2015 detailing the action. "District Attorney David A. Linn Announces the Formation of Agricultural/Water Crime Task Force."

agricultural producers tied to the Wapato Irrigation Project on the Yakima Nation Reservation in Washington State reported in 2015 that an increase in the number of water thefts had reduced their capacity to meet production expectations, suggesting that unauthorized water use is a problem with economic consequences, found across the Western US (Bernton 2014).

The centrality of water in communities and economic wellbeing across the West is clear. The Magic Valley region of Idaho⁴, for example, experiences desert like conditions with annual rainfall under 13 inches a year, yet produces numerous crops such as beans, sugar beets, corn, and potatoes through irrigation from the Snake River and its tributaries. Farm cash receipts from the Valley were valued at \$3.1 billion in 2010, indicating that irrigation based agriculture is a substantial economic activity (Hines et al. 2014). Water use is the bread and butter of many local economies in the Valley, and beyond, and additional water equates to increased yields for many agricultural operations. This source of economic growth is under severe constraints, as the reduction of snow packs across the American West on account of climate change and the significant increased demand for water as population rates have dramatically increased water demand and reduced supply across the American West (Mote and Sharp 2016). Taken together, a serious problem of water scarcity, already well documented in the literature, becomes clear (Reisner 2013; National Research Council 1992).⁵ It is this scarcity in the present, and the future, that will drive the motivation to violate existing water rights law, which can be as simple as wanting to water a lawn (Bensten 2006).

The responsibility to combat unauthorized water use falls to the states, who have water compliance agencies that adjudicate and enforce water rights. Underlying the enforcement approach is a reliance on senior water right users under the prior appropriation doctrine to communicate when their allotments are not met, something that is not uncommon given that many of the basins in the West are fully appropriated or over-appropriated (Whittlesey 1995). However, enforcing water rights and ensuring that users do not overuse their legal amount is quite difficult. This is in part because there is little reliable data on water flows for most basins in the American West, including if and how much of the water supply is lost to theft. Several states do not collect data on the unauthorized water use, while others have limited enforcement systems in place, raising serious questions about how prepared Western states are to manage a vital and important resource facing serious scarcity concerns. Further, most research on this topic tends to examine the role of stakeholder processes at the front end of water distribution decisions, not examinations of water management post distribution.⁶

This paper seeks to address the issue of unauthorized water use and the role of states in securing this natural resource in the age of climate change. Using data gathered from 11 prior appropriation states in the Intermountain and Pacific Coast regions,⁷ this paper offers four contributions that are relevant to a range of fields investigating water use and climate change in the American West. First, the paper defines and examines the basic components of unauthorized water use. Two, it examines the current state government response to unauthorized water use as it is demonstrated by data collection practices in 11 western states. Third, it offers an analysis of the unauthorized water use trends in the region which indicate that it is a growing problem. Fourth, the case is presented, that the Western states will be under growing pressure in coming decades to provide a more robust 'water accountability' regime that will possibly include the criminalization of unauthorized water use and a more robust assessment mechanisms of water flows, as climate change related water scarcity diminishes resource availability. This research concludes that unauthorized water use is a growing problem in the American West that will require states officials to make significant changes to enforcement structure surroundings unauthorized water use.

⁴ The Magic Valley consists of Cassia, Lincoln, Minidoka, Gooding, Jerome, and Twin Falls counties.

⁵ These are among many other contributions from a variety of disciplines.

⁶ Bartula et al (2017) serves as an example of this kind of approach. It is a critical component of the water policy process, but it does not address the enforcement piece of water management policy.

2. UNAUTHORIZED WATER USE AND ITS IMPLICATIONS

Unauthorized water use is the consumption or transport of any sizable amount of water⁸ without authorization from water system managers, be it private or public ownership. When accessing surface water, unauthorized water use can be conducted in three basic ways.⁹ The first is by using a tanker truck or other vehicle to haul away water from a source, much like Tom Selleck did. Sources of such water include a fire hydrant, river, stream, or canal.¹⁰ The second, and much more common, is for a water user with a legal right to withdrawal from a managed source, simply take more than their allotted share, such as when an agricultural user pumps more water from an irrigation canal or adjusts their canal gate to be open longer or at a higher level than what their right dictates. The third method involves pumping or extracting water from a proximate source without a water right; for example, when a land owner has access to an adjacent water source such as a river and pumps water directly from that source. The methods of unauthorized water use are not technically complicated and in many cases do not require more than one person to successfully complete.

Detecting unauthorized water use is difficult because water inventory mechanisms are weak and incomplete. Few water governing agencies or organization, whether at the local, state or federal level, have clear and reliable measurements of water inventory that would be admissible in criminal courts. There is little infrastructure to assess and record water flows for individual water users, and general water flow predictions for individual basins have a high margin of error and are not considered reliable to the level where determinations of individual allotments could be calculated.¹¹ These barriers to measurement make it difficult to know when, where, and how water is misappropriated, if at all. Unauthorized water users need to be caught in the act for authorities to know, with any precision, the magnitude of a violation. Raising awareness and alerting the authorities of a potential unauthorized water use problem, often falls on senior water right holders who do not get their allotted water and then ask state officials to conduct a water call in order to correct the situation.

