The Land Use Planning, Water Resources and Climate Change Adaptation Connection: Challenges and Opportunities

A Review

Bobbie Klein[1] and Douglas Kenney[2]

Introduction

Rapid population growth coupled with global climate change pose significant challenges for water managers in the western United States as they try to match supply to demand. Climate change is projected to affect water in the west in a variety of ways including decreased snowpack, earlier snow melt, increased winter rain, peak winter flows and flooding, and reduced summer flows which, when coupled with rising demand, will make it harder to meet future water needs.[3]

Water conservation (also referred to as "demand management") is one important climate change adaptation response.[4] Demand management has been successful in keeping overall water demand constant in western cities such as Los Angeles, San Francisco, Seattle and Denver despite population growth.[5] Yet two forces conspire to increase future demand. First, even if conservation reduces per capita use, water demand will nevertheless rise if population continues to grow.[6] Second, if local land use decisions favor single-family over multi-family homes, per capita use will increase since single-family houses use about twice as much water for landscaping compared to multi-family homes.[7]

Scholars have long expressed concern that there is a "disconnect" between land use planning and water resources planning that allows approval of new housing developments without assurance of sufficient water supplies. This paper arose of out an

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[1] Managing Director, Center for Science and Technology Policy Research, University of Colorado at Boulder (contact: bklein@colorado.edu). This work was conducted using funding and resources of the Western Water Assessment, a joint program of the National Oceanic and Atmospheric Administration (NOAA) and the University of Colorado.

[2] Director, Western Water Policy Program at the Natural Resource Law Center, University of Colorado (contact: douglas.kenney@colorado.edu).

[3] Parry et al. (2007) at p. 62.

[4] See, e.g., Rocky Mountain Climate Organization (2007); State of California (2008); Nelson et al. (2007).

[5] See Nelson et al. (2007) at p. 69, Appendix B.

[6] Hanak (2005) at pp. 18-19, estimates that if per capita use remains constant and population grows as projected, California's urban water demand will increase by 3.6 million acre-feet (or 40%) between 2000 and 2030. If per capita use is reduced moderately from 232 gallons per capita per day (gpcd) to 221 gpcd, urban water demand will still grow by 3.1 million acre-feet in the same time period. If per capita use is reduced aggressively to 192 gpcd, urban water demand will grow by 1.5 million acre feet above current levels.

[7] Mayer et al. (1999) found that 58 percent of water in single family homes is used for outdoor purposes, with higher amounts used in more arid western climates. See also Hanak (2005) at pp. 11 n.3, 19-20.

interest in whether the disconnect is limiting opportunities for demand management to be used as a climate change adaptation strategy. We found that the disconnect has been addressed to some extent in 9 of the 11 contiguous western states which have some type of policy linking approval of new development to water availability. Further, there are indications that these laws encourage water conservation. However, these programs may hinder the use of demand management as a climate change adaptation strategy.

Part I of this brief overview discusses the disconnect. Part II summarizes assured water supply legislation in the 11 western states, as well as other approaches, and discusses the effectiveness of these laws. Part III discusses the relationship between policy responses and demand management, and then looks at the dilemma water managers face: should conserved water serve as a climate "cushion" or should it allow further growth? Part IV provides a summary and conclusion.

I. The Disconnect

Historically development has been approved without a showing of an adequate water supply, on the assumption that water would be there when needed. Authors have attributed this outcome to a "disconnect" between land use planning and water resources planning.[8] The disconnect is due to a variety of factors: Different levels of government and different decision makers are responsible for land use planning and for water planning. Land use decisions in most states have been delegated to counties and municipalities which develop the plans that form the basis for zoning decisions and building permits, while water allocation is a more unscripted process resulting from the cumulative decisions of individuals awarded rights based on first appropriation and/or land ownership. The different levels of government that are involved with these decisions have different goals: state governments that regulate water are primarily motivated by the desire to minimize disputes and protect established rights and economic investments, while cities and counties that plan and regulate land have a more established focus on balancing public and private interests, as shown by the emphasis on regulating nuisances. While land use plans written by professional planners may recognize the limitations of water resources, the actual decisions taken pursuant to those plans are often heavily influenced by growth advocates and political leaders, with little consideration for the burdens this places on the water sector. Conflicts can arise both vertically because decisions are made by different layers of government at federal, state, and local levels, as well as horizontally because of conflicting decisions made by different communities in the same region, or by different departments within the same municipality.

