How do you obtain necessary funding for an irrigation audit program when water is in abundance?

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Abstract. *The Grand Valley of Western Colorado is flush with irrigation water. The Water Rights of Grand Valley irrigators prior to 1922 account for 2260.28 cubic feet per second (close to 900 thousand acre-feet per 200 day growing season. This is more than adequate for the needs of the Grand Valley(even if the lower states dry up). Due to the abundance of water and the "use it or lose it" attitudes of the area's population, obtaining local, state and federal funds for water conservation programs is nearly impossible. This paper explains why an irrigation audit program in the Grand Valley of Western Colorado is difficult to fund and the problems resulting from a lack of such a program. Background information and data are provided.*

Keywords.

Grand Valley, Colorado, Mesa County, Grand Junction, Colorado River, Gunnison River, Ute Water Conservancy, Palisade Water, Clifton Water, City of Grand Junction, water conservation, funding, Colorado Water Conservation Board, Bureau of Reclamation, water rights, selenium, salt loading, run pumps, deep percolation, salinity loading.

Introduction.

The Grand Valley is a populated valley approximately 30 miles (48 km) long and 5 miles (8 km) wide, located along the Colorado River in Mesa County in western Colorado. The valley contains the city of Grand Junction, as well as the smaller communities of Fruita, Orchard Mesa, Clifton and Palisade.

Six irrigation companies provide raw water for the Grand Valley. [1] In 2007 they diverted 1,648,985 acre-feet of water from the Colorado River. The 982,964 acre-feet diverted for the production of electricity or run pumps, was returned to the river. The remaining 666,021 acre-feet was diverted for irrigation or domestic use. [2]

Four water providers (City of Grand Junction, Clifton Water, Palisade Water and Ute Conservancy District) serve the domestic needs of the residents and businesses.[3] As a result of state-wide drought conditions during the 2001-2002 Water Year, the Grand Valley domestic water providers drafted a response plan in case domestic water supplies were threatened.[4] Their water delivery systems are joined to permit the sharing of water in case of drought. They also developed a tiered pricing schedule to be implemented when their water supplies are threatened.

[1] http://www.irrigationprovidersgv.org/
[2] Information provided by Rham Dan Khalsa, Bureau of Reclamation, Western Colorado Area Office.
[3] http://www.thedripwebsite.com/
[4] http://www.thedripwebsite.com/PDF/DroughtResponsePlanApril2003.pdf

The Concept.

Improper irrigation in the Grand Valley is an issue documented by several years of irrigation audits conducted by Mesa County Colorado State University Extension staff. [5]

Table 1. Grand Valley Irrigation Audit results for 2005 through 2008

Year	Acres Audited	Water Savings [6]	
		Gallons	Acre-Feet [7]
2005	18.7	14,015,281	43.01
2006	28.8	21,585,032	66.24
2007	27	20,235,968	62.10
2008	23.5	17,612,787	54.05
Total	98	73,449,069	225.40

It is estimated that 7.6 square miles [8] or 4,864 acres of the Grand Valley consists of high water-using landscapes. If the water application on all 4,864 acres was reduced by 40% [9], a savings of 11,187 acre feet or over 3.6 billion gallons of water per year would be expected. As the population of Mesa County, Colorado increases from 134,189 [10] to an estimated population of 209,628 in 2020 [11] and 224,820 by 2025 (92.3% growth from 2000), this amount of landscaping is likely to double [12] and the water needs of the Grand Valley significantly increase.

An irrigation audit program in the Grand Valley would help reduce per capita water use, help prevent future water restrictions, and ensure adequate water is available for domestic, agricultural and industrial uses.