Individuals who engage in unauthorized water use fall into two broad categories. The first group consists of those who do not know they are violating water law. In these cases, the contact between the state and unauthorized water users becomes about education as opposed to criminal or civil proceedings. The other group of unauthorized water users consists of those who knowingly violate the law, and are typically repeat offenders and thus the subject to cease and desist letters or civil proceedings. The motivation for these violators is clear, especially agricultural users for whom additional water can result in additional production and economic gain. As noted above, examples of unauthorized water use are not limited to the American West. As noted above, New Delhi has faced a major drought and water shortages in recent years, leading to the creation of a black market run by organized gangs who pilfer water from the public water system and sell it to users whose regular water use is restricted on account of rationing (Aman 2015). While New Delhi remains the extreme, a recent case in Nevada involved bribes which were allegedly paid so that the Southern Nevada Water Authority could acquire additional water rights, illustrates the pressures water users are under the lengths they are willing to go to secure supplies. These examples illustrate the financial incentive of acquiring water and the illegality some individuals will engage in in order to do so (Jenkins 2016). What is clear is that unauthorized water users have ample motivation to

⁸ For most state agencies investigating unauthorized water use in an agricultural context, the water volume would have to be significant and ongoing. In a residential context, police may arrest someone who tampers with a fire hydrant, or uses a neighbors hose without authorization dependent on the context and willingness of the victim to press charges. In general however, most of the unauthorized water use cases indicating that the cases that warranted state involvement were in the thousands of gallons as opposed to the hundreds of gallons.

⁹ While some of the data includes ground water, the focus of this paper is surface water.

¹⁰ A construction water truck was stolen in broad daylight alongside the freeway in Oakland with at least some speculation that the truck's water and capacity to transport water was valuable enough to steal it (Krause 2015).

¹¹ There is a great deal of general water flow data for the American West, however, and most data has some margin of error, typically large enough to limit its credibility in a civil or criminal proceeding.

violate the law, given the low probability of facing civil or criminal proceedings. We can expect that motivation to increase across the states surveyed as water flows decrease.

3. WESTERN STATE RESPONSES TO UNAUTHORIZED WATER USE

Western states have established agencies to both adjudicate and enforce water rights, tasks that include responding to unauthorized water use complaints. Individual water users come into contact with these agencies in two general ways. In some cases, senior water right holders discover they are not receiving their water allotment and make a water call to the appropriate agency to intervene. In the second scenario, an individual in any capacity suspects or witnesses unauthorized water use and reports it to the authorities.¹² For example, if a reporting individual witnesses a neighbor use more water than they were allocated, that would be cause for an inquiry by most states provided that the witness approached the state agency, typically in writing or using a state issued water complaint form. The vast majority of complaints, if proven valid, conclude with simple communication between the state and the suspected user.¹³ For example, in the State of Idaho, when it is clear that unauthorized water use has occurred after an investigation, an enforcement action or Notice of Violation is issued and the violator is notified to 1) cease and desist, 2) required to pay a penalty, or 3) required to sign a consent agreement with the IDWR that confirms that the details recorded are accurate, and the matter was resolved. Most cases examined in the data were resolved with communication and education on the proper use practices and the details of the water user's water right. In rare instances civil action is undertaken by state officials, however it is a small percentage of cases examined. For example, in 2015 the State of California levied a \$1.5 million fine against the Byron-Bethany Irrigation District of Byron, Ca for unauthorized use (Stevens and Moran 2015). The Bryon-Bethany case was one of only two cases investigated by the California Water Board in 2014 that resulted in civil action (Associated Press 2015). This low number of civil cases, indicates that there is little incentive to abide by the law given the low probability of being caught, and the low rate of fines issues if someone is caught.

States vary in how individuals can report complaints. Several states, such as Utah, have a water use complaint form (see Appendix A), where individuals can detail the suspected unauthorized water use. These forms require complainant to provide information, such as who the alleged violator is and how long the alleged violation has occurred. On both Utah and Montana's form there is a place for the complainant to sign, indicating that the forms are not anonymous. For rural residents this poses a dilemma, as reporting unauthorized water use may result in some form of retribution which may occur in tight knit communities. Reporting unauthorized water use using the Montana and Utah forms also requires the time and motivation to file a complaint, access to a computer with internet access, and a working printer. In addition, the completed form has to be mailed to the state offices, making filing a complaint a multiple step process. Thus, someone who is willing to stand by their claim of unauthorized water use would have to generate a record of the complaint and be motivated to follow up with the appropriate authorities. In addition, western states have not allotted an abundance of resources to address this problem (Idaho State Legislature),¹⁴ so it is likely that anonymous complaints would have to be of a serious nature or perhaps be connected to a previous case that the state authorities have already investigated for the states to allocate substantial investigative resources. Several states reported that there were numerous unauthorized water use complaints that reached the state that were not investigated. Thus, we believe that many

¹² It is suspected that some claims of misappropriation are handled by water districts and canal companies on a local level, but that significant cases are handled at the state level.

¹³ This is true, unless a portion of the water infrastructure such as a gate is damaged or vandalized and it is deemed a criminal act.

¹⁴ The State of Idaho for example, allocated \$12.1 million for the 2016 fiscal year for the entire Department of Water Resources, which in addition to complaints, permits, water rights, aquifer management, among other water related tasks. (Idaho State Budget pg. 473).

cases are reported to local managers such as irrigation district managers, and that the more serious cases are reported to the state.

