Colorado Legislative Council Staff

ISSUE BRIEF

Number 09-02 | A Legislative Council Publication | August 1, 2009

RAINWATER HARVESTING IN COLORADO

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In 2009, Colorado joined New Mexico, Arizona, and other western states that allow certain homeowners to use water obtained from a precipitation collection system, also called *rainwater harvesting*. This issue brief describes how precipitation collection systems work and how they may help Colorado address part of its water supply needs. It also describes the new laws that allow limited use of these systems.

Precipitation Collection

Precipitation collection occurs when runoff from an impervious surface is intercepted and applied to a beneficial use such as lawn watering. Basic harvesting systems consist of a roof catchment area, 55-gallon rain barrels, and garden hoses to distribute the water. Larger systems include paved surfaces that divert water to lined holding ponds. A 1,000-square foot roof will yield approximately 150 gallons of water from a quarter inch of rain. Systems typically apply the harvested water to lawns and gardens. The water captured by a precipitation collection system would have otherwise flowed into a stream, evaporated, or been consumed by vegetation. Until recently, precipitation collection systems were effectively prohibited in Colorado due to the cost of complying with the state's strict water law.

Colorado's Water Supply Challenge

According to the State Demography Office, Colorado's population is projected to increase from 5 million people to 7.3 million people in 2030. The 2004 Statewide Water Supply Initiative estimates that annual municipal and industrial water demand in Colorado will increase by 630,000 acre-feet to 1.9 million acre-feet. An acre-foot is the amount of water that would cover an acre of land with one foot of water or 325,851gallons of water. Approximately 80 percent of the projected demand is expected to be satisfied by existing and planned water projects. However, the study estimates that there will be a shortfall of 118,000 acre-feet that needs to be developed by 2030. Rainwater harvesting may help satisfy part of this projected shortfall. Outdoor water use accounts for about half of the total residential water use in the Denver area, most of which goes toward lawn watering. A 2007 study conducted for the Colorado Water Conservation Board (CWCB) and Douglas County determined that precipitation collection systems, in conjunction with drought tolerant landscaping and efficient irrigation, may reduce outdoor water demand by up to 88 percent.[1]

Colorado's water law

Water in natural streams, or that is tributary to a stream, may be appropriated and used in accordance with the doctrine of prior appropriation, commonly known as "first in time, first in right." An appropriation is made when an individual takes available water from a stream or well and applies it to a legally recognized beneficial use, such as irrigation. The first person to appropriate water from a stream system has the most senior water right. Persons who

[1] "Holistic Approach to Sustainable Water Management in Northwest Douglas County," prepared by Leonard Rice Engineers, Inc., 2007.

appropriate water later have more junior water rights. During water shortages, senior appropriators must be satisfied before junior appropriators may take any water from the stream.

State Limits on the Use of Harvested Water

In general, flowing water, even diffuse runoff and seepage that is not in a defined channel, is presumed to be tributary to the river system. Under Colorado's water law, taking water out of priority from a stream that is obligated to a water right is prohibited if it would injure that right. Most of Colorado's streams are over-appropriated, including the South Platte and Arkansas river basins where most Coloradans live. In such rivers, there is not enough water to satisfy existing water rights during average stream flow conditions. Persons using water from a precipitation collection system may cause injury if they consume water that would have otherwise flowed into a stream and been available for use by a vested water right. Until recently, precipitation collection systems were presumed to cause injury unless an owner could prove otherwise to the water court or the State Engineer. Providing such evidence typically requires the services of a water engineer and an attorney, which may make precipitation collection systems too expensive for most homeowners.

The 2007 study for the CWCB and Douglas County determined that on average 3 percent of the precipitation that fell on the undeveloped test site returned to the stream or ground. In a wet year, up to 15 percent of the precipitation returned to the stream or ground. During a dry year, none of the precipitation that fell on the undeveloped test site returned to the stream or ground. This study indicates that much of the precipitation that falls on a piece of ground may be intercepted by a precipitation collection system without significantly depleting stream flows.

Small Precipitation Collection System Exemption

In 2009, the legislature passed Senate Bill 09-080 that exempts certain small residential precipitation collection systems from much of the doctrine of prior appropriation. This change may help affected homeowners avoid litigation costs and the potential need to replace their depletions to the stream system. Specifically, the new law allows precipitation to be collected from up to 3,000 square feet of a roof of a home. However, only homes that *are not* connected to a domestic water system, such as the Denver Water Department, may collect the water. Eligible persons must also have an exempt well permit or qualify for such a permit. The collected water may only be used for ordinary household purposes, fire protection, watering of animals and livestock, and irrigation of up to one acre of gardens and lawns. However, persons with exempt well permits are limited to using the collected water under the same restrictions as their well permit. For example, an owner of a well permit that is restricted to in-house use only would not be allowed to use harvested water to irrigate a lawn or garden.

Pilot Program for New Residential Developments

Another law, House Bill 09-1129, authorizes a 10-year pilot program for the collection of precipitation from rooftops for nonpotable uses. The program can include up to 10 new residential or mixed-use developments that are to be selected by the CWCB and the State Engineer. The purpose of the program is to develop data and methods to measure local precipitation, native plant consumption, and ground water flow. It will also evaluate precipitation collections designs and determine how to prevent injury to water rights. The projects are required to operate according to a substitute water supply plan that is approved annually by the State Engineer. At the end of pilot study, collection systems must obtain Water Court approval of an augmentation plan or be permanently abandoned. Substitute supply plans and augmentation plans replace a junior water user's depletions to a stream system, thereby preventing injury to a decreed water right.