Chapter 5
Rainwater Harvesting Guidelines

No national standards exist for rainwater harvesting systems. As a result, efforts abound to give assistance to those considering using rainwater as a water supply at state and local levels. In Texas the voluntary approach has been the hallmark of water conservation efforts, and a Water Conservation Best Management Practices (BMP) Guide produced by the Texas Water Development Board (TWDB) in 2004 included a section on Rainwater Harvesting and Condensate Reuse for use by water providers. (See References.) Guidance in other parts of the country ranges from voluntary guidelines such as BMPs to codes and ordinances stipulating minimum standards for various aspects of rainwater harvesting. The wide variety in approaches is summarized in this chapter by sharing a few key examples of the initiatives that are available to assist the planner of a rainwater harvesting system.

RWH Best Management Practices


American Rainwater Catchment Systems Association. The American Rainwater Catchment Systems Association (ARCSA) is in the process of publishing guidelines for potable and nonpotable rainwater harvesting systems. The guidelines will be available on the ARCSA website at www.arcsa-usa.org.

Other Voluntary Guidelines

A number of University-level programs have published guidelines that are helpful to rainwater designers and planners. Included among them are Texas Cooperative Extension’s guidelines and the University of Arizona’s “Harvesting Rainwater for Landscape Use,” both of which focus on capturing rainwater for outdoor irrigation. The University of Hawaii College of Tropical Agriculture and Human Resources in Hawaii produced “Guidelines on Rainwater Catchment Systems in Hawaii,” which has information for people using rainwater for potable consumption. (See References.)

These guidelines for potable systems recommend that storage tanks be constructed of non-toxic material such as steel, fiberglass, redwood, or concrete. Liners used in storage tanks should be smooth and of food-grade material approved by the U.S. Food and Drug Administration (Macomber, 2001).

Building Codes

In addition to voluntary effort, some states and municipalities are choosing to establish rules. Ohio, Kentucky, Hawaii, Arizona, New Mexico, Washington, West Virginia, Texas, and the U.S. Virgin Islands are considering or have developed rules related to rainwater harvesting.
Rules, ordinances, building codes, and homeowner association covenants nationwide run the gamut from requiring rainwater harvesting systems on new construction to prohibiting tanks as an eyesore.

In Texas, HB 645, passed by the 78th Legislature in 2003, prevents homeowners associations from implementing new covenants banning outdoor water-conserving measures such as composting, water-efficient landscapes, drip irrigation, and rainwater harvesting installations. The legislation allows homeowners associations to require screening or shielding to obscure view of the tanks.

The State of Ohio has the most extensive rules on rainwater harvesting in the United States, with code on cistern size and material, manhole openings, outlet drains, overflow pipes, fittings, couplings, and even roof washers. Ohio’s rules also address disinfection of private water systems. (See References.)

**Cistern Design, Construction, and Capacity**

Cistern design is covered by rules in some states, often embedded in the rules for hauled water storage tanks. In Ohio, cisterns and stored water storage tanks must have a smooth interior surface, and concrete tanks must be constructed in accordance with ASTM C913, *Standard Specification for Precast Concrete Water and Wastewater Structures*. Plastic and fiberglass tank materials and all joints, connections, and sealant must meet NSF/ANSI Standard 61, *Drinking Water System Components*.

In the U.S. Virgin Islands, Bermuda, and other Caribbean islands (islands without large reservoirs or adequate groundwater reserves), all new construction and even building expansion must have a provision for a self-sustaining water supply system, either a well or a rainwater collection area and cistern.

The rules for private water systems in the U.S. Virgin Islands state that new cisterns must have a minimum capacity of 2,500 gallons per dwelling (Virgin Islands Code, Title 29, Public Planning and Development).

The U.S. Virgin Islands specifies that cisterns for hotels or multi-family dwellings have a minimum capacity of 10 gallons per square foot of roof area for buildings of one story, and 15 gallons per square foot of roof area for multi-story buildings, although the requirement is waived for buildings with access to centralized potable water systems.