Each state has an agency that is designated to adjudicate water rights in the state and whose phone numbers are readily available on the internet or phone book, provided that individuals wishing to report unauthorized water use know who to call, have the patience to figure it out, and are not satisfied with their local management. In the state of Montana, for example, residents can call one of eight field offices or use the toll free general state number to get to the Department of Water Resources. None of the 11 western states examined here had a statewide hotline or a designated phone number specifically for water complaints. However, in light of the recent drought conditions in California, several counties, irrigation districts, and cities have set up tip lines for unauthorized water use complaints over the past two years.¹⁵ For the states who maintain detailed records on complaints, none of them reported how the complaint was brought to the attention of the state (i.e. whether it was a phone call, a completed complaint form, letter, or other method).

It is important to note the rural nature of most of the cases in question, which may present a number of challenges related to reporting of water theft. First, given the isolation inherent in much of the rural West, the number of possible witnesses is inherently low. Second, those who do witness unauthorized water use face possible retribution for reporting a neighbor or community member to a state agency, which may render such reporting cost prohibitive for many. Third, as discussed above, water measurements for many rural users are limited, and many water users not possessing a meter. Visual inspection of water use is not conclusive in assessing if a violation has occurred, and is problematic in a legal context, yet such informal measurements are common in many states surveyed in this research. Fourth, it is likely in some cases that the violation is detected by a neighbor or personnel employed by an irrigation or water district and is then adjudicated between the two parties, or with a local irrigation district without further outside involvement. Anecdotal evidence suggests that there is wide spread use of informal institutions that facilitate water right enforcement across the American West.¹⁶ Therefore, the assumption adopted here is that more unauthorized water use occurs than is reported to state governments. Some states acknowledge this, for example, the state of Montana water complaint form contains a section for complaint filers to indicate if they have spoken with their local water appropriator in an attempt to resolve the complaint. In sum, these dynamics reduces the overall reliability of the data provided by the states.

Once the state agency is in possession of a complaint of unauthorized water use the investigation process is initialized. This typically involves a staff member of the agency in question reviewing the appropriate water rights, possibly visiting the site in question, communicating with the suspected unauthorized water users, and in some cases conducting water assessments using GIS and other tools to determine if overuse is occurring.¹⁷ However, states vary significantly in how they record these investigations, making record keeping on unauthorized water use across Western states haphazard at best. Since states retain jurisdiction over water rights, they have each designed and implemented unique enforcement strategies. The result of this variation in monitoring water use, is that the states diverge in how readily available unauthorized water use data is, with some having detailed data which is posted on their websites and others not collecting data at all. Eleven states were contacted via phone and email in September and October of 2015, and asked to provide ten years of unauthorized water complaint data and outcomes. Of the eleven states, three states did not collect data (New Mexico, Wyoming, and Colorado), one state collected data but did not make it

¹⁵ Mendocino and Madera County, the City of Glendale, and Turlock Irrigation District are several who fit this category.

¹⁶ For example, in informal unauthorized water use with several irrigation district managers, the topic of farmers confronting other users over unauthorized use was brought up. The general idea was that it was not uncommon for users to confront one another concerning overuse or to bring in irrigation managers. Clearly such confrontations and resolutions occur, but to what extent and how much water involved is unknown.

¹⁷ This is based on interviews with state officials in Montana, Washington, Oregon, and Idaho.

publically available (Oregon)¹⁸, two had data that was a simple count (Idaho and Nevada), and the remaining four had easily accessible data that contained case details (Arizona, California, Utah, and Washington).

The three states that did not collect data did so primarily for lack of resources and capacity. The state of New Mexico responded in a written letter stating that the state does not possess the reports or complaints of unauthorized water use, but that the district offices potentially possess such data. The state of Wyoming does not systematically collect data on complaints. Upon request the Deputy State Engineer in Wyoming asked the superintendents for each of the four regions to individually answer the question of how many complaints of unauthorized water use they had received. What they reported back varied, but it can be characterized that Wyoming's recording keeping is limited to the institutional knowledge of the individual superintendents in the four regions, as it was clear the superintendents did not have a uniform process to managing unauthorized water cases. While it is clear that the state official believes the state has handled the cases appropriately, there is little interest in properly detailing and cataloging the cases.

The states that did collect data provided it in two general forms with varying degrees of accessibility. Idaho and Nevada provided simple counts of the cases they had. Nevada officials, upon request, compiled their records and then made them available; when the data was received it was only the raw numbers of cases and none of the case details. Neither the detailed records nor the raw numbers are available on their website. Due to the sensitive nature of the data, the state has chosen to not make complaints or activity publicly available; however files are available for viewing in the Nevada Division of Water Resources office in Carson City. However, starting in 2009, the State Engineer established an Alleged Violation Case Program, indicating that there had been growth in the concern over unauthorized water use. Idaho, on the other hand, established a new database, which was brought online in 2013 but is not accessible to the public. Data collected before 2013 exists but is considered unreliable by the state, as there apparently was not a uniform procedure or widespread recording of complaint data by state officials.¹⁹ The Idaho database and the Nevada records in Carson City presumably contain information on the specific cases, the nature of the complaint, and violation in question and the outcome of any investigation.²⁰

