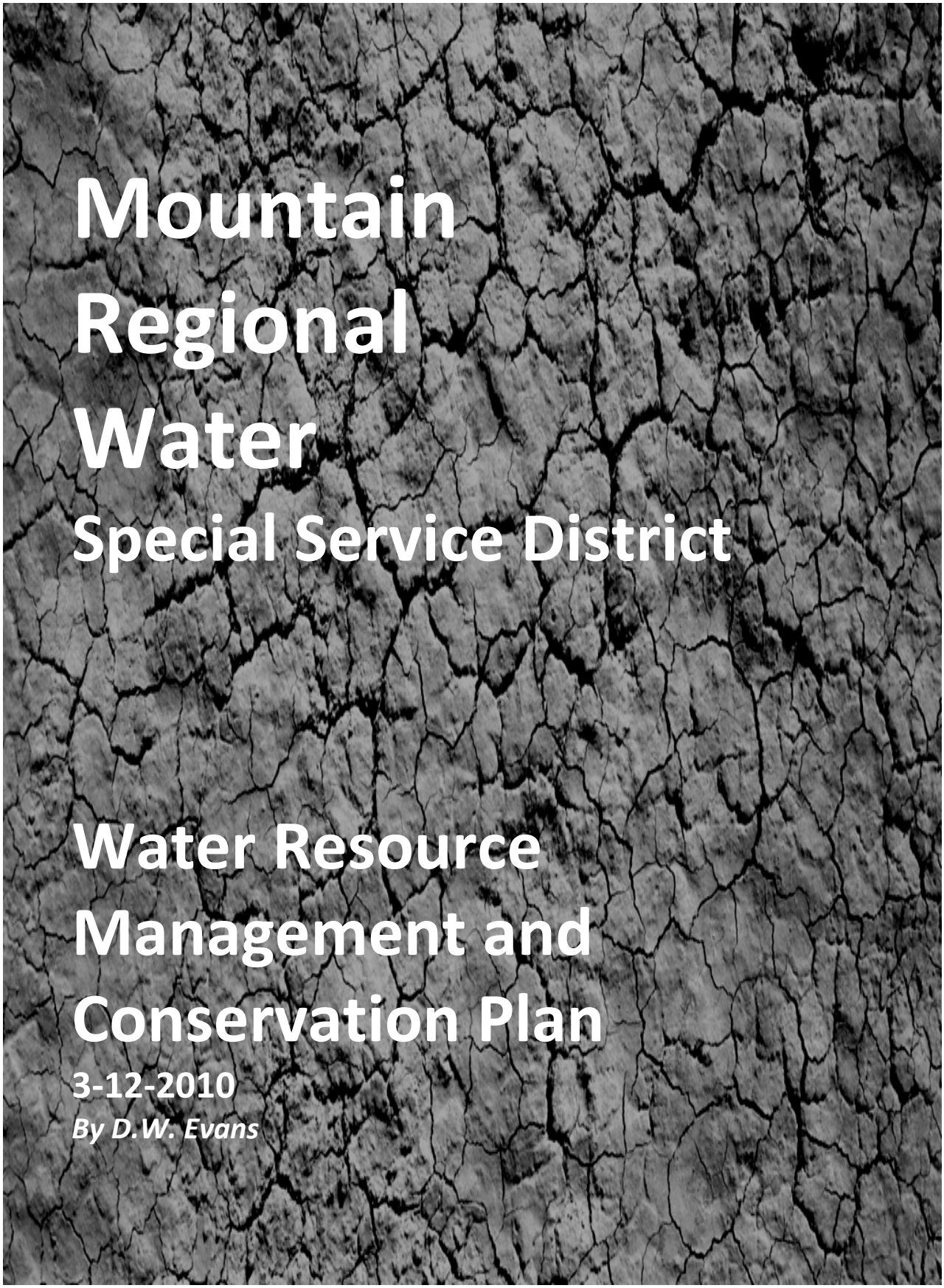


Mountain Regional Water

Special Service District

Water Resource Management and Conservation Plan

3-12-2010

By D.W. Evans

Table of Contents

1 Introduction

In response to the rapid growth occurring throughout the state of Utah, Mountain Regional Water Special Service District's (the "District") citizens and leaders are becoming concerned for the future cost and availability of their water supply. A similar concern has been demonstrated by the state legislature in the Water Conservation Plan Act (House Bill 71) as passed and revised in the 2004 legislative session (Section 73-10-32 Utah Code Annotated). This Water Resource Management and Conservation Plan (the "WRMCP") is an update of a previously adopted water conservation plan (2003) and is written to address how water conservation programs and practices will play an important role in meeting the District's current and future water needs as well as address the concerns of leaders and citizens of both our District and the state of Utah.

One unique aspect of this Water Resource Management Plan is that the District is also including an Energy Management Plan with corresponding goals and objectives as well. With the extreme complexity, large service area, number of sources, pumping facilities, and vast vertical extent of Mountain Regional Water District (see APPENDIX A) ranging from 6,100 feet of elevation to nearly 9,500 feet, District management have realized that the operation of pumping and boosting facilities has a major impact on not only the budget and efficiency of the District, but the environmental and physical delivery systems as well. Water and power then are intrinsically tied together and they must be addressed as a unified whole when conservation and resource management goals are developed and implemented.

2 Brief Description of the District and its Water System

Located in the heart of western Summit County, and in the second driest state in the nation, the District's 2009 population is approximately 7,747 (assuming 2.8 residents per residential ERC as estimated in the 2000 census). Providing water to meet the needs of the citizens of Mountain Regional has always been a top priority of District and County leaders and planners. As a result, a well-maintained and operated water system provides the patrons of the District with water when and where needed.

Mountain Regional is a true regional district, formed in 2000 to regionalize many floundering water systems in western Summit County. To date nearly 11 private and public system have been regionalized and interconnected by a massive infrastructure and water source development program. A District that began with only a couple hundred customers has grown to over 4000 in less than 10 years. This massive growth has resulted in a very large and complex district with many sources, pumping facilities and perhaps more pressure zones than any system in the State.

As a result of the lack of source water in the western summit county basin area, the District has developed new wells and a large water importation project know as the Lost Canyon Project, designed to deliver over 7,000 acre-feet of water per year from Rockport Reservoir in eastern Summit County to District customers and Park City Municipal Corporation. The District has a 3-fold mission, namely correct or mitigate water source and quality issues through proper regionalization, second - develop a

viable water importation project to serve the District and Park City, and third - implement a viable water conservation program.

This third goal has been worked on since day one of the District, and as can be seen by this updated study, has proved to be very successful. It has resulted in a water conservation ethic that has resulted in some of the lowest water uses per Erquivilant Residential Connection (ERC) and gallons per capita (gpcd) in the State of Utah.

Currently, the District water system provides water to 2,767 residential ERC's, 190 commercial ERC's, 35 industrial ERC's, 100 institutional (public) ERC's, 428 irrigation customer ERC's, including 2 golf courses, and 32 recreation connections. Detailed District demand statistics can be found in APPENDIX B.

