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# exposures

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**Written in Water**



**EXCLUSIVE**

Prehistoric Rock Art as  
Landscape Art



**ASLA**  
COLORADO



*(All imagery courtesy of Oxbow Design Collaborative)*

## WATER RESOURCE MANAGEMENT IN DESIGNED LANDSCAPES OF THE AMERICAN WEST

By David Gregory, Diana Denwood

**T**his article views Water Resource Management in Designed Landscapes of the American West. Our most critical natural resource will be discussed through the lens of contemporary landscape architectural practice in terms of Planning, which is necessary to confront the issue of water scarcity.

### Here is a land where life is written in water.

*-Colorado's late Poet Laureate, Thomas Hornsby Ferril*

If you have ever visited the Eastern Sierra Mountains along Highway 395 in California, you can recall that it is a beautifully dramatic landscape with 14,000 ft. snow-capped peaks that abruptly rise up off the desert floor. It is a vast desert landscape, sparsely populated and stark, with miles of preserved open space, an abundance of biodiversity, and endless recreational opportunities. As a young person from the east I recall this landscape very well as it is beautiful and altogether different than anything east of the Mississippi. On

one trip in particular, my destination was the Owens River Gorge, which lies to the east of the Sierra Nevada escarpment in the shadow of the high mountains. I distinctly remember a strikingly incongruent landmark: a 12' diameter pipeline guarded by chain link fence that headed off as far as the eye could see through the otherwise completely natural landscape. The signage on the fence and the lettering on the pipeline read "Property of LADWP." LADWP stands for Los Angeles Department of Water and Power. The pipeline is a part of the Los Angeles Aqueduct built in 1908 to serve the City of Los Angeles, bringing water from the Owens River overland 338 miles to allow for prosperity in places far too dry to sustain a growing population. The Owens River and Owens Lake are part of the Great Basin and therefore, do not drain naturally to the ocean. Rather, surface water flows into various inland lakes and has since been pumped south to serve the City of Los Angeles. Today, Owens Lake is a dry lake bed and the Owens River flows at a fraction of its native volume.





Twentieth century water infrastructure like the Los Angeles Aqueduct and the Hoover Dam were marvelous engineering feats for their time, and demonstrate just how far the cities of the American West will go to secure a reliable water supply and a future existence. At great financial, political, and ecological expense, vast and complex water storage facilities and distribution networks were created to serve the needs of a growing population. Cities expanded at exponential rates on lands that would have been thought to be illogical, infeasible, even laughable one hundred years ago. Our water infrastructure and green lawns symbolize the great transformation of the western landscape – and sets the stage for our contemporary water predicament.



From the 100th Meridian to the California coast, the American West is unique and ever-changing in many regards but one identifying characteristic remains the same – the West has limited and unpredictable patterns of precipitation. Despite obvious difficulty, transformation of this strange and dry country was inevitable. Early explorers and researchers saw the challenges that the Western climate posed to human industry. In 1878, after his

expedition down the Colorado River, John Wesley Powell delivered a report to Congress entitled “Report on the Lands of the Arid Region of the United States.” It stated, “The physical

conditions which exist in the arid lands, and which inexorably control the operations of men, are such that the industries of the West are necessarily unlike those of the East.” At the time of this report, the arid lands became a unique natural resources problem. In the late 19th and early 20th centuries, one solution in particular enjoyed broad-based support: “rain follows the plow.” The basic idea was that if enough arid land could be irrigated and planted, eventually it would become more temperate – an absurdly grandiose solution that did not prove successful. Similarly, a century later there are still grandiose solutions offered; like the construction of a 600 mile pipeline from the Missouri River to new development along Colorado’s Front Range. Nonetheless, other solutions were realized: reservoirs, dams, pipelines, and irrigation ditches mark the Western landscape and provide water and electricity to millions of people. Every year in Colorado, pipes carry thousands of acre-feet of water from the relatively water-rich mountains over a hundred miles to water-poor Front Range cities. When a resource is so precious, it requires special protections. Just as law and policy responds to rights such as intellectual property and land, unique laws and policies have formed around Western systems for collecting, storing, and distributing water.