The most advanced states with regards to data collection on unauthorized water use are California and Utah. They had data accessible on their websites along with the details of the cases. Washington, Arizona, Montana, and Oregon had data, which included case details. And while the data was not posted on their websites, state agency workers were quick to provide the data. These states varied with regards to the type of details that were contained in the records. California case details included a case number, the date the complaint was received, the alleged injury, the course of the complaint, and county of origin and a status update of the investigation. Montana had similar fields and added who the complainer was, the water source, basin, and any related water right number(s). Utah's data contained the same fields, and added the regulation action (e.g.: measuring device/Control Structure, delinquent distribution assessment, unlawful use of water, etc.), and a list of related proceedings (e.g. if a particular entity/individual has had previous interactions with the Division of Water Rights, the type of proceeding such as whether it was a letter, cease and desist order, investigation, or informal resolution, the status of those proceedings, any related submittals, and a comments section, which was often used to provide case background. The state of Washington's reporting procedure was nearly identical to California's. The lack of publically accessible data is clearly an issue among several states. Table 1 further describes the diversity of state practices related to data collection of unauthorized water use. In sum, the ways in which data is collected, stored, and the degree of transparency all vary significantly by state.

¹⁸ Oregon officials reported that they maintain a binder of cases that is available to photocopying in their Salem, Oregon office.

¹⁹ This information was communicated to the author via a telephone conversation with a state official.

²⁰ The Idaho water use complaint database is not accessible online. No request was made to view the detailed reports from the database.

Table 1. Western State unauthorized data practices and availability

State	Agency	Compiled Data	Readily Available	Notes	Online Water Complaint Form
Idaho	Idaho Department of Water Resources	Yes	No	Compiled Data and provided in an email, but no details on cases	No
Washington	Department of Ecology	Yes	Yes	Yes, they have an internal database that captures formal and informal complaints	No
Oregon	Water Resources Department	Yes, but not digitally	No	Has written log book not in digital form	No
Nevada	Division of Water Resources	Yes	No	Compiled data and provided in an email but no details on cases	Yes
Arizona	Department of Water Resources	Yes	No	Three public requests have been made without response.	Yes
New Mexico	Office of State Engineer	No	No	Responded in writing that no data is kept.	No
California	State Water Resources Control Board	Yes	Yes	Date on website	Yes
Utah	Division of Water Rights	Yes	Yes	Data on Website	Yes
Colorado	Division of Water	No	No	The state does not maintain statistics.	No
Montana	Water Rights Bureau	Yes	Yes	Data collected separately by each of the eight different field offices.	Yes
Wyoming	Office of State Engineer	No	No	The State Engineer's office reported that complaints were not systematically documented.	No

4. CURRENT UNAUTHORIZED WATER USE TRENDS IN THE AMERICAN WEST

The ability to compare unauthorized water use data across states is limited. First, as noted above some states do not have data to analyze. New Mexico and Colorado have not collected data, Wyoming has no formal data collection, and Oregon's approach limits review. For the six states that did have data, there is a wide range of available years from three (Idaho) to 13 (Utah); Table 2 displays the number of available years from each state. States were asked for the past ten years of data, and only one state (Utah) had more than ten years of available data (13 years of data). On the other side of the spectrum, Idaho supplied only three years of data; while they had a database previous 2013, that data is widely considered suspect on account of variance in reporting practices.

Table 2. Years of data through 2015

State	Years of data
Arizona	2
California	8
Idaho	3
Montana	8
Nevada	5
Oregon	6
Utah	13
Washington	6

States that did provide data had a wide range with regards to number of cases. Table 3 offers the average complaint cases for the available years of data. Oregon held the highest average, followed by Washington, and California. Possible explanation for this is the stronger regulatory capacity for Oregon and Washington. This is somewhat surprising given that California is the ranked first in agricultural production. Other states with lower agricultural production, such as Montana and Utah who are ranked 33 and 37, respectively (USDA 2016).²¹ We would expect California with its large

²¹ California ranked 7 in cattle production, Montana 14th, and Utah 33rd.

number of water users and recent water crisis to drive up the number of water complaints and not be on par with Utah or Montana. On the other hand, despite being agriculturally abundant, Idaho had an average of 11 complaints per year; however, only two years of data were used to calculate the average. The variation in the number of cases can be caused by a range of factors, but clearly this is a difficult set of data to compare given the range of years states have available data for and the lack of consistency in data collection.

Table 3. Average number of complaints for available years

State	Average
Arizona	13.5
California	44
Idaho	11
Montana	42
Nevada	23
Oregon	109
Utah	39
Washington	103

Table 4. State complaint data for Western States

State	Year	Number of Complaints	State	Year	Number of Complaints
Arizona	2014	18	Oregon	2009	172
Arizona	2015	9	Oregon	2010	153
California	2008	25	Oregon	2011	97
California	2009	18	Oregon	2012	104
California	2010	12	Oregon	2013	98
California	2011	14	Oregon	2014	79
California	2012	29	Oregon	2015	66
California	2013	27	Utah	2003	34
California	2014	188	Utah	2004	31
California	2015	106	Utah	2005	12
Idaho	2013	2	Utah	2006	65
Idaho	2014	21	Utah	2007	68
Idaho	2015	30	Utah	2008	37
Montana	2008	51	Utah	2009	79
Montana	2009	44	Utah	2010	40
Montana	2010	42	Utah	2011	27
Montana	2011	34	Utah	2012	10
Montana	2012	40	Utah	2013	30
Montana	2013	60	Utah	2014	39
Montana	2014	23	Utah	2015	10
Montana	2015	14	Washington	2010	188
Nevada	2010	10	Washington	2011	55
Nevada	2011	26	Washington	2012	69
Nevada	2012	21	Washington	2013	130
Nevada	2013	22	Washington	2014	74
Nevada	2014	37	Washington	2015	321
Nevada	2015	48			