Table 2.1 below summarizes the major infrastructure and facilities of the District:

TOTAL NUMBER of STORAGE RESERVOIRS	**18**
TOTAL GALLONS of STORAGE	**8,660,000**
TOTAL GALLONS of RAW WATER STORAGE	**13,000,000**
TREATMENT PLANT CAPACITY	**3 MGD or 2,100 gpm**
TOTAL PRESSURE ZONES	**39**
TOTAL MILES OF PIPELINE	**117 miles**
TOTAL WELLS and OTHER SOURCES	**28**
TOTAL PEAK GPM of SOURCES	**5,500 gpm**
TOTAL PUMPING STATIONS	**13**
TOTAL PUMPS	**88**
TOTAL PUMPING HORSEPOWER	**8,850**
TOTAL PUMPING CAPACITY in GPM	**29,000 gpm**
TOTAL VERTICAL HEAD or ELEVATION IN SYSTEM	**3,214 feet**
TOTAL SQUARE MILES of SERVICE AREA approx.	**25**
TOTAL ACRES of SERVICE AREA approx.	**16,000**
TOTAL PRESSURE REDUCING (PRV) STATIONS	**70**
TOTAL CHLORINATING or DISINFECTION PLANTS	**5**
TOTAL MASTER METERS	**32**
TOTAL CUSTOMER METERS	**2,647**
TOTAL FIRE HYDRANTS	**approx. 1,200**
TOTAL CONTROL COMPUTERS (PLC's)	**40**
TOTAL CONNECTIONS or CUSTOMERS	**2,908**
TOTAL ERC's (equivalent residential connect.)	**4,924**
TOTAL POPULATION	**7,747**
TOTAL STAFF	**19**
TOTAL ERC's per EACH STAFF	**349**
TOTAL ACRE FEET of WATER RIGHTS	**7,880**
TOTAL ACRE FEET per ERC	**1.6**

Table 2.1

The following figures below show the extent of the District in western Summit County as well as the relief and geographic locations of the major regionalized sub-districts:

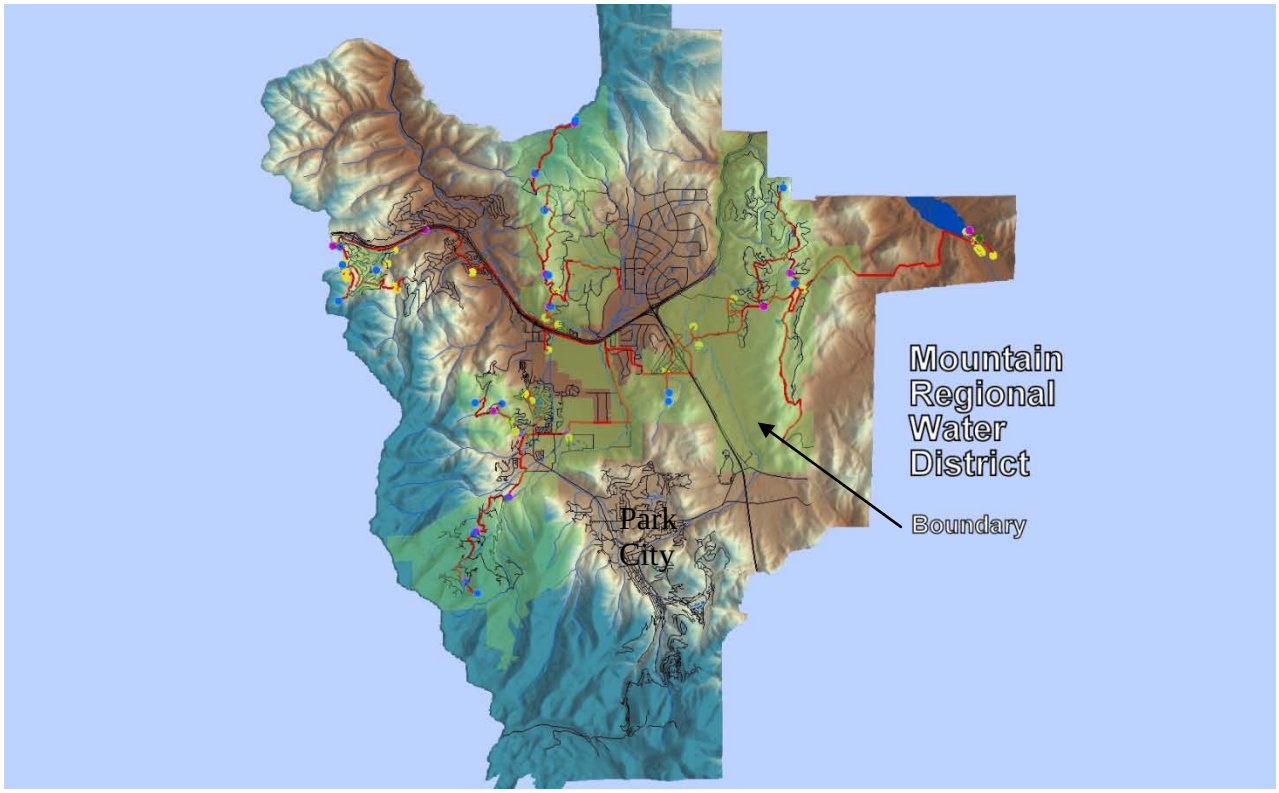


Figure 2.1 Western Summit County showing Park City and the District Boundary in yellow

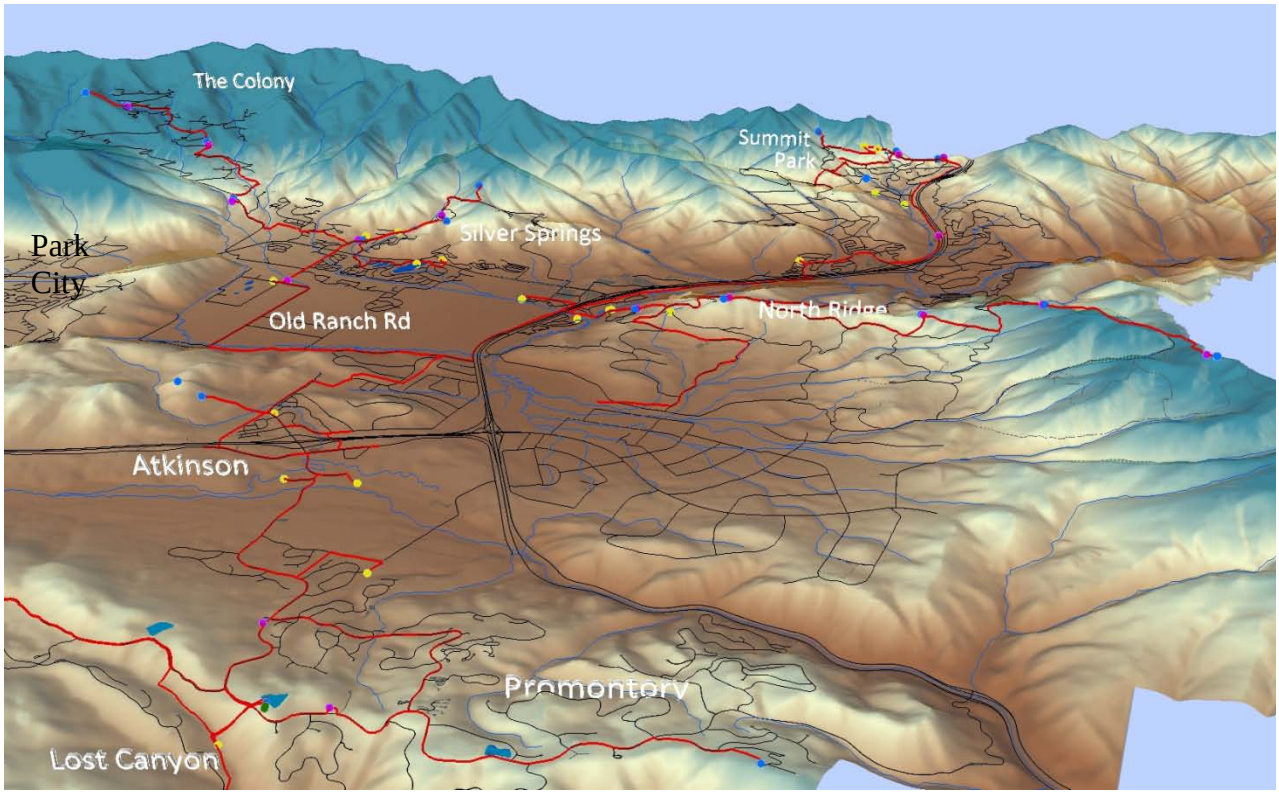


Figure 2.2 Snyderville Basin looking west towards Salt Lake County, showing major transmission lines, infrastructure, and regions served by Mountain Regional Water (Sources in yellow)

3 Current District Water Trends and Statistics

A. Current Use:

Mountain Regional Water is presenting herein yearend 2008 statistics in all of its water use reports and calculations. 2009 numbers were not fully audited and therefore unavailable for usage at the time of this report. As stated above the District's water system provides water to 2,767 residential ERC's, 190 commercial ERC's, 35 industrial ERC's, 100 institutional (public) ERC's, 428 irrigation customer ERC's, including 2 golf courses, and 32 recreation connections. The more detailed statistics can be found in the tables of APPENDIX B.