The benefits of a Grand Valley irrigation audit program include:

- The reduction of water use and fewer dollars spent on irrigation water
- The reduction of runoff and associated contamination of the Colorado River with pesticides, fertilizers, etc.
- The reduction of deep percolation
- The reduction of fertilizer and chemical requirements to maintain the lawn
- The reduction of insect and disease problems

[5] Irrigation Audit reports 2005 – 2008 at http://WesternSlopeTurf.org
[6] The estimates provided are based on an annual ETo of 49 inches and sprinkler system efficiency of 70%.
[7] An acre foot of water contains 325,861 gallons.
[8] Personal conversation with Rick Corsi, Mesa County GIS Specialist
[9] Irrigation audit programs can reduce the water use by an average of 40%.
[10] 2006 estimate http://quickfacts.census.gov/qfd/states/08/08077.html
[11] http://www.mesacounty.us/administration/adminpopulationdata.aspx
[12] http://www.mesacounty.us/about_mesa_county.aspx

- The improvement of irrigation system performance
- The improvement of landscape appearance; fewer saturated and dry spots
- The reduction of salinity and selenium problems for down-stream users

Salts flushed into the river by excessive irrigation cause extensive economic impacts to water users in the lower Colorado River basin. Estimates by the US Bureau of Reclamation indicate these costs exceed $300 million annually to include reduced crop yields, limiting the types of crops that can be grown, plumbing and appliance corrosion, and high water treatment costs. [13]

Over-irrigation flushes 580,000 tons of salt into the Colorado River from the Grand Valley soils each year. [14] These salts negatively impact plant and animal health throughout the Colorado River basin. Proper irrigation of lawns significantly reduces deep percolation and flushing of salts into the river system.

Selenium is a trace element widely found in the Mancos shale soils that underlie much of the populated valleys of Western Colorado. "Selenium is a trace metal that bioaccumulates in aquatic food chains and has been known to cause reproductive failure, deformities, and other adverse impacts in birds and fish, including some threatened and endangered fish species." [15] Drainage from the Uncompahgre Project and the Grand Valley may account for as much as 75% of the selenium load to the Colorado River near the Colorado-Utah line. [16]

As population growth occurs, the need to develop previously un-irrigated Mancos soils for new housing, shopping malls, and industries will result in increasing problems with higher levels of salt and selenium being flushed into the Colorado River.

The Belief.

Many who live in the Grand Valley believe irrigation and treated water will always be available. There are a number of reasons for this.

Eighty percent of Colorado's population resides on the East Slope of the Continental Divide and 80 percent of the water is on the West Slope. [17]

The canals are kept full during the irrigation season to ensure those at the end of the canal always have access to their full allotment. Some of these canals are 12 feet deep and all run at full flow

[13] Sonja Chavez de Baca, Coordination, Gunnison Basin & Grand Valley Selenium Task Force. Letter dtd September 18, 2008 to Barbara Sharrow, Bureau of Land Management, Montrose, CO.
[14] Colorado River Salinity Control Program, Grand Valley Colorado, Bureau of Reclamation Report http://www.usbr.gov/dataweb/html/grandvalley2.html
[15] USGS Publication "Characterization of selenium concentrations and loads in select tributaries to the Colorado River in the Grand Valley, western Colorado"
[16] http://www.seleniumtaskforce.org/indexold2.html
[17] Eric Hecox, Manager, Interbasin Compact Process, Department of Natural Resources, September 2, 2008. Memorandum to the Basin roundtable Chairs and IBCC Members.

from the first of April to mid-October. These canals run by major roads throughout valley giving area citizens "proof" the availability of water is not and never will be a problem.

During the 2002 drought only 6.2 million acre-feet flowed down the Colorado. By mid-July the Ute Water Conservancy District's primary water source and the Lower Molina power plant were out of water. Even during this period the domestic water providers did not implement drought restrictions. This provides further "proof" the Grand Valley does not need to conserve water.

"If we don't use it, we'll lose it" and "If we don't use it, Denver or California will take it" are common sayings of valley residents. Even with the many negatives related to excess irrigation, as delineated previously, this engrained mind-set further compounds efforts to implement water conservation efforts.

