Colorado Master Gardener Training
Colorado Gardener Certificate Training
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Colorado State University
Knowledge to Go Places
Cooperative Extension

Colorado's Water Situation

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Western water rights

Doctrine of *Prior Appropriation*

In Colorado and other western states, water rights are based on the doctrine of ***prior appropriation*** or "first-in time, first-in-right". Rights are established when water is put to beneficial use.

In the west, water rights are a private property that can be sold, leased, or rented (like other personal properties such as a home, apartment or car). With the *prior appropriation doctrine* used in western states, a property owner does not own water that rains, snows, or flows across or adjacent to his/her property.

By contrast, states east of the Mississippi River follow some form of "riparian" water right (i.e., water rights belong to owners of lands bordering the water). Without an understanding of the *doctrine of prior appropriation*, newcomers and residents may fail to realize that the purchase of land does not necessarily include the rights to irrigation water.

Colorado Master Gardener

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Under the *prior appropriation doctrine*, water rights are established by putting the water into **beneficial use**. The person or organization putting the water to beneficial use may request the ***water courts*** to officially recognize the right by a **decree**.

In the establishment of water rights, the water judge decrees the location at which the water will be withdrawn, the amount to be withdrawn, the use to which it will be use, and assigns a ***priority date***. Claims with earlier priority dates have ***senior rights***; claims with more recent priority dates have ***junior rights***.

During times of reduced rainfall or drought, ***senior rights*** (water rights established in early years) take precedence over ***junior rights*** (water rights established in recent years). Use will be reduced or cut off for junior rights, protecting senior rights.

When a water use is changed, the water courts have to reissue the decree amending the location, amount, or use, and reestablish the priority date based on previous priority. Since Colorado's water supply fluctuates continually and is basically filed-on, issues of senior and junior rights become very complex.

Administration

In Colorado, the Office of the State Engineer (the Colorado Division of Water Resources) administers water rights. They monitor the amounts of water being taken from surface and underground sources and oversee distribution based on the priority of water rights.

For administration, Colorado is divided into seven "water divisions", based on primary water basins as follows:

- Division 1 – South Platte River basin
- Division 2 – Arkansas River basin
- Division 3 – Rio Grande River basin
- Division 4 – Gunnison, San Miguel and part of the Dolores River basins
- Division 5 – Colorado River basin (excluding the Gunnison River basin)
- Division 6 – Yampa, White and North Platte River basins
- Division 7 – San Juan and Dolores River basins

Interstate water rights are set in federal agreements based on stream flows for the Platt, Colorado, and Arkansas rivers.

Wells

The Colorado Division of Water Resources also regulates the drilling and use of wells (underground water). In the past, the lack of strict regulations caused a significant drop in the water table in some communities, creating problems for well users. Currently, new well permits are very restrictive, limiting outdoor irrigation to a limited number of square feet or totally prohibiting outdoor watering.

Non-potable water and gray water

In some communities of the west, homes have a waterline for drinking water and a second waterline with non-potable water for irrigation. In Colorado, many larger landscape sites (like golf courses, parks, and industrial sites) are irrigated with non-potable water.

During drought and in communities with limited water resources, the public has interest in the use of ***gray water*** (water from the bath/shower and washer) and in harvesting rainwater for landscape irrigation.

Harvesting rainwater

While this issue is very complex, the bottom line is that it is illegal under Colorado water rights. Although no specific statute has yet been written specifically directed at harvesting rainwater, the act of intercepting and diverting the water could be in violation Colorado water rights. As strange as it may seem, if a person were to capture and divert rainwater it could negatively impact the senior rights of another.

What a person should do to "harvest" rainwater is to get a decree from the water courts for that purpose, establishing that the practice would not be injurious to another's water rights. If another water right holder in the basis felt that the harvesting was impacting their water supply, they could take it to court. Any rainwater harvesting system would also have to follow local zoning, building and plumbing codes.

On a large scale, some cities in California have had landscape architects design systems to capture runoff water from city streets, parking lots, rooftops and other landscapes, and divert it into storage facilities for reuse. This large-scale practice would obviously be a water right issue in Colorado.

Using gray water for irrigation

The use of ***gray water*** (water from the shower/bath or washing machine) is even more complex with issues of water rights (controlled by the State

Engineer's Office) and issues of wastewater treatment (controlled by the Colorado Department of Health).