The population of the District is calculated by multiplying the year 2000 census Average Household Size value of 2.8 residents per home for this area, by the current Equivalent Residential Connection (ERC) value as applied to typical residential type users (See APPENDIX J). Commercial and other users are not expected to have an impact on population. By multiplying 2,767 residential ERC's by 2.8 we arrive at an estimated District population of 7,747.

Appendix C contains a 2008 water production report, showing the production of all of the District's sources, by month and year. It also divides the production into various demand zones in the District. These zones are significant because they reflect different types of housing and landscape environs. This data assists us in planning for new developments in various areas and sub-climates of the District. Sources with water rights restrictions are displayed as well and annual production data since the District inception are displayed. A graph is also provided below as Chart 3.1, showing the annual production by month as the District has grown. Note that there is a sizable reduction in the usage from 2007 to 2008 due to increased leak detection and repair efforts provided by District staff, as well as increased patron conservation efforts. Most all of the annual increases since the year 2001 are based on the growth of the District.

For 2008, the annual consumption was 869,576,674 gallons or 2,668.63 acre feet. The peak month was July with 179,718,050, or 5,797,356 gallons per day average, with an average water source flow rate of 4,026 gpm for that month. The peaking factor (the relation of an average annual day to the peak day) for 2008 was 2.43.

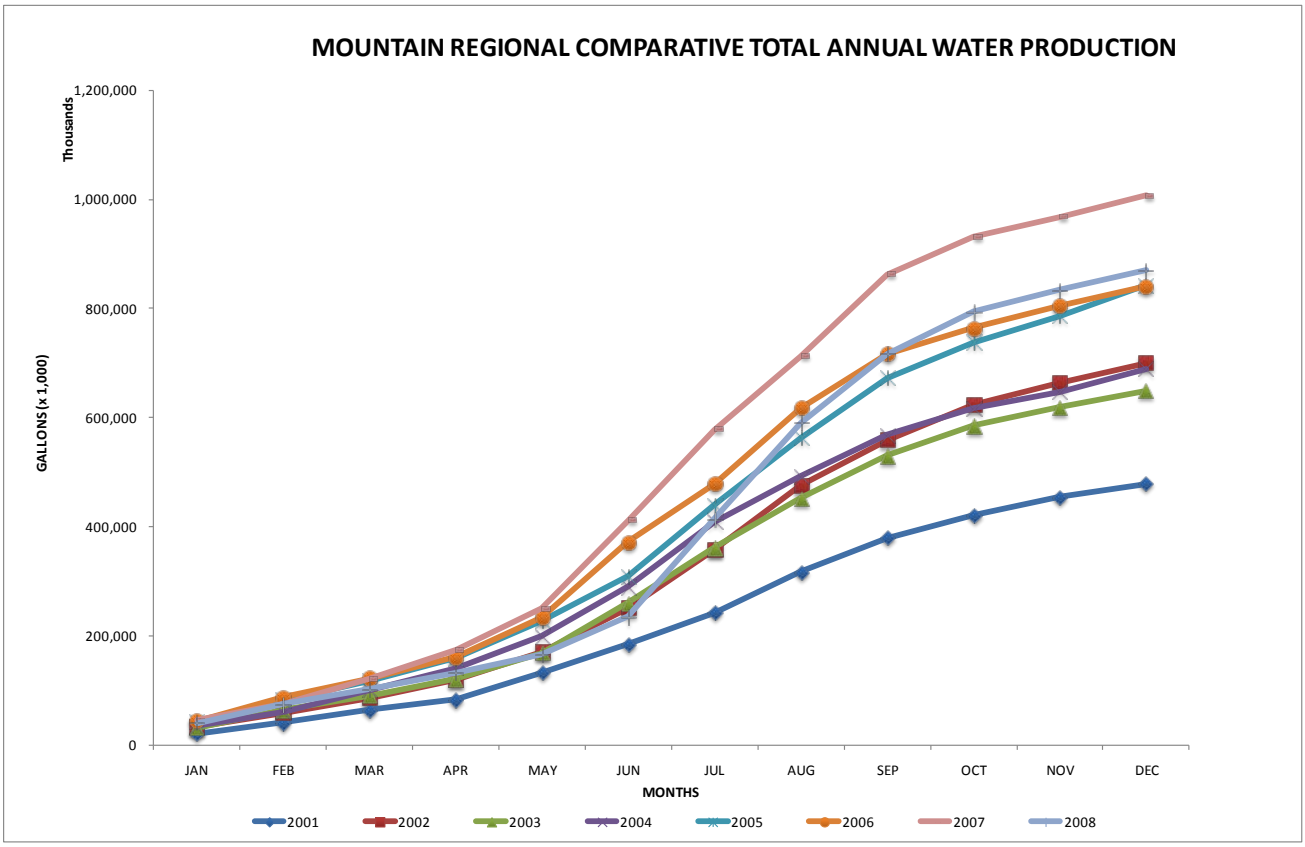


Chart 3.1

APPENDIX B contains the detailed water demand statistical tables for the District for 2008. This data is taken from our meter reads and accounting databases. While much of this data is very complex, the important information is described herein and is also described in the table footnotes. Of particular note we present the following:

Table 1.1 shows a summary of the ERC and customer account data used in our billing and accounting systems. This also shows stand-by customers and possible minor errors in our database.

Table 1.2 is used to formulate data for our supply and demand and system water loss graphs shown in APPENDIX D.

Table 2.1 shows demand data by group codes for the various areas we serve in the District. This data is used to show trends and demands by different sub-areas or developments in the District and is used to better plan for new development in each of these areas – rather than using an across the board average ERC demand number. Conservation and planning often needs to be tailored for each area based on development type, scope and climate. These tables not only show demands but also the impact peaking factor for each category. This

number is important because the higher the number, the more impact a project will have on the capacity or physical infrastructure of our water system. The higher this number is above 2.5, the greater chance the user will be assessed in the higher rate blocks in summer months.

Table 2.2 is based on the same data as 2.1 but it has been adjusted to show the actual demand per unit rather than total area. This would be used to determine a single ERC's impact per area.

Table 3.1 is similar to 2.1 but now the data is broken into customer type, i.e. residential, commercial, industrial, institutional, and recreational, etc.

Table 3.2 again is based on the same data as 3.1 but it has been adjusted to show the actual demand per customer type unit rather than total types. This would be used to determine a single ERC impact per type of customer.

Table 4.1 breaks demand data up by rate codes in our billing system.

Table 4.2 again is based on the same data as 4.1 but it has been adjusted to show the actual demand per rate code unit rather than total rate codes. This would be used to determine a single ERC average revenue for each rate code utilized.

Back up to Table 3.3 – this table is one of the more important tables in APPENDIX B. This table is used to calculate the actual Equivalent Residential Connection (ERC) properties of the District. Data is initially based on the common types of residential customer types, i.e. large residential, typical residential, smaller residential (town houses), and condos. The key figure here is the first line on Note 14 which is titled, "Average of all residential types". This is the demand of a typical residential ERC in 2008. A typical ERC in the District uses 112,063 gallons of water per year with a peak month of 24,250 gallons or 782 gallons per peak day. The monthly average is 9,339 gallons per month and the peaking factor is 2.60. The annual acre-feet of water needed to service a typical ERC is 0.34 acre-feet per year.

B. Per Capita Consumption:

Using the above demand figures, the Average Gallons per Capita per Day (gpcd) for Mountain Regional Water District for the year 2008 equates to 110 gpcd. This is an amazingly low figure considering the State average is 183 gpcd. The Districts water usage is nearly 40 percent less than the State average!

For the year 2006 the figure was 116 gpcd, and for 2007 the figure was 115 gpcd, showing a marked improvement in conservation for the year 2008. In

2001, the estimated figure was 140 gpcd. This is over a 20 percent reduction since the inception of Mountain Regional Water nearly 10 years ago.