Nevertheless, it is still worthwhile to compare the data across states, as some interesting findings emerge. In general, the trend of water complaints cases has been increasing across the board, as figures 1-6 indicate. California, Idaho, Nevada, and Washington have clear increases in caseloads, even with the 2015 data being incomplete for all states. Montana and Utah had wide variance in their caseloads, but a general decline in 2014 from previous years was visible. In 2015 Washington had the highest case number for a given year in the data set, with 321 cases, indicating a spike in cases over previous years, even though the data for 2015 was incomplete. California similarly had a dramatic increase from 2013 to 2014, perhaps on account of the persistent drought. An explanation of why there is variation from year to year and state to state is beyond the scope of this paper. However, there are likely several clear contributing factors, such as the size of the state, the number of water users, water flow volume, the proclivity of informal institutions, the capacity and reputation of the state water bureaucracy, and water user awareness of the state agencies in question.

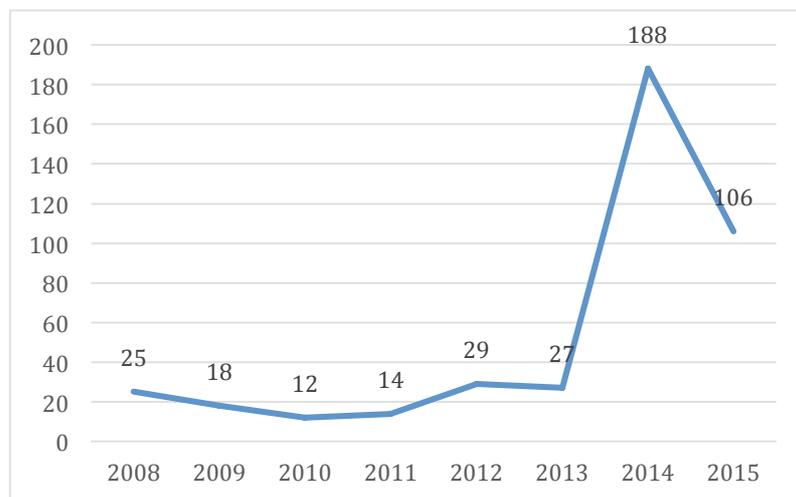


Figure 1. California complaint data 2008-2015

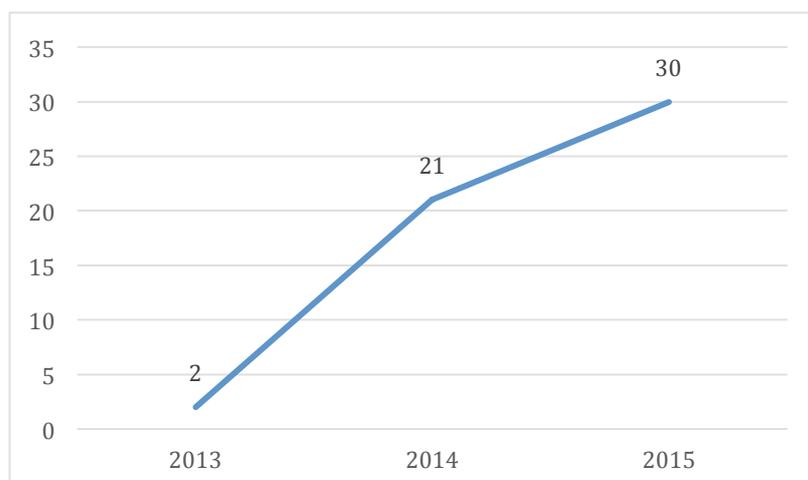


Figure 2. Idaho complaint data 2013-2015

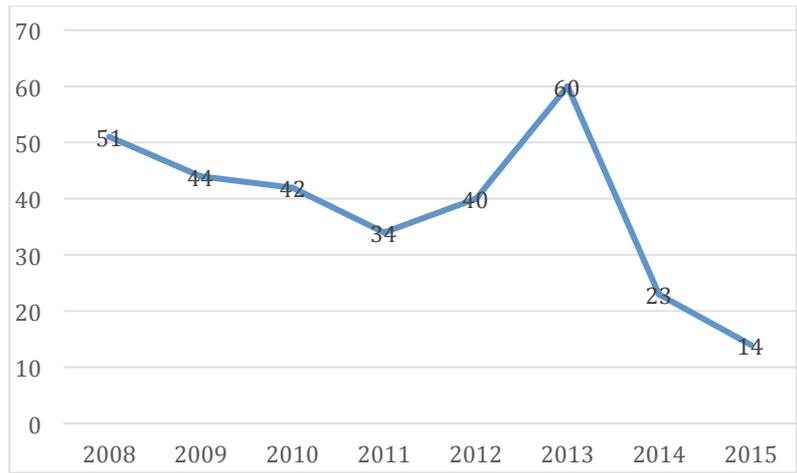


Figure 3. Montana complaint data 2008-2015

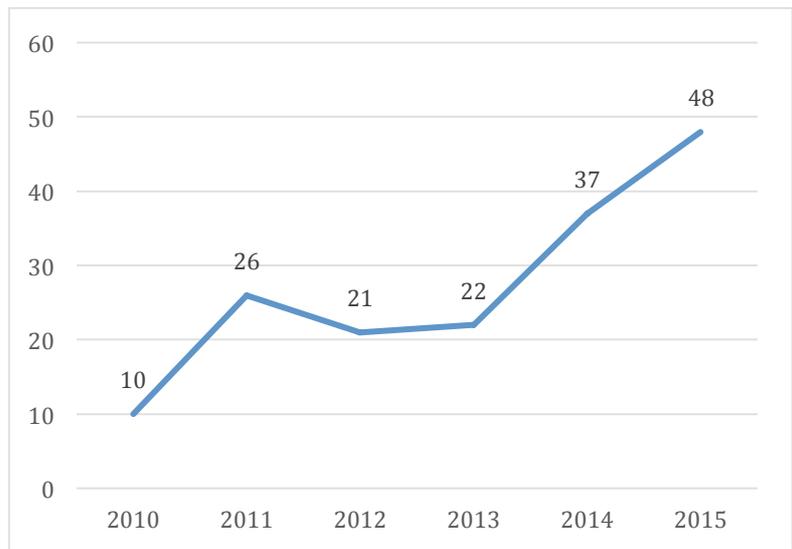


Figure 4. Nevada complaint data 2010-2015

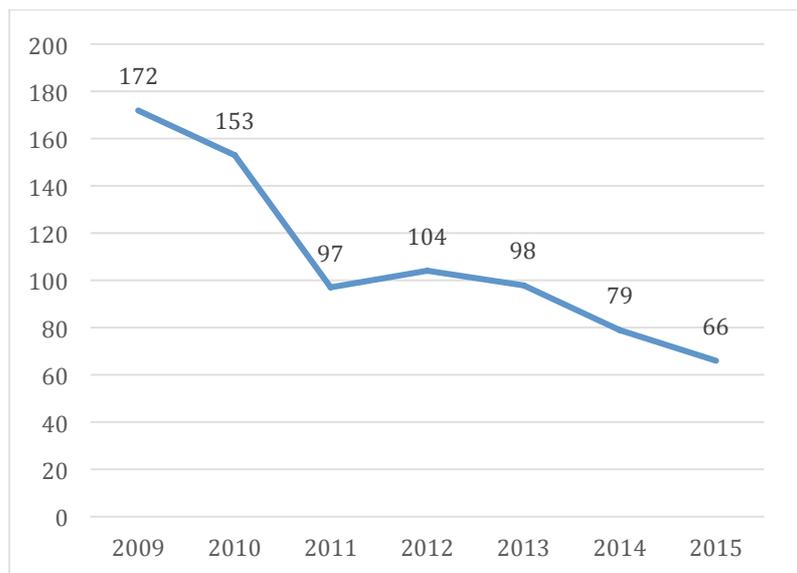


Figure 5. Oregon complaint data 2009-2015

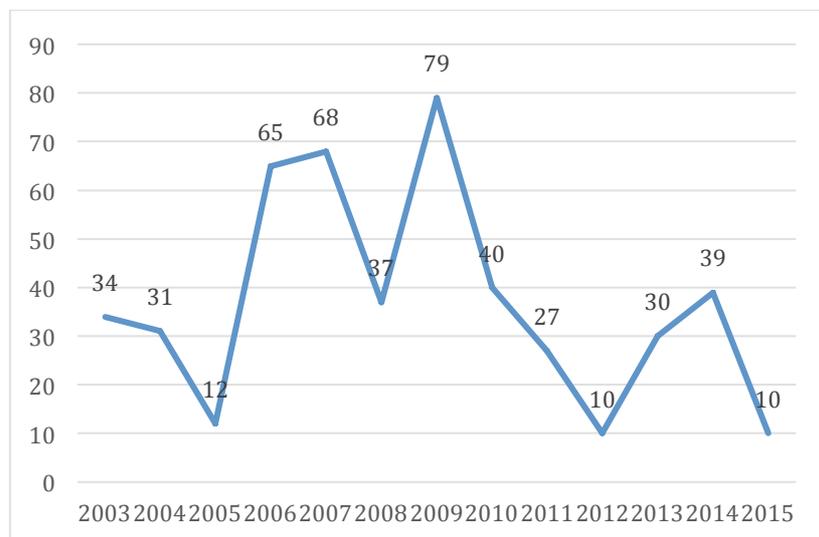


Figure 6. Utah complaint data 2003-2015

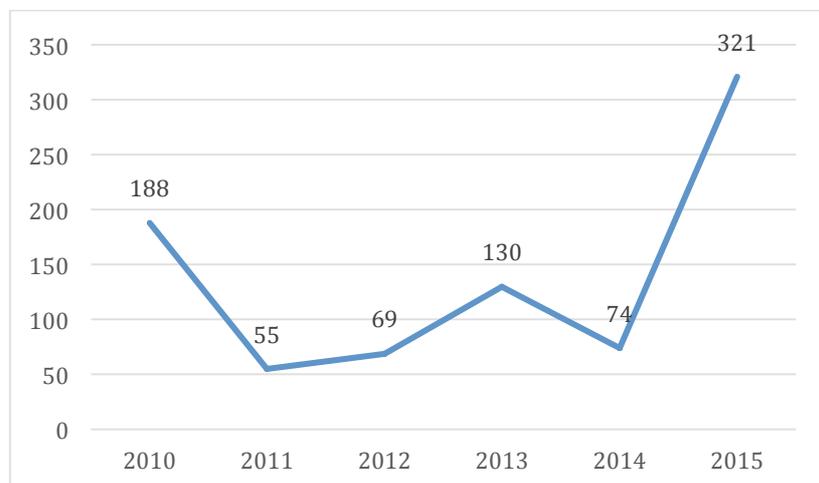


Figure 7. Washington complaint data 2010-2015

5. THE GROWING DEMAND FOR WATER ACCOUNTABILITY AND STATE PREPAREDNESS

This paper has examined the nature of unauthorized water use, the method and degree of western states record keeping on unauthorized water use, and current trends in unauthorized use. These findings, in combination with growing concern about water availability, suggest that Western states will be under pressure in coming decades to provide a more robust water accountability regime. ‘Water accountability’ is the degree to which the state government sufficiently protects water rights through management of inventories, use, and pursuit of unauthorized users. Turton (2003) argues that these local problems will lead to greater securitization efforts around water. Basins throughout the region have faced water scarcity conditions that have had a negative effect on agricultural producers (Berton 2015). A wide literature on the securitization of water has emerged, but it mostly focuses on developing world nations and management of shared waterways. And few researchers in the water policy literature view unauthorized water use as a problem at all. Yet there are several reasons to believe that a growing demand for water accountability will manifest in the American West. First, current data and future predictions of hydrologic trends lend support to the notion that climate change will create water scarcity issues generating major concern for the regions stakeholders, primarily the agricultural industry, urban consumers, and environmental activists. In