A focus group of land use and water managers identified the following consequences of managing land and water separately: increased competition for water; reduced ability to match water supply and demand; and inability of local communities to direct the allocation of scarce water supplies and thus to pursue community priorities including the

[8] Van de Wetering (2007), Tarlock and Van de Wetering (2006), Coulson (2005), Arnold (2005), Tarlock and Lucero (2002).

retention of farmland and wildlife habitat, and the provision of affordable housing and parks.[9]

A related issue is the water utility's duty to serve, under which public utilities must serve all customers within their service area who can pay for service. The duty to serve has been defined as broadly as a duty "to acquire necessary supplies to meet projected demands."[10] The duty to serve, coupled with the disconnect between land use and water resources, has led to the assumption in the west (as elsewhere) that "water suppliers have a duty to acquire sufficient supplies to accommodate high-end growth projections under worst case drought scenarios, and that those who challenge this orthodoxy have a high, if not impossible, burden of persuasion."[11]

II. Policy Responses

a. Assured Water Supply laws

States and local governments have implemented a variety of measures to better connect water resources and land use planning. One common policy response is the assured water supply law that requires a showing of an adequate water supply before new development can be approved. The goals of these laws generally are to protect homebuyers from purchasing land without an adequate water supply, provide better linkage of land and water planning, and protect the environment including tools to fight sprawl.[12]

i. Summary of Assured Water Supply Laws in Western States

We found that 9 of the 11 contiguous westernmost states have some type of assured water supply law that makes approval of new development contingent on a showing of water availability. These results are summarized in the following table:

[9] Lucero (2005).
[10] Tarlock and Van de Wetering (2006) at p. 58.
[11] Tarlock and Van de Wetering (1999) at pp. 173-174.
[12] Davies (2008).

Western States Assured Water Supply Laws

Arizona	1980 Groundwater Management Code established Active Management Areas (AMAs) where groundwater use is strictly regulated. In an AMA, the Assured Water Supply program applies. Anyone who offers land for sale or lease generally must demonstrate that "water of sufficient quantity and quality is available to sustain the proposed development for 100 years" before marketing the land. In 1995, the Arizona Department of Water Resources adopted rules that require new developments to be sustained predominantly by renewable supplies such as surface water. Outside of the AMAs the Adequate Water Supply program applies. Developers must obtain a determination from the state concerning the quantity and quality of available water but may still sell lots even if the water is found to be inadequate as long as the inadequacy finding is provided to prospective buyers. In 2007 local governments were granted authority to require a 100-year water adequacy determination before developers could sell lots in new subdivisions.[13]
California	2001 SB 610 amended Cal. Water Code sec. 10910-12, to require that a water supply assessment be included in environmental reviews for projects of over 500 units. 2001 SB 221 amended Cal. Govt. Code sec. 66473 to provide that cities and counties cannot approve a subdivision map of more than 500 units unless a water purveyor provides written verification of a sufficient and reliable water supply.[14] Section 66473.7(a)(2) defines "sufficient water supply" as "the total water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses."
Colorado	The 1972 Subdivision Act (SB 35) provides that counties must adopt subdivision regulations requiring developers to provide "adequate evidence that a water supply that is sufficient in terms of quality, quantity, and dependability will be available to ensure an adequate supply of water for the type of subdivision proposed." CRS sec. 30-28-133(3)(d). No subdivision may be approved unless the subdivider provides evidence of a sufficient water supply. CRS sec. 30-28-133(6a). HB 1141, enacted May 2008, created CRS sec. 29-20-301-306 which requires local governments to determine whether an applicant for a development permit for more than 50 units or single-family equivalents has satisfactorily shown an adequate water supply exists.
Idaho	No statutory provisions. Many local governments reportedly require that developers show adequate water rights or an adequate water supply.[15]
Montana	MCA sec. 76-3-601 and 76-3-622 require that applications for new subdivisions include evidence of adequate water availability for new water supply systems, unless cisterns are proposed.
Nevada	Prior to approval, any division of land into five or more lots must show evidence of "the availability of water which…is sufficient in quantity for the reasonably foreseeable needs of the subdivision" as certified by the Nevada State Engineer. NRS sec. 278.349(3), sec. 278.377(1)(b). For division of land into four lots or less, the local body "may" require proof of water supply prior to approval. NRS 278.462.[16]
New Mexico	The New Mexico Subdivision Act, NM Stat. Ann. sec. 47-6-9, requires that counties adopt regulations specifying requirements for "quantifying the maximum annual water requirements of subdivisions, including water for indoor and outdoor domestic uses;" "assessing water availability to meet the maximum annual water requirements of subdivisions;" and "water conservation measures."[17]