C. Supply Sources:

Mountain Regional has many water sources, including both groundwater and surface water. These sources and their approved production capacity used for development are shown in APPENDIX E. Summit County has a strict water concurrency program where sources are approved as to their capacity each year. This program is performed because many of the wells in the area are in bedrock aquifers that tend to show diminished capacity or water quality with use. The current levels of approval are shown on this table. Future planned or anticipated sources are also shown. A deduction is made in these source capacities for system demands that do not translate well to ERC's, namely golf courses, recreational and other irrigation type users. Also a conservative annual deduction of 8% per year is made for anticipated losses associated with groundwater withdrawals. The current total source capacity approved for 2009 is 8,633 gpm (inclusive of all necessary deductions).

For planning purposes, the source capacities of future sources are extended into the future to 2050. Future Aquifer Storage and Recovery (ASR) sources are shown with capacities available during peak months due to winter storage. These sources, along with the massive Lost Canyon Importation Project sources demonstrate a commitment to conservation based strategies well into to future development years of the District.

D. Demand Projections:

Table 3.3 in APPENDIX B helps define an Equivalent Residential Connection (ERC) for the District. As stated above, and ERC equates to an annual consumption of 0.34 acre-feet per year, but to ascertain an ERC's impact on source and system infrastructure, we need to evaluate what impact An ERC has on a peak day period. On the bottom line of table 3.3, it shows that all types of users (less golf courses) need 0.68 gpm per ERC on the peak month (July) of the year. This calculation is based on an average peak day multiplied by 1.3 to get an instantaneous peak gpm. The District then rounds this up to 0.86 gpm per ERC to ensure a safety factor is used in system design. This is also the minimum amount the Summit County Concurrency program recommends for planning purposes.

Next we need to determine exactly how many peak day ERC's the District serves. This is done by taking the true or typical residential ERC's of 2,457, then adding to this figure the smaller residential types of users, i.e. condos and town homes, but at a reduced factor since they consume much less water (much less irrigation per ERC). Table 3.3 shows the peak day relationship factor of these types to be 13.98 % (or a small residence uses 13.98% of a large residence). When this factor is applied to these smaller users, we get 43 ERC's. Next we take all of the commercial type users, less large irrigation customers (i.e. golf courses, etc) and calculate what their peak month demand is. After dividing this peak month demand by the 0.86 gpm arrived at above,

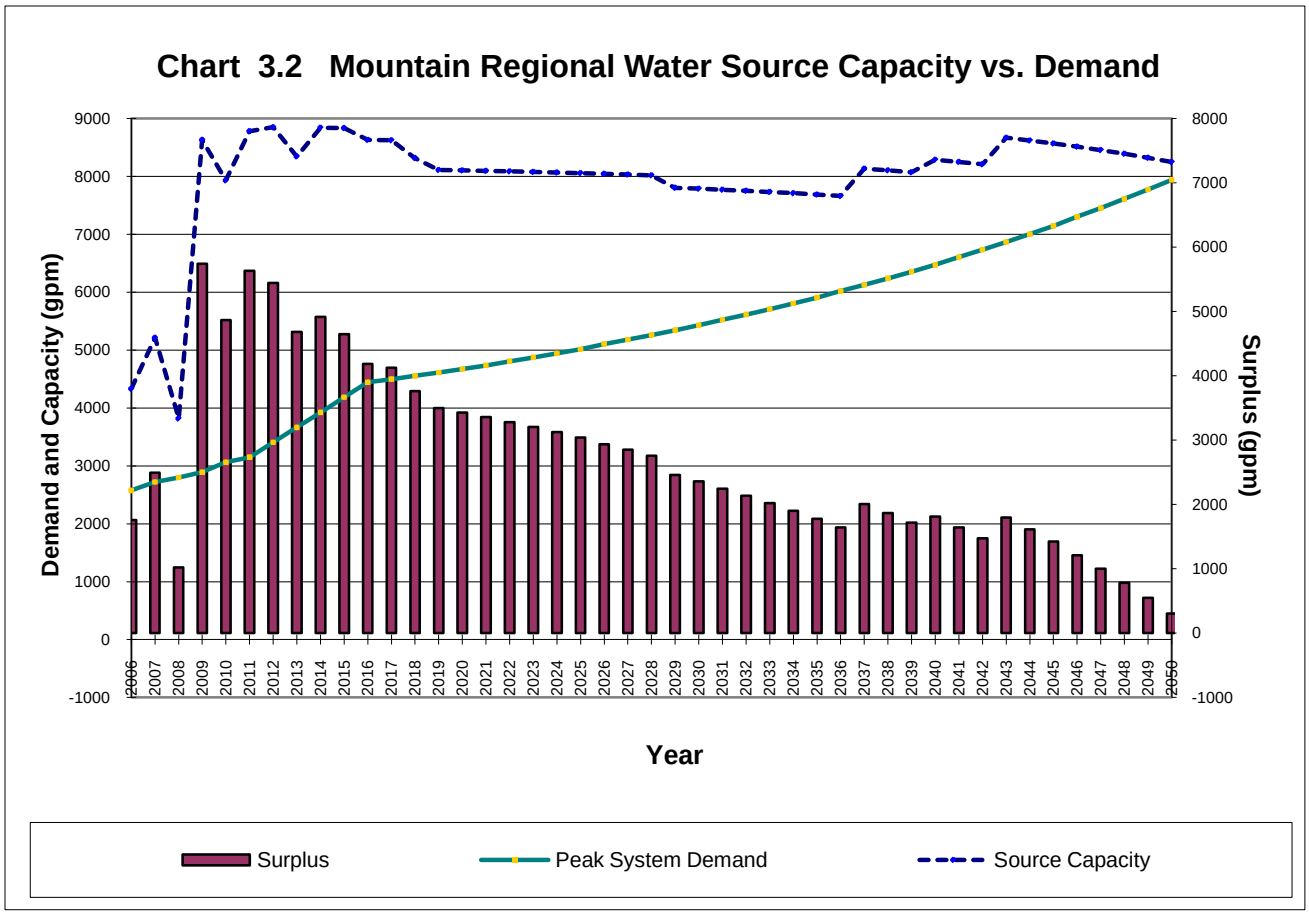
we get 705 ERC's. These amounts added to the residential ERC's amount, bring the total District count to 3,206 ERC's.

Using the above ERC and customer group calculations, as well as source capacities of the District, APPENDIX E shows projected future demands up to the year 2050. The District believes that they will reach build-out by the year 2050. These numbers are also based on current projections for developments approved or in the approval process, as well as a constant 3.5 percent growth rate per year beyond that. The demand section of this table also includes connections approved each year but not connected to the system. The demand per ERC rate of 0.86 gpm peak month is used in all of the demand calculations.

By subtracting the demand calculations from the supply calculations, a water capacity balance can be calculated, similar to an accounting balance sheet. This table shows District reserve capacity out to 2050. Chart 3.2 below shows the estimated projected capacity of District sources carried out to the build-out period of 2050.

Also included in the APPENDIX E table is a calculation of water rights demands for each year. This table shows that the maximum number of acre-feet needed in water rights at build out would be approximately 8,000 acre-feet.

The Table in APPENDIX F shows the current water rights held by Mountain Regional Water and the associated water sources that each right is assigned to. This table demonstrates that the District should easily have sufficient water rights for the next 30 to 40 years.



E. System Deficiencies:

Mountain Regional had many deficiencies initially. Many of the systems acquired had source and other system deficiencies, but through a massive regionalization process and development of an importation project, most of these deficiencies have been resolved. Regionalization in and of itself is an incredible conservation project. By simply interconnecting sources and storage systems, one areas deficiency is cured by another areas strength, creating a more efficient and resilient system. Economies of scale are also realized in the operation of such a system.