addition, population growth is a particular concern for water distribution. The jump from 19.5 million people in 1950 to 72.1 million in 2013 (U.S. Census, 2016) has increased demand for water use, and expectations are for those numbers to increase. The position of this paper is that no additional documentation of water scarcity in the region is required to make the case that water accountability will become an item of political action.

Anecdotal evidence suggests that state governments are already feeling pressure to act on this issue. Such a process is already underway in California, where county officials are prioritizing unauthorized water use cases, and as mentioned several have established hotlines to report unauthorized water use. Pressure is also increasing from water users to increase accountability of unauthorized use, as the Byron-Bethany Irrigation District case illustrates, where water users frustration with management practices drove a response. Finally, pressure is also likely to come from the federal government; as of 2015, seven of the states examined in this project (Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington) were receiving USDA drought relief funds and a lack of water accountability undermines those federal efforts to offer assistance to the states in question. It is hard to imagine federal officials will want to spend money on drought relief if steps are not taken to address water management issues.

Research on public opinion, linkages to public policy, and decision making of political elites has been well documented in the literature (Alm 2007). This research is concerned with what available policy response will be available to states after water accountability becomes a political issue and is the subject to greater interest by lawmakers, state officials, and stakeholders.²² There are several policy adoptions that this paper predicts will occur. First, there will likely be a change in recording keeping procedures. The data presented above allows for a basic evaluation regarding how well prepared states are based on an examination of their current record keeping practices on unauthorized water use. States cannot provide water accountability without accurate records on the prevalence of unauthorized water use and the specifics of individual cases. Similar to any law enforcement statistic, police departments across the country cannot claim a reduction of crime without showing in numerical format the number of murders, assaults, thefts, etc. Likewise, states cannot properly respond to claims that water supplies are subject to unauthorized water use without similar data. Thus, the state practice of recording the number of unauthorized water use complaints will be the first step in addressing the problem. The prediction made here is that states such as Colorado, New Mexico, and Wyoming who do not have established and institutionalized reporting practices will initiate more robust accounting practices. Those states that already have robust reporting practices in place will be better positioned to criminalize unauthorized water use. Further, states will need to add additional personnel responsible for the management of these new reporting and data collection systems, requiring additional state resources. States will also face increasing pressure to provide transparency of this data.