[13] Arizona Dept. Water Resources (undated).
[14] Western Water Law and Policy Reporter (ed.)(2005b).
[15] Western Water Law and Policy Reporter (ed.)(2005d).
[16] Western Water Law and Policy Reporter (ed.)(2005e).
[17] Western Water Law and Policy Reporter (ed.)(2005f).

Oregon	OR. REV. STAT. §§ 197.015(6) and 197.175(2)(a) (2005) require local governments to adopt comprehensive general plans governing local land use decisions and require that the water-land use connection be addressed including specifically taking into account the availability of water systems. State law leaves the details largely to localities. As a result, most localities have adopted ordinances incorporating water availability into their development regulations and ordinances, but there is a wide range of variability in how strictly the laws are applied.[18]
Utah	No statutory provisions. Developers generally show local authorities that the State Engineer has approved the use of water, or provide a "will serve" letter from a water distributor agreeing to provide service.[19]
Washington	RCW 19.27.097 provides that "Each applicant for a building permit of a building necessitating potable water shall provide evidence of an adequate water supply for the intended use of the building." RCW 58.17.110 requires that adequate provisions be made for potable water supplies before a subdivision can be approved.[20]
Wyoming	Wyoming Statutes sec. 18-5-306 requires that each application for a subdivision permit produce "a study evaluating the water supply system proposed for the subdivision and the adequacy … of the system."

ii. Effectiveness of Assured Water Supply Laws

Davies (2008) finds the track record of assured water supply laws is mixed. The laws have succeeded in preventing "dry development" in some instances. For example, California and Oregon courts have halted developments lacking adequate water supplies, and a 25,000-home development in Arizona was delayed because of insufficient water.[21]

Further, assured water supply laws have created incentives for developers to voluntarily adopt water conservation rather than relying solely on acquisition of new supplies to provide water for new development. For example, a dispute in Monterey, California was settled when the builder agreed to install extra-efficient water fixtures to lower demand.[22] If developers can show their proposed subdivision requires less water due to demand management, they will have lower water acquisition costs under the assured supply law. Santa Fe, New Mexico, goes one step further by allowing developers to offset the water needed for *new* development by retrofitting toilets in *existing* residences.[23]

It is unlikely that assured supply laws will stop development, however. Rather, "development may become more difficult and costly in some places. In others, it may be delayed or be more concentrated until the requisite guaranteed water supply is in place, depending on the available total developed water in a state and the strength of competing

[18] Davies (2008) at p. 1259; see also Western Water Law and Policy Reporter (ed.)(2005g).
[19] Western Water Law and Policy Reporter (ed.)(2005h). However, local planning authorities rarely require any kind of verifiable showing of a water supply that will meet the demands of a new project. As a result, some developments have found themselves without adequate water at full build out, forcing local governments to form special water districts to develop new water supplies and construct infrastructure; often at taxpayer expense. Id. at 326.
[20] Western Water Law and Policy Reporter (ed.)(2005i).
[21] Davies (2008) at p. 1266.
[22] Davies (2008) at p. 1279.
[23] See Lucero and Tarlock (2003) at p. 824.

demands."[24] As one planner put it, "These laws are not going to stop sprawl. They are just going to make us more creative in how we find the water."[25] The experience with California's laws supports this conclusion. Of the ~10% of proposed California developments which were initially thought not to have a sufficient water supply, most found water in subsequent reviews.[26] However, there is contrary evidence as well. Since the mid-90s, California jurisdictions with water availability screening policies have approved 13-22% fewer residential construction permits compared to jurisdictions without similar policies.[27] But this discrepancy might be due to longer delays before approval, downsizing or refusal of projects, or an increased climate of uncertainty surrounding the approval process leading to fewer applications.[28]

Another concern is that these laws encourage rampant water acquisition at the expense of rural areas and the environment. For example, some feared California's law would encourage developers to "look everywhere—underground aquifers, creeks, far-flung water agencies, storage banks and reclamation plants—for the billions of gallons needed to supply future faucets."[29] Others observed that Arizona's law "triggered a race to acquire water ranches and other sources of supply."[30] However, as noted, the laws are encouraging developers to rely on water conservation in order to meet the water availability requirements.