Areas that still pose problems are mainly the Summit Park system. This water system is very old and was not installed to high standards by the original developer; hence many leaks and major breaks occur in this area. The District has employed an incredible maintenance and construction staff that is able to respond promptly and repair many of the problems when detected. The District has also expended hundreds of thousands of dollars on high tech electronic listening devices that are placed in the valve boxes in this area. These devices listen at night for leaks and we are able to pinpoint problems areas when we read the detectors (similar to reading water meters electronically). The District

also has very sophisticated leak detection correlation equipment which enables us to pinpoint leaks within a foot or so of the problem.

In an effort to save money, Mountain Regional is also replacing small sections of the distribution line in Summit Park each year as the Summit County Public Works department replaces sections of aging road infrastructure in the area. It could take upwards of 20 years to replace all of the distribution system in this area.

The District's aggressive water loss reduction and leak detection program has proved to be one of the greatest water conservation initiatives undertaken to date. As can be seen by the graphs in APPENDIX D, water losses have been reduced to just under 17 percent in 2008, from a high of over 60 percent in 2001.

Other problems the District is working on is a program of making water sources work together more efficiently, by using them when their production is best, and when operating costs and power costs are lower. The Districts advanced SCADA system has helped in the reaching of this goal but there is much still to be accomplished in this area.

F. Intersystem Agreements:

Mountain Regional Water District currently has agreements to supply Park City Municipal Corporation with 2,500 acre-feet per year of water originating at Rockport Reservoir, and delivered in the Lost Canyon Project. The District also has wholesale water agreement to supply water to Gorgoza Mutual Water Company in an emergency situation, and to High Valley Water Company on a fairly continuous basis. Wholesale water agreements can be curtailed by the District in a water emergency situation if necessary.

G. Water Quality:

Water quality is very good within the District's source and delivery systems. We have had one source that has experienced diminished water quality - namely the Atkinson Well #2. This source was over used in its early days (pre 2000) and now has high TDS, and sulphate levels. The source is a very good producer of water however, and the District is investigating making this source its first ASR well. Testing and piloting of this well for ASR purposes will be underway in 2011. An ASR plan has been submitted to the State Division of Water Quality and the Division of Drinking Water.

The District has also had some Total Organic Carbon (TOC) issues with water imported from Rockport reservoir during certain periods of the year. See section H below for a description of the treatment process used in the District.

H. Treatment Systems:

Mountain Regional has one 3-4 MGD water treatment plant completed in 2005 for treating imported water from the delivered Rockport Reservoir area through the Lost Canyon Project. This plant is referred to as the Signal Hill Treatment Facility and is located on the top of one of the mountains within the Promontory Development. We also have many disinfection systems in use on some wells and springs within the District.

Currently the District is expending nearly 3 million dollars on an upgrade of its treatment plant to reduce the TOC problem described above. Additional pre-treatment and post-treatment facilities are being installed to with in conjunction with the current membrane filtration technology. This upgrade will also make the water quality better for injection purposes into the ASR project as previously described.

The District is also currently upgrading its disinfection facilities on all of its appurtenant sources. The District's current treatment plant can be expanded at least another 1 MGD, which could be done in approximately 5 years.

I. Distribution System:

Most of the distribution system within the District is fairly new and in very good condition. The District just spend 3 million dollars to replace an aging and leaking distribution system at Stage Coach Estates area last year, and will continue to replace the systems at Summit Park over the next 20 years or so. Again refer to the graphs in APPENDIX D to see the water loss reduction programs and performance of the District.

J. Reuse Potential:

Mountain Regional Water has developed a very close relationship with the only water wastewater district in our jurisdiction, namely Snyderville Basin Water Reclamation District. We work together on watershed metering and enhancement projects and we are currently working on the areas first water re-use project. This project would serve over 1,000 homes and businesses and is located adjacent to their Silver Creek Wastewater Treatment Facility. This project will be a joint effort of both utilities and could spread to other areas in the western Summit County region if successful.

K. Environmental Aspects:

Our main service area – Snyderville Basin is located in a very sensitive environment. There is a current moratorium on all future water exchanges into the Basin by the State Engineer due to the lack of groundwater resources, and surface water resources are sparse and very easy to contaminate. The District takes extra care in protecting our environmental resources. This is one of the reasons the District chose to serve most of our future development with imported water, originating on the upper Weber River drainage at Rockport Reservoir.

L. Institutional and Political Factors:

Mountain Regional Water Special Service District is a quasi municipal public entity formed under the statutes of the State of Utah by the Board of Summit County Commissioners in January of 2000. The District has an appointed Administrative Control Board (appointed by the County Governing Board) that handles the vast majority of operational functions of the District. The Summit County Council (changed last year from a commission form of government) will always be the governing board of Mountain Regional Water District, but most of their responsibilities have been delegated to the Administrative Control Board. The District works closely and well with other governmental entities in the region.

M. Financial Resources:

All of Mountain Regional's financial resources originate in user fees assessed upon the users of water as well as impact fees assessed upon the new users or developers of water projects, to fund the capital improvements associated with the same. The District does not levy a property tax of any kind. The District has established a Special Improvement District within the Promontory area to help defer a municipal assessment type bond used to fund much of the Lost Canyon Project infrastructure needed for that particular development.

N. Fiscal Structure:

Mountain Regional funds most of its operations from user fees and funds its debt service from capital type fees, i.e. impact fees, and user fees. The District has a 33 million dollar revenue bond it services as well as an SID bond serviced by assessments upon the users in the Promontory Development. The District has adequate funds to cover all of its ongoing operations, maintenance and capital improvement programs. Aside from debt service, some of the Districts largest expenditures are electrical energy for pumping and leases of water rights from Weber Basin Water Conservancy District. The District has a current budget of nearly 7 million dollars and has annually produced clean audits of all of its fiscal policies, procedures, and operations.

O. Institutional Infrastructure:

All water systems in our area are regulated by the Summit County Health Department and the State Division of Drinking Water (and Water Quality where applicable). Mountain Regional has an excellent working relationship with these entities and will continue to comply with all relevant codes and standards imposed upon us.

The District also relies on our excellent relationship with Weber Basin Water Conservancy District and the US Bureau of Reclamation, and their Weber River Federal and State projects for the vast majority of our water rights and sources of supply.

4 Detailed Water Conservation Strategies:

Mountain Regional Water's Conservation planning and implementation process will incorporate the following basic goals and strategies:

A. **Measure Accurately** - all water use, including separate meters for irrigation and domestic uses, if necessary.

STRATEGY: The District inherited through the acquisition of several systems, particularly Silver Springs, customers with inefficient or even no metering. Through investigation by the District, nearly one third of Silver Springs (approx. 300 customers), are either un-metered or lacking meters on irrigation systems. The District should also read meters year round to better establish usage patterns, detect possible residential leaks, and to promote conservation responsibility.

IMPLEMENTATION: The District is currently expending large sums of time and money to remedy this situation. The District has found that more customers than initially expected are unmetered. To date we have spent hundreds of thousands of dollars ensuring that all customers are metered and the District is proud to announce that as of 2009 this goal has been accomplished. The District now reads meters by radio 12 months a year. This program has proven very successful to meeting not only our conservation goals, but protecting property from leaks as well.

B. **Price water to recognize its finite nature**. Pricing mechanisms should provide incentives to water users who conserve water as well as penalties for those who waste it.

STRATEGY: The District has adopted rate schedules to assist in the accomplishment of this conservation objective. As can be seen from the rate table in Appendix G below, the District has a history of some of the highest rates in the higher block categories in the State of Utah.

Rates will continue to be evaluated over the next several years, and conservation effectiveness will be evaluated against the rates adopted, to determine if further conservation pricing incentives need to be incorporated into the rate structures. Currently the District's highest rate assesses $ 20.00 dollars per 1,000 gallons of water used, for usages above 80,000 gallons per month.

IMPLEMENTATION: Through conservation based rates and public education programs, the District has reduced water use per ERC significantly since the District's inception in 2000. It is estimated that water use per ERC has been reduced by at least 20 percent during this period. Also, the District has some of the lowest water consumption statistics in the State. The District has also adopted strict conservation

oriented rules and regulations, focused at dealing with users who waste or use water for unauthorized purposes (see section 14 below).