The cost of water in the Grand Valley is relatively inexpensive. Raw water delivered through the irrigation canal system ranges anywhere from $77 for 7.8 million gallons ($3.35 per acre foot), to $212 for 1.3 million gallons ($53 per acre foot) depending on the irrigation company.

Homeowner Associations in western Colorado provide raw water to home sites for as little as $75 a year for all the water the resident can use. As a result of the low cost, western Colorado residents with access to raw irrigation water do not consider water conservation important. Why spend the money to upgrade your irrigation system and reduce deep percolation when water is so inexpensive?

Even treated water is relatively inexpensive. Domestic treated water costs as little as $3.00 for one-thousand gallons [18] as compared to $5.93 per thousand gallons of water for the eastern Colorado city of Arvada. [19]

Even if the lower Colorado River states called for more water, the water rights held by the Grand Valley water providers prior to 1922 (Table 2) would continue to provide for the water needs of the Grand Valley. These rights are for 897 thousand acre-feet of water, more than adequate for the needs of the valley. [20] With this amount of water guaranteed for the Grand Valley, why should the farmers and residents of the area conserve water?

Table 2. Water Rights in the Grand Valley by Priority.

[18] http://www.utewater.org/rates.htm
[19] http://www.denverwater.org/rateinfo/pdf/frontrange_09.pdf
[20] Based on a 200 day irrigation season and 2260.28 cfs water rights.

Year	Agency	cfs [21]
1882	Grand Valley Irrigation Company	520.81
1889	Palisade Irrigation District	80
1898	Orchard Mesa Irrigation District	10.2
1903	Mesa County Irrigation District	40
1907	Orchard Mesa Irrigation District	450
1908	Grand Valley Water Users' Assoc.	730
1908	Bureau of Reclamation	400
1914	Grand Valley Irrigation Company	119.47
1918	Palisade Irrigation District	23.5
Total		**2260.28**

Why aren't funds available for a Grand Valley irrigation audit program?

With the exception of the City of Grand Junction, other water providers in the Grand Valley see no benefit in supporting water conservation programs. The City of Grand Junction has helped fund this irrigation audit program during the last three years. Requests for funds from Mesa County to support the Grand Valley irrigation audit program have been denied. [22]

Monies are available from the Colorado Water Conservation Board's (CWCB) Water Efficiency Grant Program (established through HB 05-1254) for an irrigation audit program. These grants require a 25% match which Grand Valley water providers and governmental entities are not willing to provide. [23] In addition, CWCB requires proof of water savings. [24]

Meters have never been installed at raw water points of delivery. Since much of the Grand Valley is irrigated with raw water, providing the CWCB their required proof of water savings, is not possible. Treated water is metered, but many of these sites have dual systems. These systems are set up to use treated as well as raw water for irrigation.

In addition, a water provider must first develop a water conservation plan and have it approved by CWCB in order to be eligible to receive a grant from CWCB for water conservation purposes. Since a water shortage in the Grand Valley is not an issue, why should these water providers, domestic or raw, spend the money and devote the time to develop such a plan?

The Bureau of Reclamation grant program also has restrictions the Grand Valley can't fulfill. The "*Water 2025* Challenge Grant Selection Criteria" requires identifying the "direct benefits of

[21] Cubic feet per second
[22] See the annual irrigation audit reports at http://WesternSlopeTurf.org for funding partners
[23] CWCB GUIDELINES FOR THE WATER EFFICIENCY GRANT PROGRAM Revised November 14, 2006
[24] Personal phone call with Veva McCaig, CWCB.

the proposed work, i.e. acre-feet of water conserved" [25] which as indicated previously is not possible.

Conclusion.

On July 31st 2008 the Irrigation Audit program in the Grand Valley of western Colorado was discontinued due to a lack of financial support.

[25] http://www.usbr.gov/water2025/criteria.html