Finally, assured supply laws may intensify overuse of groundwater if it is not explicitly addressed as in Arizona's Groundwater Management Act.[31]

iii. Design Elements of Effective Assured Water Supply Laws

According to Davies (2008), the effectiveness of assured water supply laws depends on five design elements: whether the laws are *compulsory* rather than voluntary; whether they are *stringent* in that they require a showing of real "wet" water rather than paper water; whether they are *universal* rather than applied on an ad hoc, fragmented basis; whether they are *granular* in that they cover all or most developments without loopholes; and whether they are *interconnected* with broader water planning, water conservation, and, potentially, overall environmental planning.[32] A weak or poorly written assured water supply law is worse than no law at all since it might cause confusion and possibly prevent further action on the water-land use front. "In the rush to connect land use and water planning decisions, it is thus important not to get lost in the mere notion that assured supply laws are good, but also to recall that how they are built and implemented very much matters."[33]

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[24] Lucero and Tarlock (2003) at p. 827.
[25] Davies (2008) at p. 1275.
[26] Hanak (2005) at pp. 74-75.
[27] Hanak (2005) at p. ix.
[28] Id. at p. ix-x.
[29] Thompson (2005) at p. 113 n. 69.
[30] Tarlock and van de Wetering (1999) at p. 177.
[31] Davies (2008) at p. 1278.
[32] Davies (2008) at p. 1280.
[33] Davies (2008) at p. 1292.

Assured water supply laws may be less effective if they do not apply uniformly. For example, Arizona's Groundwater Management Code imposes less strict requirements on areas outside the AMAs, resulting in approval of subdivisions in those areas even though it is known there may not be enough water for new homeowners. Since 2001, approximately one-third of the applications submitted lacked adequate supplies, but most projects still proceeded, resulting in thousands of rural homes lacking a guarantee of water.[34] "Selling dry lots, whose buyers are responsible for their own water and have to truck it in if they can't drill a well, is not only legal under Arizona's water laws, it is increasingly fueling development in the state's fastest-growing rural areas."[35] While in 2007 Arizona granted local government the authority to reject proposed subdivisions without an adequate water supply, if the subdivision is not in a county or municipality with an ordinance, it can still proceed without an adequate water supply. All that is required is that buyers be provided with notice that the water supply is lacking.[36]

While most local governments in Oregon have ordinances incorporating water availability into their development regulations and ordinances, there is a great deal of variation in how well those regulations tie land use and water:

> [A]ssured supply law in Oregon is typified by local differentiation, with requirements ranging from restrictive, explicit rules to general, barely-there measures. Moreover, even where a locality's assured supply ordinance may appear stringent on its face, how the locality chooses to apply its ordinances is critical. Although local planning decisions are generally subject to review by the Oregon Land Use Board of Appeals (LUBA), localities receive great deference on both factual findings and the interpretation of their own ordinances. Thus, as a practical matter, how a locality in Oregon chooses to interpret its local assured supply requirement may matter just as much as, if not more than, the fact that the locality has the requirement at all.[37]

In Colorado, CRS 30-28-133 provided the legal framework for El Paso County's regulation requiring developers to secure a 300-year water supply for each proposed subdivision. Mayo (1990) described this regulation as "the nation's most stringent water supply requirement for land development."[38] However, municipalities lacked the authority to enact such requirements until 2008 when HB 1141 specifically granted municipal governments the same authority as counties to require that developers show an adequate water supply.[39]

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[34] Davies (2008) at p. 1266.
[35] McKinnon (2005) at p. 1.
[36] The ADWR reports that "for most areas outside of the AMAs an adequacy determination from the Department is not required prior to recording a plat and initiating lot sales" Arizona Dept. Water Resources (undated).
[37] Davies (2008) at p. 1259.
[38] Mayo (1990) at p. 197.
[39] Dawson (2008).