C. **Hold Responsible** - all water users for protecting the quality of water resources at their disposal.

STRATEGY: The District will educate the public, with the assistance of other agencies, the importance of protecting the fragile quality of the water resources in the Basin and the County. The District will, vigorously prosecute those who abuse or threaten the viability or security of any of the water resources under the District's purview or damage the same.

IMPLEMENTATION: The District is continuing to ensure that water quality is maintained at high levels within its jurisdiction. Beginning this year the District will be studying and submitting its source protection plan for the Upper Weber river system (the source of the Lost Canyon Project). The District has also curtailed or eliminated wells that are in areas that are too difficult to protect. The District also has adopted security plans and vulnerability assessments to assist in the protection its water resources.

D. **Create financial or publicity incentives to reward users for efficient irrigation systems**. Key elements to observe are system design, operation, and maintenance, combined with effective scheduling and management practices.

STRATEGY: The District has provided incentives, particularly in pricing and availability of water for irrigation, especially in the new Promontory Development. This is the first development in the Basin to bring into its project, from the Rockport Importation system (the Lost Canyon Project) a secondary irrigation system. Lower rates will be established for this secondary water, and incentives for its use will be provided, particularly in severe drought conditions. This system is also designed to be expanded onto certain other areas of the District, if this system proves efficient and feasible.

IMPEMENTATION: This policy and program has significantly reduced the burden on the more expensive water treatment and groundwater facilities located in the Basin. It is expected that ground water supplies will stabilize or possibly increase over the next decade due to these secondary systems being implemented. Also – many landscapes have been modified in the district to utilize xeriscaping principles or low water demand landscapes due to District ongoing education and water pricing strategies.

E. **Create or assist in educational programs,** which emphasize to all water users the absolute necessity of supporting regulatory policies, which reward conservative and efficient water use.

STRATEGY: The District will develop and publicize a water wise demonstration garden, and will continue to support and participate in the annual children's water festival each year. The District will also provide resources on it's WEB page, billing stuffers, as well as individual assistance to customers and patrons seeking the same.

IMPLEMENTATION: While the District has not been successful in implementing a conservation demonstration garden due to real estate prices, we have helped others implement water saving designs in their landscaping projects which have in-turn proved to be a model for others. For example, nearly all public landscape areas in the Promontory development have been based on low water designs. The District has been very successful in its annual water fairs and has educated many – especially children in the principles of water preservation and conservation. Water conservation information is provided on the District's web page. The District has also assigned a staff member to be the District Conservation Coordinator.

F. **Support water reclamation initiatives**, particularly for irrigation, including the use of reclaimed water from municipal, industrial, and other available sources, where practical.

STRATEGY: The District will work with Park City and the Snyderville Basin Water Reclamation District (SBWRD) to investigate the possibility of utilizing treated re-use water in secondary systems, as provided by the Reclamation District. This strategy will require cooperation and the fusion of goals and strategies of all parties.

IMPLEMENTATION: As of three months ago – the District began negations with a major developer and the Water Reclamation District on the possible construction and implementation of Summit County's first water re-use project. The development will serve over 1,000 homes and businesses and is expected at a minimum to irrigate all public landscapes with "type 1" reclaimed and treated wastewater in the Silver Creek drainage. Mountain Regional will provide the water rights for the project and will assist in the treatment and distribution of the reclaimed water. It is hoped that this project if successful will spread to our other customers and other areas in the Snyderville Basin.

G. **Give increased support to developing new water resources**, conveyance, and storage facilities, which enhance dependable water supplies for urban and agricultural use, with proper consideration given to legitimate environmental concerns.

STRATEGY: Fully develop the Lost Canyon water importation project, as previously described, and assist Park City and others in the implementation of their importation goals and strategies, particularly where facilities may be utilized conjunctively.

IMPLEMENTATION: At a cost of nearly 20 million dollars, the Lost Canyon Project was completed in 2004 and enlarged with an expansion in 2008 and 2009. This project can bring into the Basin nearly 7,000 acre feet a year of water originating at Rockport Reservoir in Eastern Summit County. This project will allow many of the groundwater resources to be managed more conjunctively and provide opportunities for other water conservation programs (See Goal K below). The District will deliver 2,500 acre-feet per year of this water to Park City beginning in 2011. This project should also enhance the environmental quality of the streams originating in the Snyderville Basin area.

H. Participate in water conservation planning as an ongoing program. These plans must be in place prior to a critical need and must provide for each water user's acceptance of a fair share of any water conservation effort.

STRATEGY: Involve “stakeholders” in the design, development, and implementation of conservation programs. Continue to work with the Board of Realtors in this effort as well as the local Recycling Association and others.

IMPLEMENTATION: This goal has been met and is ongoing.

I. Institute studies to identify water use and misuse by all segments of the water using industry to provide data on which to base decisions regarding equitable water distribution during periods of shortage.

STRATEGY: Continually refine this conservation policy, as new statistical data on water use and patterns are developed. Pilot Study the use of smart irrigation controllers as proposed below (sub-section N), or other programs, to see if they can assist in the implementation of the policies of this conservation plan, and track better the use and miss-use of water throughout the District. Use the District GIS system to track visually water use patterns throughout the District. Review common space, HOA usage, and irrigation user demands and profiles to see if they are falling within their prescribed and contracted allotments. These users have recently proven to be some of the largest users of water in the District.

IMPLEMENTATION: The District is just beginning this process, particularly with their new GIS system, however successful implementation and results are expected.

J. **Investigate innovative water storage projects,** to allow the District to better manage its water resources during peak periods of the year.

STRATEGY: Investigate systems such as enhanced reservoir storage and Aquifer Storage and Recovery (ASR) to better utilize and balance District resources and infrastructure during off-peak and on-peak periods of water production. It is hoped that the summer peaks can be reduced with proper project implementation.

IMPLEMENTATION: The District has expended considerable sums of money to study the proposed Atkinson Well 2 ASR Project, the first bedrock aquifer ASR project in Utah. It is expected that this project will go into pilot testing in 2011, and become fully operational within 2 years after that study is concluded. This project could store up to 400 acre-feet of water a year underground, treated from the Lost Canyon Project during winter months and allow its recovery during the peak source demand periods in the summer. This source consists of a well that was virtually unusable due to water quality problems but through this proposed program can become one of our greatest water conservation projects.

The District will also investigate in the future other water storage projects that can reduce the peaking load on District infrastructure, especially in the servicing of recreational facilities. We will investigate reservoir storage for golf courses and recreational facilities, as well as other innovative systems such as managed snowmaking projects in the Canyons ski area and possible ISR (Ice Storage and Recovery).

K. **Meld Water and Energy Conservation into a unified strategy.** Water and Energy share many of the same conservation strategies and should be looked at conjunctively in any conservation program.

STRATEGY: Study different electrical power and energy rates and determine if changing rates can have a positive impact on District financial resources. Also – study the Load Factors (see section 6M below) of pumping systems to determine if they are operated at optimum levels, and determine if off-peak pumping is feasible.

IMPLEMENTATION: The District has made a lot of headway on this goal in the last couple of years. All pumping systems have been migrated to rates that better reflect their operation. This process alone has saved tens of thousands of dollars a year. The District is also running major pumping systems off-peak where feasible to lessen the impact and reduce the peak loads on the power generating and delivery systems in the State. Currently the District is spending 1.5 million dollars to convert its 4,100 horsepower Lost Canyon Pump Station to primary metered transmission service. This conversion is estimated to

save as much as 8 million dollars over 20 years of operation in power costs. (See chart 6.1 in section 6 below)

L. **Water Loss Reduction Programs** are very necessary to demonstrate to customers that the District is doing everything possible to minimize water loss on the supply side of the equation while promoting conservation programs to the end users on the demand side.

STRATEGY: Carefully study annual water losses on a macro and regional level, then target areas of the District that are susceptible to leaks and water loss, particularly the Summit Park Area. Use the SCADA system to notify or alarm District staff when trends in pumping and reservoir levels indicate a possible water loss or pipe break.