The famous quote attributed to Mark Twain, “whiskey is for drinking, water is for fighting over,” is as true now as it was 150 years ago. In the late 19th century, greater numbers of settlers moved west, fueled by incentives such as the Homestead Act of 1862. It became apparent that a formal system of water allocation was needed to provide enough water during times of shortage.



Colorado's Doctrine of Prior Appropriation, or "first in time, first in right," became the water law standard for most states west of the Mississippi River. It states that older, senior water rights take precedence over younger, junior rights. This allows all senior water rights greater certainty of access to their water. The doctrine also states that the right to divert unappropriated waters of any natural stream to beneficial uses – as determined under the law – will never be denied.<sup>1</sup> Whether you agree or disagree with the laws in their conception or in application, these policies reflect a 'finders keepers' logic that is unlikely to change in the near future because of the valuable property rights issues involved. Any progress made to allow for greater innovation in water resources planning will likely require a very unique solution that works within the existing legal framework and acknowledges the expenses and efforts of current water rights holders. That said, progress is needed and current laws may have to adjust in response to massive changes coming to the West.

Today we are faced with an unprecedented set of issues that call for new approaches to western water resource management. The issue of water supply has been joined by the need to plan for climate change and population growth. Not only are these issues difficult to address, but they are facing us in an environment that is increasingly unpredictable and complex. The traditional and arguably static planning model that called for predictions and plans will need to be replaced with a much more flexible, adaptable, and dynamic model that embraces change as the new norm and works toward a more resilient and sustainable American West.



The vast networks of collection, storage, and distribution systems have made our large western cities possible, and were built for the world of the 20th century, when water was scarce but snow in the Rocky Mountains was generally plentiful and populations were manageable. Reservoirs that today store water for millions of new residents along Colorado's Front Range rely completely on slowly-melting snowpack from the previous winter and spring's precipitation. In the west, higher than average temperatures and frequent drought is becoming the norm. In 2012, "the contiguous United States experienced its warmest

year since national record keeping began in 1895," reported the National Oceanic and Atmospheric Administration's National Climatic Data Center.<sup>2</sup> Southern California relies heavily on the historically consistent reservoirs of Lakes Powell and Mead on the Colorado River. The California Department of Water Resources has reported that "Powell has been below average in 10 of the past 13 years, resulting in reduced storage levels" in both Mead and Powell.<sup>3</sup> With the Department predicting a drier than normal forecast for the Colorado River Basin,<sup>4</sup> and the US Drought Monitor confirming that January 2013 saw drought conditions throughout the Basin and in southern California,<sup>5</sup> it is probable that lean times will continue for California and all those who rely on the Colorado River Basin for water – over 100 cities including Denver, Albuquerque, Las Vegas, Los Angeles, San Diego, and Phoenix to name a few.<sup>6</sup> "I think, unfortunately, 2012 really may well be the new normal," said Daniel Lashof, Director of the Climate and Clean Air Program at the Natural Resources Defense Council, a U.S. environmental group. "It's the kind of year we expect, given the global warming trend is ongoing."<sup>7</sup>

While many urban policymakers are beginning to understand that the 21st century will bring increased drought frequency and severity, many land use policies and practices that affect our citywide water consumption behaviors are still stuck in the 20th century. The highest consumptive use of water in any given Western city is irrigation for landscaping, ranging from around 40 percent to as high as 75 percent. Residential properties in the Las Vegas Valley, for example, use on average 70 percent of their water outdoors. Many of the current municipal landscape ordinances and Home Owners' Association rules encourage the waste of water by requiring large expanses of bluegrass turf. On Colorado's Front Range, grass cannot survive on precipitation alone; it needs an average of an additional 28" of water each year. A smallish grass yard of about 5,000 square feet needs over 85,000 gallons of water each year to stay healthy. That amount of water would serve five people with all of their indoor water needs for a year. City policymakers, planners, residents, and landscape professionals can work together to support and even incentivize water-smart landscaping to reduce the "water footprint" or urban spaces.