In addition, it is forecasted here, that states will criminalize unauthorized water use. As earlier stated, few unauthorized water users are subject to criminal proceedings; civil action and fines are currently the most severe action most states take, and it is rare for states to take react with this intensity. Demands for water accountability will likely include the outright criminalization of unauthorized water use, which would replace the status quo of communication with criminal proceedings. This would transfer the burden of understanding the applicability of water rights law to the user and away from the current model, giving unauthorized water users a pass during the initial determination of unauthorized use, which as stated above may never happen given the lack accurate measurements on water flows. The charge classification could vary from misdemeanor to felony based on volume of water, previous offenses, or other criteria.

New criminal standards would require more accurate assessments of water flows and use. This is a substantial barrier, both from a scientific and state resource perspective. Water flow modeling, such as determining how much water is flowing in a specific river/stream, has limited accuracy, as

²² As opposed to modeling the public policy process, the assumption made here is that water users and government agencies will respond to political pressure and the realities of water scarcity.

most estimates of water flows have high levels of systemic error, which would make them difficult to introduce as evidence in court proceedings, making it a substantial barrier to the criminalization process. Because of the proprietary nature, age of the many canals, ditches and other water distribution infrastructure in much of the world, reliable measurements of water flows in agricultural systems is sparse, difficult to access, and of uncertain accuracy. Similarly, urban water distribution systems are characterized by system wide leakage, accounting for some 20% of overall water flow, and because many domestic water supply networks are privately owned or managed the data is correspondingly proprietary. The outcome of these and other circumstances leads to a situation in which data that could be used to estimate the occurrence and magnitude of theft from these water systems is either nonexistent, of limited accuracy, and/or proprietary and inaccessible. Complicating matters is that water right arrangements in many instances are based on water volume. For example, allotments for junior right holders are theoretically only delivered after the senior right holders receive their share, something that fluctuates based on river volume. The absence of clear water volume measures undermines the real time determination of who gets what, and makes it difficult to determine when and where a specific volume of water was removed from a water source. Current infrastructure to determine allotment volume in some instances is based on individual irrigation ditch gate levels, knowledge that is often restricted to individual water users.