IMPLEMENTATION: This program has been successfully implemented and has resulted in major water savings, particularly in the Summit Park area. The District has installed advance water leak detectors in critical areas of the District and personnel respond promptly to water leaks when discovered.

M. **County Landscape Ordinances** can save considerable resources when properly applied in the initial project planning and design phases.

STRATEGY: Development and implementation of a Summit County conservation and landscape ordinance, including possible approved plant lists utilized in new developments can have a positive impact on conservation goals and programs. Conservation practices of this nature however may require a paradigm shift in some planning and zoning practices regarding landscaping designs and limits of disturbance practices. Rather than require that a project be lush and green, it may need to resemble the native landscapes better.

IMPELEMTATION: This goal has not been implemented yet, but the District will work with the County on this in the future.

N. **Advanced or "Virtual" Conservation Methods** should be investigated and tested in the next 5 years.

STRATEGY: Many of the conservation objectives listed above can be readily implemented through simple conservation programs currently in place or proposed by the District in this plan, however there often exists a virtual (unknown and not readily discernable) reservoir of water that can be obtained and utilized through proper advanced technologies. This strategy consists of developing "Virtual" water sources and storage by implementing one or more of the following programs:

A. Enhanced SCADA computer monitoring, including statistical “data mining”, and modeling of source demands and usages throughout the District to better predict the safe yield of sources and aquifers.

B. Implementing a Geographical Information System (GIS) system that allows better analysis of trends in water usages with land use and geographic features, weather processes (reference ET values) or micro-climates, and land development trends or constraints. This would allow the District to track conservation and water usage trends in different areas, climates, and elevations.

C. Weather Station installation in the several microclimates within the Basin to measure general weather conditions, precipitation, soil moisture characteristics, and daily reference Evapotranspiration (ETo) rates to assist in optimal irrigation applications within the Basin. All of this information will be made available to the public through the District WEB server, to assist customers in the fine-tuning of irrigation controllers (see APPENDIX I as a typical example).

D. The future development of a water billing system eventually calibrated or tied to the daily ETo rates and a custom allocation for each customer based on home/lot sizes, etc. to reward the conservers and penalize the abusers of irrigation water. Every customer will be allocated water that they actually need, customized to their individual landscaping needs and constraints, rather than a general base rate for all customers.

E. Pilot testing and possible implementation of a District irrigation controller program that is controlled by ETo data from the Districts weather stations and computers to ensure optimal irrigation rates and conservation practices.

F. Provide customer access using Mountain Regional's WEB site to provide to users current water usage and billing history, eventually focusing down to daily or even instantaneous levels of analysis, using daily radio read meter technology. Newer meters and electronic reading systems allow a utility to study better know when the peak day and peak instantaneous demands are reached, thus assisting in system planning and modeling for future expansion and improvements.

It is also difficult to conserve, if you do not know what your current water use is, especially compared to the District average or neighbors usage. Also, customers getting into a meter pits to read meters can be presented with difficulties and even dangers. Water and other utility meters are not user friendly, and as such,

present a barrier or obstacle to sound conservation planning and implementation.

G. As a “Virtual” conservation example, note the following:

1. Through conventional well or source development, it costs the District in capital outlay, at least 4,000 dollars per gallon per minute (“gpm”) of capacity, typically, this number approaches 5,000 dollars per gpm as we move more towards the west in the Snyderville Basin.

2. A typical home in the Basin needs 0.86 gpm source capacity, or costs 3,440 dollars for source development costs for the relevant gpm.

3. If the conservation savings, through a modern “Virtual” conservation project, i.e. an advanced smart irrigation controller and conservation program amounted to just 15 percent, this would equate to 516 dollars in source development savings per gpm developed.

4. An advanced irrigation controller is estimated to cost 300 dollars per unit at this time, and will be cheaper in quantities.

5. In other words, it could be nearly half of the price per gpm to implement advanced conservation programs, even systems more expensive than the controller program described, than it is to develop new wells or water treatment plants.

5 Administrative Water and Energy Conservation Strategies

Mountain Regional Water District takes conservation very seriously, and over the past several years; we have through vast experience developed many general conservation objectives. While most systems look more or only at what the customer can do to save water (demand side), we also put much effort into what we as the purveyor can do to conserve with our facilities, planning, and operations (supply side). We have also determined the energy conservation plays a significant role in any water conservation strategy. Much of this more administrative or supply side strategy is presented in this section as follows. We as District management will strive to:

- Understand our Water Resources Better
- Develop New and Innovative Water Conservation Strategies
- Understand Water Demand and Capacity Standards
- Understand the Energy and Power Relationships to Water Delivery
- Tie Power and Water Conservation Programs Together
- Understand and develop a “Hybridized” water delivery system
- Demonstrate our water, energy, and cost savings

A. Understanding the Water Resource

Our primary mission since our inception in 2000 has been understanding and implementing water resource MANAGEMENT and SUSTAINABILTY. We have worked hard to keep water SAFE, instill a CONSERVATION ethic, and still keep it AFFORDABLE. This is done often by administrative example and by helping the public better understand its value, especially when you live at the headwaters of a major river system (the Weber River), where slight touches in small watersheds (like upper East Canyon) can have a large effects on downstream water quality and quantity. We have tried to teach conservation and protection of our water resources, including:

- The environmental resources that RELY on it,
- And the environmental resources that SUSTAIN it.

We have also worked hard to protect and value our other resources that make our mission work, namely:

- Our Human Resources (the staff), and
- Our Financial Resources

Throughout this process - we can assume that:

- Water Rules and Regulations will always increase
- Water Costs will always increase
- Water scarcity and droughts will always increase
- Water pollution will always increase
- So therefore - Our thinking and approach to Water Management and Conservation MUST also INCREASE

B. Develop New Water Conservation Strategies

While punitive water rates are currently the "norm", and often the only conservation strategy offered by many water purveyors, Mountain Regional is investigating rates based more on many ascending blocks with little or even no base allowances. These types of rates usually involve a connection to external data such as ET weather stations and smart controllers for irrigation. Some of the newer conservation techniques management is investigating and as discussed above involve:

- Dynamic rates tied to ET rates – "Use only what you and your landscapes need"
- Remote controlled smart ET irrigation controllers – both local and centralized.
- Advanced water loss detection techniques.
- More water storage systems to reduce the impact of the peak day, etc.
- And managing the water resource more "Holistically"

C. Managing the Resource Holistically

Our concept of managing the resource more holistically is based in the joining of multiple conservation related technologies, which in the end result in a SMART system (look at the whole system better). This is accomplished by:

- Implementing a Smarter SCADA System (similar to Smart Grid Technology used in the energy industry) which is designed to assist in the conjunctive operation of water sources and storage systems.
- Implement Aquifer Storage and Recovery (ASR) Technologies.
- Integrate Water Loss Management Systems into meter reading and SCADA systems.
- Conjunctively manage the water resources. Utilize sources when capacities and quality are better.
- Work to eventually "Hybridize" the water system (discussed in detail below). This is done by:
    - Developing a larger reservoir storage system or "Battery".
    - Storing more peak day daily water demands in tanks.
    - Store some seasonal water demands in aquifers (ASR), reservoirs for golf courses and recreation parks, and possibly ice (ISR).
    - Integrate Water and Energy Conservation.
    - Recover energy at pressure reducing valves (PRV's) if practical.
- Updating infrastructure design standards to better:
    - Allow for conservation practices, and
    - Reduce the impacts of short period peak loads.
    - Integrating Energy Management into Water Management (as discussed below) to better manage energy, load factor, and pumping cycles.

D. The Energy and Water Relationship

There is a definite relationship between water and energy, not only in the production and usage of the same, but in the techniques employed in the conservation thereof. One of the largest direct costs of delivering water

involves the cost of pumping. Every foot of pumping, between say the dynamic drawdown water level of a well, to a reservoir serving a customer or zone of users costs money. The higher the pumping system head and flow, the greater the cost per ERC (Equivalent Residential Connection). Pumping during peak electrical utility loads also increases costs more and reduces the reliability of the electrical service or system(s). To better understand this relationship – we can begin with a discussion on the peak capacities of a water and energy system.