Water rights issues – In Colorado, it is illegal to use ***gray water*** for landscape irrigation. While most folks would consider water going the bath drain as "wasted" water, it is destined to be used again down stream. Your wastewater becomes someone else's water right, legally belonging to someone down stream. In most Colorado watersheds, water is reused a number of times before it finally leaves the state.

Wastewater (sewer systems) issues – Under Colorado law, it is illegal to use gray water for irrigation if the water is applied above ground, such as through a sprinkler system. Gray water can, however, be used for irrigation if applied through a subsurface system but a special permitting process must be followed. Construction of any system must be consistent with industry standards including the Uniform Plumbing Code.

Colorado's water use

Eighty percent of Colorado's water supply falls on the west slope. With the high population along the Front Range and major agriculture in northeastern Colorado, 80% of the water use (water rights) is down the Front Range and high plains.

Approximately seven to ten percent of Colorado's water supply is used for landscape irrigation, including home lawns and yards, public and commercial landscapes, parks and golf courses. During the summer irrigation season, 50% to 75% of a community's water supply may be used for landscape irrigation. Because it is highly visible, landscape irrigation is often targeted for conservation.

Based on community water use, 40% to 50% of the landscape irrigation water is wasted due to poor sprinkler system design, maintenance, and management. In other words, most residents could significantly reduce the water used for landscape irrigation (and have healthier plants) with attention to irrigation system design, installation, maintenance and management.

Production agriculture is the primary user of Colorado's water supply, using 85% to 90%. While the individual farmer can be rather inefficient in use, the run-off water returning to the system is used again and again by other farmers down the line, resulting in a 90% system-wide efficiency.

With the rapid growth in Colorado's population, some farmers have sold, leased, or rented water rights to communities. This creates a significant shift in water use during periods of drought, and creates long-term dynamics between agriculture and urbanization.

Other demands on water flows come with power generation, recreational use and wildlife habitats. As an important side issue during periods of

drought (decreased stream flow), hydroelectric power generation will decrease.

A standard unit for measuring large quantities of water is the ***acre-foot***. An acre-foot is the amount of water needed to cover an acre of land to a depth of one foot—325,851 gallons. The standard unit of measuring water flow is cubic feet per second, or cfs. One cfs equals 7.48 gallons per second or 448.83 gallons per minute.

Community water infrastructure

Due to landscape irrigation, cities typically experience 10-15 days per year when water use greatly exceeds average use. Developing the water processing and delivery infrastructure to adequately meet water needs during these few peak days is very expensive, since it is only actually needed a few days a year. One Colorado community, for example, is facing a $35 million expansion to its water-processing infrastructure to meet peak demand for just 3-5 days a year! A community typically invests $30,000 to $50,000 per new household for the water and sewer treatment infrastructure.

The high cost to meet peak water demand is why communities often adopt irrigation schedules based on address (like every third day or every other day). Schedules are designed to spread the water demand more evenly over the week. Just imagine the water infrastructure that would be required if most residents decided to water the lawn on a Saturday morning during a hot week!

Odd/even or every third day style water restrictions do not effectively reduce total water usage. With underlying concerns that they can't hold off irrigation until the next turn, residents water the lawn just because it's their turn. Irrigation restrictions that allow for no irrigation on some days of the week and/or limit irrigation run times effectively conserve water.

Growth and water conservation

Colorado's rapid population growth creates growing pains for Colorado's water supply. The ever-increasing demand for water creates issues about water rights and values. Residents who don't understand water rights may have strong values and opinions about where water should and should not be used during shortages.

Water conservation, in all use areas, is essential for communities to meet the water demand for growth. Some communities, with limited water resources have put restrictions on new building permits.

Other communities, with limited water resources, have allowed for growth by purchasing "surplus" water from water rights holders. Some of the

extreme water restrictions during the summer of 2002 are examples of what happens in years when "surplus" water is not available.

With growth, water conservation is also critical even for those communities with senior water rights. For example, with normal precipitation and stream flows, but without increased conservation and/or new/expanded water storage resources, Denver Water will not have adequate water supplied to support new growth by 2013 to 2023 (depending on rain/snow fall). Many other Colorado communities have a more critical scenario than cities serviced by Denver Water. With or without a drought, water conservation (and expanded storage capacity) will be an essential message from Denver Water and other water providers.

Since the Colorado's climate typically has a multi-year drought about every 20 years, water conservation is important to all residents.