California's laws are stringent in that they require developers to provide proof of actual water availability through historical data. In contrast, the mere possibility of future water has been deemed sufficient to satisfy water availability requirements under county ordinances passed pursuant to Oregon's law.[40]

California's law lacks granularity because it is limited to developments of over 500 units.[41] Colorado's HB 1141 has a lower threshold of over 50 units. However, even 50 units may not be granular in rural areas. As one water manager put it, "subdivisions in excess of 50 lots are pretty rare in the Upper Gunnison Basin."[42] Washington's law that requires a showing of water availability for individual buildings is an example of a highly granular law. However, Davies (2008) characterizes Washington's law as "lax."[43]

b. Other Approaches

Several other approaches have been taken to better connect land use planning and water. They are discussed briefly below.

Consistency Doctrine

The consistency doctrine requires that plans at various levels of government (state, regional, local, private) be consistent with each other. The following states have consistency provisions in their planning statutes: Arizona, California, Delaware, Florida, Kentucky, Maine, Nebraska, New Jersey, Rhode Island, Oregon, Washington, and Wisconsin. Tarlock and Lucero (2002) recommend that the state establish a planning framework with clear goals and policy direction on sustainable water supplies, guidance about elements to include in comprehensive plans, and data or information to support the planning process.

Clarification or Revision of the Duty to Serve

Courts have begun to modify the utility's duty to serve to recognize growth management considerations. For example, they have clarified that the duty does not prevent cities from subordinating utility service to land use planning.[44]

Water Moratorium

Another approach taken by some water providers in California is to declare a water emergency under state law. Then if the provider is unable to identify new water supplies, the emergency becomes a long-term water moratorium. Water providers claiming a water moratorium must exert every reasonable effort to augment available supplies to

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[40] Davies (2008) at p. 1282-1283.
[41] California's water supply requirement will apply to developers with less than 500 units if the subdivision will cause a 10% increase in service connections. Cal. Govt. Code sec. 66473.7(a)(1).
[42] Dawson (2008).
[43] Davies (2008) at p. 1288 n. 376.
[44] Tarlock and van de Wetering (2007) at p. 8.

meet increasing demands, including implementing mandatory conservation measures, fining excessive consumption, and providing incentives for new users to pay existing users to conserve:[45] Some providers have refused to find new water, thereby using the water moratorium as a surreptitious growth control mechanism. This strategy can backfire, however. For example, Santa Barbara, Goleta, and Marin County, California, residents rebelled against severe water conservation measures by reversing their longstanding opposition to importation of water. Once the water moratoria ended and water supplies increased, growth resumed.[46]

Water element in comprehensive plans

Municipalities often include a water element in comprehensive plans as a strategy to link water and land use planning. Benefits from this approach include promoting more cooperative planning between water and land use, helping local governments comply with state and federal laws, providing better information for the public and increased predictability of the development process, allowing for timely updates of water-related issues in the general plan, and avoiding litigation. However, reasons to oppose a water element include the fact that it is an unfunded mandate, that it is difficult to measure costs and benefits from such an element, California's negative experience with a housing element, and the danger of using a water element to unreasonably prohibit growth.[47]

Rethinking Demand Projections

Water demand projections, which determine how much supply a water utility must acquire, are based on a community's population projections. Water demand projections will be inflated if a community overestimates future population growth. The process of making population projections provides an "unrealized opportunity to question the assumptions that often lead to aggressive pursuits of water with little or no consideration of the tradeoffs of growth, alternative future scenarios, or whether residents are willing to pay for the infrastructure to support projected growth. The process of developing growth projections could form the basis for a productive, coordinated regional dialogue, but this rarely happens."[48] There are some signs that unrealistically high water demand projections of the past are being reconsidered in light of actual demand data. The Colorado Water Conservation Board (CWCB) revised its 2000 demand projections with more recent – and in some cases lower - demand data.[49] The City of Seattle has revised its projections downwards several times over the past forty years to be more consistent with actual water use trends which have been flat over the years.[50]

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[45] Herman (1992).
[46] Herman (1992) at pp. 449-450; Thompson (2005) at p. 117.
[47] Waterman (2004).
[48] Van de Wetering (2007) at p. 11; see also Coulson (2005).
[49] Colorado Water Conservation Board (2008).
[50] Nelson et al. (2007).

