

Water Conservation

Revised 11-16-09

INTRODUCTION

Worsening drought, population growth and record wildfire seasons in recent years have called sharp attention to the need to make more efficient use of our water supply. While states and communities in the arid Southwest have understandably led the charge in improving municipal water efficiency through regulations, even cities on the water-rich Great Lakes, like Chicago, have found themselves exceeding their water allowances and developing efficiency strategies.¹ For municipal water providers, water availability is a three-part equation, balancing water supply (surface and ground plus storage), water treatment capacity, and water distribution capacity. Each part of the equation poses costs and challenges to communities in the form of acquiring adequate water rights and investing in and maintaining the treatment and distribution infrastructure. In the next twenty years, the United States' population will increase by approximately 53 million and the nation will be forced to rise to the challenge of balancing citizens' drinking, bathing, irrigation, and commercial processing needs with a finite supply of fresh water.

This section reviews methods of attacking this problem ranging from taking steps to manage peaks in water demand to recycling gray water for irrigation. The models and regulatory steps demonstrated here are taken from a variety of communities across the United States including Arizona, California, Minnesota, Florida, and Massachusetts as well as programs like the US Green Building Council's Leadership in Energy and Environmental Design (LEED) and the National Association of Home Builders (NAHB) Model Green Home Building Guidelines. The regulations are divided into the following ordinance categories for the purposes of this section:

- Water Waste
- Water Use
- Water Conservation

The vast majority of communities with water conservation ordinances in place couple these regulatory tools with an essential variety of educational materials and financial incentives to promote optimal efficiency. Educational campaigns aim to reinforce conservational activities ranging from everyday options for reducing waste to implementing new technologies and practices like rain gardens and rainwater harvesting systems. Incentives are often in the form of rebates that facilitate efficiency updates to existing buildings. These rebates are available for things like installing water efficient appliances, toilets, faucet aerators and shower heads. Rebates are also available for landscaping activities like removal of turf and can be applied to things like free or discounted rain sensors for irrigation systems. These types programs help promote the adoption of new technologies and practices and help improve the efficiency of existing developments that are not impacted by other regulatory tools. Any community interested in improving water efficiency should consider education and incentive tools in conjunction with regulations as part of their overall strategy.

IMPLICATIONS OF NOT ADDRESSING THE ISSUE

Failing to establish water conservation provisions at the local level can have a significant impact on the future growth, the economy, and the food supply of a community. Because water is essential to life one can argue that eventually communities must improve their conservation efforts and decrease their water usage. The implications of waiting to address this problem are costly and damaging in the long run. Communities that have embraced water conservation measures have enjoyed significant reductions in overall water consumption for both residential and non-residential development.

¹ Daley, R.M. (2003, September). *Chicago's Water Agenda*. Presentation at the Urban Water Summit on September 10, 2003 in Chicago, IL.



Southwestern communities, whose long relationship with water conservation measures have allowed for analyses, have enjoyed marked improvements since implementing conservation ordinances. From 1994-2005 Albuquerque, New Mexico decreased the system-wide per capita use from 250 gallons per day to 173 gallons per day. During the same period, Tucson, Arizona reduced consumption from 169 gallons per day to 156 gallons per day. Improvements in some areas are more immediate. In only three years, the Las Vegas Valley brought their per capita consumption down from 283 gallons per day to 256 gallons per day. Reducing demand on the water supply system helps to extend the life of existing infrastructure, eliminate or prolong the need for system capacity upgrades for treatment, distribution, and storage, and enhances communities' ability to deal with a drought.

GOALS FOR WATER CONSERVATION

The primary goals of the tools and regulatory measures discussed in this section are to:

- Reduce community per capita water use while retaining attractive landscapes
- Enable communities to meet future needs of growing populations
- Protect ground and surface water supplies from unsustainable depletion
- Eliminate wasteful water use practices
- Reduce wastewater treatment volume and associated municipal expenditures; and
- Promote the increased use of harvested and recycled water for irrigation needs

Special Note: Some provisions suggested are not legal in all states. For example, Colorado law generally restricts the reuse of tributary waters which forecloses certain conservation measures like using water harvesting barrels.

Sustainable Community Development Code Framework

WATER CONSERVATION

KEY STATISTICS:

- The population of the United States is anticipated to reach 439 million people by 2050²
- Ninety percent of all drinking water in the United States is pumped from groundwater supplies and most communities have witnessed falling water tables³
- Water use is exceeding the recharge rate⁴
- Global warming forecasting predicts steadily increasing temperatures worldwide, more extreme storms, increased drought in some locations and increased flooding in others⁵
- Landscape irrigation accounts for approximately 51 percent of all domestic water consumption in the United States⁶
- There is a high level of variability in per capita water consumption between municipalities in comparable climatic zones⁷