A possible solution to this problem, as least on the user side, would be universal use of meters. Such meters on canal/ditch intake valves would be an additional cost, likely to be shouldered by water users. The associated cost of a new meter combined with the intrusion into the water user's privacy would be a clear political hurdle in implementing any criminalization reform. For example, the State of Idaho created a new ground water district (Water District #161) in Elmore County, Idaho. The new district is requiring all water users to purchase a meter that costs \$2,500. The new water district is hiring a new water master, who will have to essentially read and compile and meter data. From a resource and state spending perspective, this is complicated by the need for additional personnel, either at the local or state level to manage, inspect, and read such meters, either in response to a specific claim of unauthorized water use or on a routine basis. The status quo requires unauthorized water users to be caught in the act to face civil penalties, something that would have to be addressed by any criminalization process.

No state is in a particularly advanced position when it comes to the criminalization of unauthorized water use. Utah and California, as argued above, have a slight advantage with regards to criminalize unauthorized water use, based on their more advanced reporting and data practices on unauthorized water, use compared to other states. Developing the institutional capacity to carry out any criminalization process would require more work in other states, especially in Colorado, where state authorities do not currently collect any data on unauthorized water use. While states vary significantly on the amount of agricultural production and available water, however, they will all face greater pressure in the coming years and decades for water accountability. This is evident in California, where growing concern for water management in the era of climate change and unpredictable weather patterns, resulted in the state Legislature passing the Sustainable Groundwater Management Act (SGMA) in 2014. A key provision of the act is to require all ground water basins to develop a plan for management that ensures sustainability by 2040 (Walton 2015). This clearly poses a threat to many water users who now will face pressure to document their ground use regardless of how long they have been pulling water from their wells, much like in Elmore County, Idaho. Surface and ground water users will face the same issues in the coming decades.

6. CONCLUSION

This paper has outlined the growing problem of unauthorized water use in the American West and has argued that the dual threat of climate change and population growth will force states to alter their existing policies. By examining the data collection practices of eleven western states, and after an analysis of the available data on unauthorized water use, three general conclusions have been

reached. First, there is evidence to suggest that unauthorized water use is of growing concern across the American West, but that the nature of unauthorized water use reporting limits the accuracy of the data collected at the state level. Second, several states, primarily Utah and California, have more robust and advanced reporting and data practices around unauthorized water use than the other states. States such as New Mexico, Colorado, and Wyoming are particularly underdeveloped in their unauthorized water use data processes, and by proxy this can limit their response to the problem of unauthorized water use. Third, the growing demand and decreasing supply of water in the region driven by population growth and climate change, will result in political pressure for states to criminalize unauthorized water use. This water accountability could result in two substantial changes in the law; first, criminal charges for unauthorized water users, and second meter requirements for water users.

Both of these policy changes would face substantial political opposition, however, the implementation of water accountability has advantages. First, policy makers will have a set of laws and institutions, provided they are properly funded, with the explicit task of preventing the waste of a valuable resource. That effort, if properly managed, could address the vast majority of the concerns various stakeholders may have about water management policy, particularly agricultural industry water users. Moreover, strong and agile institutions will be critical for societies to mount successful resilience efforts in the face of changing conditions (Homer-Dixon 1999). Criminalizing unauthorized water use, in the face of growing scarcity, may be one of the few tools states have to address the problem associated with reduced water flows.

This paper has established how well state responses to unauthorized water use. Future research aiming to developing this literature will require an examination of the various other levels of governance of water, specifically sub-state actors in the form of water districts and irrigation masters. It is likely that many unauthorized water use incidents that are handled by locally organized irrigation and water districts and not reported to state officials. Further complicating the local level examinations, is the lack of uniformity in responses to unauthorized water use by local managers, and the incongruity of record keeping practices. If water managers are resolving disputes on their own without state agencies or without reporting to state agencies, there is additional data that can shed light on the number of cases that exist. It could be that only the most difficult cases are reported to state officials, indicating that the problem is likely larger than the data examined here.

While the sub-state level remains under examined, the federal role in water management must also be considered, however, this is more speculative than empirical. The position of this paper has been that water scarcity in the Western U.S. will remain a major policy issue for the foreseeable future. If conditions continue to worsen to where food production, food prices, and water security become issues, it may prompt a more robust and interventionist federal response. This response may include the criminalization policies utilizing federal resources to curtail unauthorized water use, intervention into water markets, and other policies. If the predictions for climate change and population growth in the region continue unabated, there will be shortages and a water crisis, and policy makers at both the state and federal level will be under significant pressure to intervene and at least demonstrate an attempt to elevate the negative outcomes of water scarcity. While criminalization may not yield significant results in undercutting unauthorized water use, the political pressure will create the conditions to where the policy may be attractive to federal and state authorities.

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