III. Discussion

Courts and agencies in the past have discounted demand management as an appropriate response to future water needs.[51] For example, a federal court upheld an agency position that "sound water supply planning" did not encompass water restrictions because they "create public health and safety risks."[52]

More recent thinking views water conservation as an important means of providing water for population growth. According to Hanak (2005), "If we are to accommodate the millions of new residents anticipated over the coming decades, new water will need to be part of the equation….studies have shown that urban conservation is one of the largest potential sources of cost-effective new supplies. The implication is clear: Conservation by existing residents will need to be part of the new water portfolio."[53]

Water conservation, either in new or existing homes, can help satisfy assured water supply laws. In the first two years of California's laws one-third of all new projects under review were required to introduce recycled water or conservation measures to obtain approval.[54]

Using water conservation for growth is not without controversy, however. Residents have opposed water conservation measures such as metering which they feel will facilitate growth by increasing the water supply.[55] Similar sentiment was expressed in Santa Fe: "It's going to be hard to be gung ho about conserving water when the water is going to new development".[56]

Another concern for current residents is that if they reduce their water consumption in order to accommodate growth, there will be less flexibility to make further reductions during times of drought (or water shortages caused by climate change).[57] Peter Mayer found that "demand hardening"—the notion that long term conservation will reduce the water savings potential for short term demand management strategies during water shortages[58]—may become a concern during water shortages if conserved water has been used to serve new customers. However, his study concluded that some portion of conserved water can be used to serve new customers without negatively impacting reliability.[59] Given the choice between acquiring new supplies versus using demand management to accommodate growth, Thompson concludes that "Many regions are quite profligate in their water use and, although local residents may like receiving cheap water

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[51] See Tarlock and Van de Wetering (1999) at p. 173.
[52] North Carolina v. FERC, 112 F.3d 1175 (D.C. Cir. 1997), accessed 4/22/09 at http://cases.justia.com/us-court-of-appeals/F3/112/1175/585318/.
[53] Hanak (2005) at pp. 91-92.
[54] Hanak and Browne (2006) at p. 162.
[55] Hanak (2005).
[56] Lucero and Tarlock (2003) at p. 824 n. 91.
[57] Thompson (2005) at p. 111.
[58] Flory and Panella (1994).
[59] Mayer (undated).

that they can use with abandon with little fear of droughts, land use planners should not proscribe otherwise sensible growth to preserve current water supplies."[60]

The Rocky Mountain Climate Organization report recognizes the dilemma that water managers face:

> Water conservation is favored by many water suppliers as a cost-effective means to decrease the need for new water development. The risk of a drying climate poses a new dilemma for water suppliers. Do the suppliers use the water saved from conservation to 1) supply new population growth, 2) reserve some or all of the saving to protect against shrinking supplies, or 3) set aside some savings for environmental purposes such as improving river habitat? If the supplier uses the savings exclusively to supply growth in its service area, water efficiency is increased but more people become dependent on the same supply of water. If that supply shrinks, the additional savings needed to provide for the essential human uses in that supplier's service area might substantially impact landscapes and businesses within the service area. Water suppliers need to recognize that the choices are very case-specific and a given volume of saving can usually only be used for one choice. The saved water probably cannot do double duty. Water suppliers should carefully consider the risks and potential tradeoffs of this dilemma.[61]

IV. Summary and Conclusion

Nine of the eleven contiguous western states have enacted some version of an assured water supply law. These laws take a variety of forms from universally applied and mandatory, to not applied at all in parts of the state, with varying degrees of effectiveness. No single approach is perfect, though Davies (2008) thinks a compulsory, stringent, universal California-type approach (albeit with greater granularity) is more effective than a more voluntary, county-by-county Oregon-type approach. The laws do appear to be preventing at least some dry development, though not growth per se, as well as encouraging water conservation.

While the laws are providing incentives for developers to install water efficient appliances in both new and existing homes, the saved water appears to be intended to serve new residents rather than provide a climate cushion. In that respect, the assured water supply laws could limit the opportunities for using demand management as a climate change adaptation strategy.

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[60] Thompson (2005), at p. 113.
[61] Rocky Mountain Climate Organization (2007) at pp. 8-11 – 8-12.

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