I. WATER WASTE

		Achievement Levels			References/Commentary	Code Examples/Citations
		Bronze (Good)	Silver (Better)	Gold (Best)		
	Remove Obstacles	<ul style="list-style-type: none"> ▪ Identify limiting ordinances (e.g., conditions, covenants, and restrictions) that require the use of turf in lawns and common areas and craft exceptions to these ordinances ▪ Permit rain gardens, drainage swales, and similar facilities by right 	<ul style="list-style-type: none"> ▪ Allow attractive hardscaping alternatives to landscaping requirements (e.g., ornamental gravel, mulch) 	<ul style="list-style-type: none"> ▪ Override private covenants and restrictions that require turf grass or limit water-conserving landscaping 	<ul style="list-style-type: none"> ▪ Wisconsin Department of Natural Resources, <i>Rain Gardens: A how-to manual for homeowners</i>. Available online. Retrieved November 1, 2009. 	<ul style="list-style-type: none"> ▪ Las Vegas Valley communities served by Southern Nevada Water Authority including Boulder City, Henderson, North Las Vegas, Clark County, Las Vegas (multiple ordinances) ▪ Water waste and tampering ordinances, City of Tucson, AZ. <i>Water Conservation Ordinances</i>. Available online. Retrieved November 2, 2009. ▪ Reduced water use credit plan, U.S. Green Building Council. <i>LEED for Neighborhood Rating System</i>. Available online. Retrieved November 2, 2009.
	Create Incentives	<ul style="list-style-type: none"> ▪ Grant extra landscaping credit for rain gardens . 	<ul style="list-style-type: none"> ▪ Accelerate site-planning and building permitting for developments meeting LEED-ND (LEED Neighborhood Development) water conservation standards 	<ul style="list-style-type: none"> ▪ Give extra landscaping credit for protection of native plants on site ▪ Give bonus points in design review systems for water conservation and water harvesting. 	<ul style="list-style-type: none"> ▪ More information on rain gardens and sample garden plans, Rain Gardens of West Michigan. <i>Raising Awareness About Stormwater Issues</i>. Available online. Retrieved November 1, 2009. ▪ A comprehensive definition of water harvesting and water 	

² Bernstein, R., Edwards, T. (2008) An Older and More Diverse Nation by Midcentury (2007) 2006 American Community Survey, *U.S. Census Bureau News* CB08-60, 2-11.

³ Citation for falling water tables

⁴ Stat for water use v. the recharge rate.

⁵ Intergovernmental Panel on Climate Change [IPCC] (2007). *Climate Change 2007: The Physical Science Basis*. Intergovernmental Panel on Climate Change.

⁶

⁷ Roessler, C. (2008). Changing Water Policies in the Dry Southwest: Smart water use and a shift in water culture form a winning strategy. *The American Prospect*, May, 2008. (Discussing that in 2005 the average single-family residential water consumption in Tucson, AZ, was 114 gallons per capita per day compared to 174 in Las Vegas, NV)

Sustainable Community Development Code Framework

WATER CONSERVATION

						<p>harvesting techniques. Coen Reijntjes. <i>Water Harvesting: A review of different techniques.</i> Available Online. Retrieved November 14, 2009.</p>
	Enact Standards	<ul style="list-style-type: none"> ▪ Include optional low-water landscaping or plant list as part of landscaping code 	<ul style="list-style-type: none"> ▪ Require all new commercial and multi-family developments to use Xeriscape (drought tolerant) principles and low-water plants from an established plant list to landscape 	<ul style="list-style-type: none"> ▪ Require use of on-site or municipal recycled and harvested water for non-potable uses 	<ul style="list-style-type: none"> ▪ Albuquerque, NM enjoyed a 35% decrease in single-family residential daily per capita water consumption after adopting water-efficient landscaping provisions 	

II. WATER USE

		Achievement Levels				
		Bronze (Good)	Silver (Better)	Gold (Best)	References/Commentary	Code Examples/Citations
	Remove Obstacles	<ul style="list-style-type: none"> ▪ Update building codes to fully comply with the US Energy Policy Act of 1992 (EPAct) 	<ul style="list-style-type: none"> ▪ 	<ul style="list-style-type: none"> ▪ 	<ul style="list-style-type: none"> ▪ 	<ul style="list-style-type: none"> ▪ Las Vegas Valley communities served by Southern Nevada Water Authority including Boulder City, Henderson, North Las Vegas, Clark County, Las Vegas (multiple ordinances) ▪ No water waste ordinance, City of Santa Monica, CA Office of Sustainability and the Environment. Available online. Retrieved October 31, 2009. ▪ Residential water conservation ordinance, City of San Francisco, CA. Available online. Retrieved October 30, 2009. ▪ Water use management ordinance, City of Austin, TX. Available online. Retrieved October 26, 2009. ▪ City of Flagstaff, AZ. <i>Water Conservation Strategies.</i> Available
	Create Incentives	<ul style="list-style-type: none"> ▪ Allow increased density in exchange for reduced water use in multi-family developments 	<ul style="list-style-type: none"> ▪ 	<ul style="list-style-type: none"> ▪ Large Customer Mandatory Water Conservation Plan – require large water users (e.g., those consuming more than 50,000 gpd) to submit a long-range water conservation plan that addresses both indoor and outdoor water use. ▪ Clearly define enforcement methods and associated penalties in the ordinance 	<ul style="list-style-type: none"> ▪ Western Resource Advocates. <i>Water in the Urban Southwest.</i> Available Online. Retrieved November 1, 2009. 	
	Enact Standards	<ul style="list-style-type: none"> ▪ Prohibit landscape watering between 11:00 AM and 7:00 PM during hot and dry months (as defined by local temperature and precipitation patterns) 	<ul style="list-style-type: none"> ▪ Regulate days of the week watering is allowed (e.g., alternate days between even and odd street numbers) ▪ Restrict watering on steep 	<ul style="list-style-type: none"> ▪ Regulate water-wasting outdoor activities such as hosing down pavement, buildings, or equipment by requiring runoff to be returned 		