The City of Portland, Oregon, requires a minimum cistern capacity of 1,500 gallons capable of being filled with harvested rainwater or municipal water, with a reduced pressure backflow prevention device and an air gap protecting the municipal supply from cross-connection (City of Portland, 2000).

**Backflow Prevention and Dual-Use Systems**

The option of “dual-supply” systems within a residence – potable harvested rainwater supplemented with water from a public water system with appropriate backflow prevention – is an option that might be explored for residences which cannot collect enough rainwater.

In most Texas locations, rainfall occurs seasonally, requiring a large storage capacity to hold enough water collected during rain events to last through the dry spells.
Allowing for a connection to the public water supply system could serve to promote harvested rainwater as a supplemental water source to customers already connected to the public water supply infrastructure.

This “conjunctive” use would require an appropriate backflow prevention device to keep rainwater from entering the public water supply due to a drop in pressure in the utility’s distribution system.

The City of Portland has approved supplemental use of public utility water at a residence since 1996. The code includes specific guidance for design and installation of the system. It also limits rainwater to nonpotable uses. The Portland Office of Planning and Development publishes a RWH Code Guide which includes FAQ and the relevant code sections (City of Portland, 2000).

The State of Washington Building Codes Council in 2002 developed guidelines for installation of rainwater harvesting systems at commercial facilities. They are similar to the City of Portland guidelines mentioned above, but require a larger cistern size, determined by the size of the catchment area, which is limited to roof areas. In 2003, the Washington State Legislature approved a 10 percent reduction in stormwater fees for any commercial facility that installed a rainwater harvesting system in compliance with the guidelines (Washington State Legislature, 2003).

**Required Rainwater Harvesting Systems**

Perhaps the most supportive ordinances are those requiring rainwater harvesting in new construction.

For instance, Santa Fe County, New Mexico, passed the precedent-setting regulation requiring rainwater harvesting systems on new residential or commercial structures of 2,500 square feet and larger. A bill requiring rainwater harvesting systems on all new construction narrowly missed passage in the New Mexico legislature (Darilek, 2004; Vitale, 2004).

The City of Tucson, Arizona, has instituted requirements for water harvesting in its land use code as a means of providing supplemental water for on-site irrigation. In fact, “storm water and runoff harvesting to supplement drip irrigation are required elements of the irrigation system for both new plantings and preserved vegetation” (City of Tucson Code, Chapter 23).

Water harvesting in Tucson is also intended to help in meeting code requirements for floodplain and erosion hazard management (City of Tucson Code, Chapter 26).

**2005 Rainwater Harvesting Legislation**

The Texas Legislature passed House Bill (HB) 2430 in May 2005, establishing a rainwater harvesting evaluation committee to recommend minimum water quality guidelines and standards for potable and nonpotable indoor uses of rainwater. The committee will also recommend treatment methods for indoor uses of rainwater, methods by which rainwater harvesting systems could be used in conjunction with existing municipal water systems, and ways in which that the state can further promote rainwater harvesting. The committee consists of representatives from the Texas Water Development Board, Texas Commission on
Environmental Quality, Department of State Health Services, and the Texas Section of the American Water Works Association. The committee will provide its recommendations to the Legislature by December 2006.

References


City of Tucson Code, Chapter 23, Land Use Code, Section 3.7.4.5B. 2004.

City of Tucson Code, Chapter 26, Floodplain and Erosion Hazard Management, Section 26-10, Detention/retention systems. 2004.


Ohio Department of Health Final Rules, 3701-28-09 Continuous Disinfection, www.odh.ohio.gov/Rules/Final/Chap28/Fr28_lst.htm


Vitale L. 2004 Mar 11. [Personal communication]. Sante Fe County.

Virgin Islands Code, Title 29, Public Planning and Development; Chapter 5, Building Code; Section 308, Water supply, cisterns, gutters, downspouts, wells. 2004.