As we look back to the century that has passed for lessons learned, one unanticipated consequence of our highly engineered water solutions has become abundantly clear: our culture has become dependent on expensive and static systems that regulate and deliver a resource with which we have little conscious relationship. Our systems are costly but individuals are not confronted with an obvious cost. The water bill is low. The drained creek is not in our backyard. From a sustainability and community standpoint, our current solutions have created a disconnect with the general public. The notion that we can simply turn on the faucet and water will flow without limit and at a fraction of its true cost will no longer suffice in this time of population growth and climate change. New regulations at all levels of government, emerging technologies, and conservation efforts are protecting water resources, but there is something missing: we do not have a strong cultural and emotional connection to the resource. As we look forward to the future, we must move beyond engineering solutions and reinvigorate our culture's relationship to water. Individuals must learn to consciously value water, to consider its origin, and realize that they are not its only dependents. Consequently, whether conscious or not, it is through this resource that our culture, landforms, weather, agriculture, and cities are understood and interpreted. Over time, this relationship can emerge and be cultivated

to encompass not only an understanding of water as a resource but a sense of connection to the land, and ultimately, a connection to the future.

### **You know the worth of water when the well runs dry.**

*- Ben Franklin*

As planners and design professionals capable of envisioning and communicating what the future in the West looks like we have a very unique opportunity to seize a lead role in changing our cultural relationship to water. As planning and design leaders we should encourage awareness through dialogue, provide education through the use of language that clearly articulates the issue, and inspiration through visualization that will allow access to built projects and unlock potential aesthetic and functional outcomes. What does the West look like in 50 years? 100 years? Will we adopt a methodology of a more simple time - to design and engineer our way through any problem or any shortage no matter what the difficulty, expense or cost to limited resources? Or will we see an opportunity to use our knowledge, skills, and abilities as designers to imagine and communicate a future that looks different and more sustainable? Through awareness, dialogue, and action, a grassroots movement focused on water scarcity can foster a broad-based emotion-

al connection to the resource that will gather momentum in much the same fashion as the recycling movement. Is there any good reason why people living in the West would undervalue its most precious resource? It is true that water scarcity is our most pressing issue but by no means does it exist in isolation. This is where the true opportunity lies. Design and planning innovation is at the center of the water, energy, and climate nexus and the reality is that we cannot treat them as mutually exclusive. Rather, we should treat the issue as the connective tissue that connects our health, well-being, and safety in the west. If our efforts stop short at simply conserving water- without a cultural message and without making the connection to climate change and energy issues- then we may be marginally successful on the supply side but we will not recognize the gravity of the issue nor will we have addressed the root cause of the problem. Alternatively, if we take a leadership role on this issue we can not only conserve water, we can help drive the political discourse and ultimately, lead us down a more sustainable path.

Consensus on this topic says there is not one idea, one policy, one cultural shift that will lead us into a future with a reliable water supply. Rather, it is a combination of efforts on the part of many working together from the ground up that will design, plan, and innovate our way into a sustainable future – a future that has a responsible and inclusive decision making apparatus that allows everyone into the process and allows a heightened relationship with the resource to emerge.

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4. California Department of Water Resources, (2012). DWR Experimental Winter Outlook Water Year 20012-2013. Retrieved from [www.water.ca.gov/waterconditions/drought/docs/Winter\\_outlook\\_2012\\_handout.pdf](http://www.water.ca.gov/waterconditions/drought/docs/Winter_outlook_2012_handout.pdf)

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6. Cohen, M. Pacific Institute, (2011). Municipal deliveries of Colorado River basin water. Retrieved from [www.pacinst.org/reports/co\\_river\\_municipal\\_deliveries/crb\\_water\\_8\\_21\\_2011.pdf](http://www.pacinst.org/reports/co_river_municipal_deliveries/crb_water_8_21_2011.pdf)

7. CNN Staff. (2013, January 9). Hundreds of U.S. Counties Labeled Disaster Areas Due to Drought. Retrieved from [www.cnn.com/2013/01/09/us/drought/index.html?iref=allsearch](http://www.cnn.com/2013/01/09/us/drought/index.html?iref=allsearch)

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**Diana Denwood** is a water conservationist specializing in xeriscape maintenance and design. Always at the heart of her work are the principles of resource conservation, ecological preservation, and sustainable living. After earning a Master's degree from the University of Colorado-Denver's Urban and Regional Planning program in 2010, she supported energy efficiency and renewable energy projects for a municipal planning department. Currently, Diana supports water conservation and community garden initiatives in Colorado.



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