Sustainable Community Development Code Framework

WATER CONSERVATION

			<p>slopes</p> <ul style="list-style-type: none"> Require installation of water meters on all new construction and rehabilitation projects 	<p>directly to a stormwater drain</p> <ul style="list-style-type: none"> Regulate wasteful residential irrigation practices such as misdirected spray heads, runoff into driveways or adjacent lots and malfunctioning sprinklers Require all new and renovated car washes to install water recycling systems 		<ul style="list-style-type: none"> online. Retrieved November 1, 2009. City of Shrewsbury, MA. <i>Water Conservation Tips</i>. Available online. Retrieved November 1, 2009.
--	--	--	--	---	--	--

III. WATER CONSERVATION: REDUCE DEMAND ON WATER TREATMENT AND DELIVERY SYSTEMS

Rainwater Harvesting and Greywater Recycling	Achievement Levels				References/Commentary	Code Examples/Citations
		Bronze (Good)	Silver (Better)	Gold (Best)		
 <p>Remove Obstacles</p>	<ul style="list-style-type: none"> Identify limiting regulations and private covenants (e.g., homeowner association conditions, covenants and restrictions) and craft exceptions that include allowing rainwater harvesting tanks Repeal bans on developments having on-site rainwater harvesting systems notwithstanding statewide prohibitions. Work with legislators to update state law where current regulations expressly or effectively prohibit greywater recycling. 	<ul style="list-style-type: none"> Allow above and below-ground water storage tanks as a conditional use (a land use requiring additional review) except in special districts (e.g., historic districts) or locations where on-site retention of rainwater is prohibited by law. 	<ul style="list-style-type: none"> Allow water storage tanks as a by-right accessory use except in special districts (e.g., historic districts) or locations where on-site retention of rainwater is prohibited by law. 	<ul style="list-style-type: none"> Arizona is commonly regarded as the best example of statewide legislation for greywater recycling, City of Tuscon, AZ. <i>Rain Water Harvesting and Grey Water Reuse Resources</i>. Available online. Retrieved November 2, 2009. Texas Water Development Board. <i>The Texas Manual on Rainwater Harvesting</i>. Available online. Retrieved November 1, 2009. City of Lighthouse, British Columbia. <i>Greening the BC Building Code: Next Steps</i>. Available online. Retrieved October 24, 2009. Arizona State law on greywater recycling with further analysis and state-by-state comparative discussion, Oasis Design. <i>Improvements on Greywater Laws</i>. Available online. Retrieved 	<ul style="list-style-type: none"> Reclaimed water ordinance example, City of Palm Beach,, FL. <i>Ord. No. 97-12, § 1, 5-20-97</i>. Available online. Retrieved October 23, 2009. 	

Sustainable Community Development Code Framework

WATER CONSERVATION

					November 1, 2009.	
	<p>Create Incentives</p>	<ul style="list-style-type: none"> Reduce or eliminate permit fees for installation of water storage tanks Revise plumbing requirements and building codes to allow for greywater recycling systems 	<ul style="list-style-type: none"> Offer credits to residential and commercial developments that install water harvesting systems Eliminate permit requirements for greywater recycling systems for small residential systems 			
	<p>Enact Standards</p>	<ul style="list-style-type: none"> Create specific screening requirements to apply to this use appropriate to the use context Local jurisdictions could narrow system size and design requirements for different capacities of retention systems beyond those defined by state law 	<ul style="list-style-type: none"> Require the installation of recycled water irrigation systems in all new developments Require development designs to include water harvesting for landscape irrigation 	<ul style="list-style-type: none"> Require a percentage of irrigation water in developments to come from greywater or harvested rainwater Require greywater recycling systems 	<ul style="list-style-type: none"> Florida currently has a water recycling capacity of 1.1 billion gallons/day, over half of its total wastewater treatment capacity Florida Department of Environmental Protection, Florida Water Conservation Initiative (2002) 	<ul style="list-style-type: none">