E. The Concepts of Water Peak Capacity

- A water system source and plant is always sized to meet its user's peak daily demand, known as (PDD).
- The Distribution and Transmission systems are sized for the Peak Instantaneous Demands (PID) of the users, i.e. irrigation and fire flow.
- A water system storage reservoir allows for the Peak Instantaneous Demand (PID) of users to be averaged or smoothed into the PDD, allowing for a smaller source peak demand.
- The water rights of a system are based on Average Day Demand (ADD) or Average Yearly Demand (AYD).
- The Peaking Factor (Pf) is a ratio of the PDD divided by the ADD, and is an indicator of the overall impact of a particular user on the water system.
- State Source Sizing Standards are typically based on a Peaking Factor of about 2.
- The Art of water conservation is found in reducing the overall peaking factor of the source and delivery system, thus reducing the need for oversized sources and infrastructure that are only needed a short time of the day or year.

F. The Concepts of Energy Peak Capacity

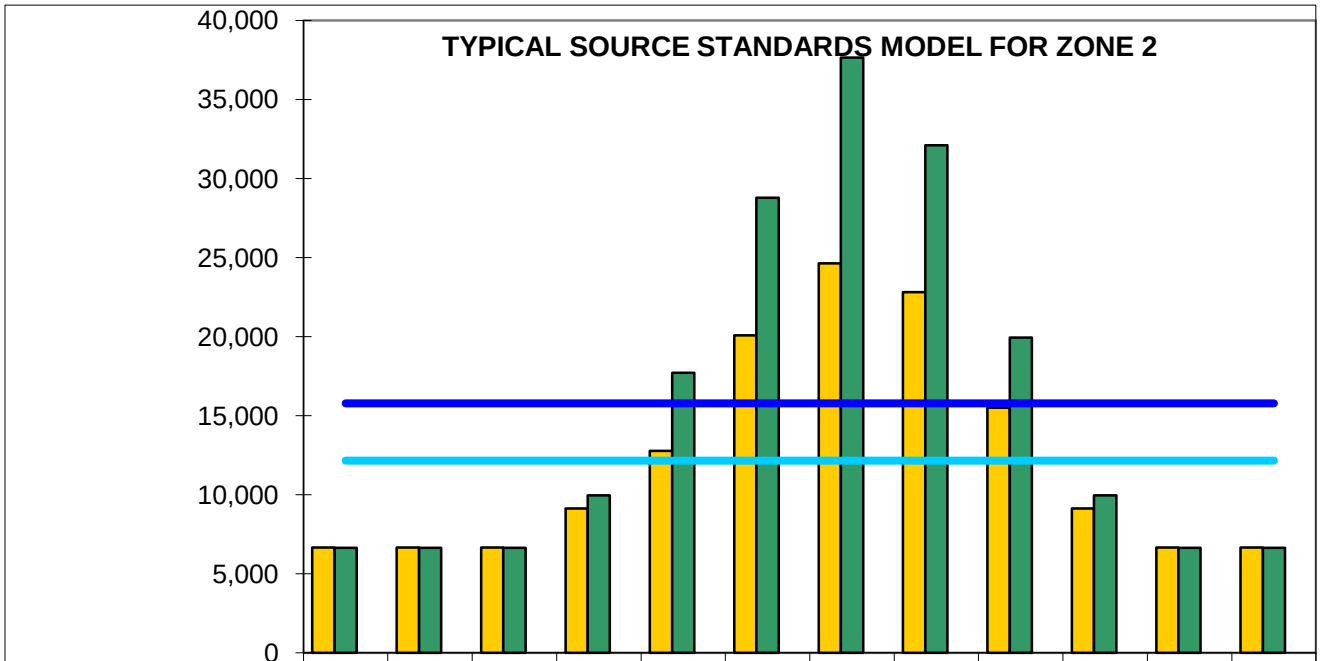
- Electrical Power systems size power generating and delivery systems using the same concepts of a water system.
- Power plants are sized to meet the peak daily energy and power load of their users, even if for a very short time.
- The art of energy conservation is based on reducing the overall peaking factor of a system, thus reducing peak generating demands, brown outs, rolling blackouts, and minimizing the total carbon footprint of a power system.
- The SMART energy grid is an attempt to reduce adverse peaking impacts

G. Advantages of Reducing the Peak

- Peak water demands and power deliveries are the most costly.
- Peaks require the greatest usage of resources.
- Peak demands rob a system of customer growth capacity – whereas reducing the peak through conservation allows for the economic servicing of more customers with fewer upgrades.
- Peak demands increase O&M on a system.
- Peak demands have a greater impact on the environment.

H. The HYBRID Car Concept

Hybrid cars have a gas engine and an electric motor which "Holistically" work together to conserve energy. The electric motor acts as a generator to store energy in batteries when needed. Hybrid Cars are very efficient because they can shut off their gas engine at will and store excess energy in their batteries during breaking periods ("Regenerative Breaking") or when coasting, going downhill, or decelerating. This stored energy is then used during accelerations or when needed to reduce the amount of time the gas engine is needed. Simply put – when you drive a Hybrid car up and over a mountain summit, and then back down the other side – you used the same amount of energy as if you tunneled straight through the mountain and maintained the same speed the entire distance. This "Mountain" example is analogous to a water systems annual demand curve, and is what Mountain Regional has attempted to do by reducing loads on water sources and powers systems during peak periods of the year. See chart 5.1 below for a typical annual demand curve. We call this process "hybridizing", and it is explained in detail below.



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Indoor Demand	6,666	6,666	6,666	9,125	12,775	20,075	24,638	22,813	15,513	9,125	6,666	6,666
TOTAL Demand	6,644	6,644	6,644	9,966	17,717	28,790	37,649	32,112	19,932	9,966	6,644	6,644
Total ADD	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779
TOTAL ADD	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779	15,779
Indoor ADD	12,167	12,167	12,167	12,167	12,167	12,167	12,167	12,167	12,167	12,167	12,167	12,167

Chart 5.1 The Seasonal Water Demand Curve

I. "Hybridizing" the Water System

The basic concept is to store water and energy during off peak periods and use it during high demand periods – similar to a hybrid car. Storing more water allows for a reduction in the peaking factor of the water system i.e. utilizing larger tanks or ASR (Aquifer Storage and Recovery). Increased storage can also allow for more efficient off-peak pumping. It further allows for an emergency reserve if needed.

Current storage requirements do not always allow for off-peak pumping during growth build out periods – or peak demand periods. A large or newer system however, with lower initial growth can accommodate hybridizing in its early years very easily. Energy recovery at large pressure reducing valves or stations (PRV's) can also be used to reduce the "Up-Hill" pumping costs of the pumping curve.

J. The Seasonal (or Daily) Demand Curve Common Capacity Terms

To better understand how water and energy are inter-related, consider the following:

- The flow of water in a system is expressed in terms such as GPM, or MGD, or Ac-Ft/Year.
- Flow in an electrical system is expressed as Current and is expressed or measured as amperage or Amps.
- The pressure of water is a function of its elevation head and is expressed in terms such as PSI, or Feet of Head.
- The pressure in an electrical system is expressed as Voltage, which is its electromotive force.
- Power in water is a function of the pressure times the flow, and is expressed in units such as Horsepower.
- Power in an electrical system is a function of the voltage times the current and is expressed as watts or kilowatts.
- The volume of water billed by utilities is expressed in terms such as Gallons, Cubic feet, or Ac-Ft.
- The volume of energy billed by electrical utilities is expressed in terms of Kilowatt Hours or kwh.
- The peak capacity demand of an ERC on water utilities infrastructure is billed as a onetime capital impact fee.
- The peak capacity demand of a customer on electrical utilities infrastructure is billed monthly with the energy charge – and is called the peak power or demand load.
- Water is stored in a reservoir – Electricity is stored in a battery.

K. The Big Energy Conservation Secret

If a water utility uses the correct power rate for pumping systems, it can save money. If they pump during off peak periods of the Electrical Utility – they can save much more money, by completely eliminating the peak Power Demand Charge. If they use Variable Frequency Drives or increase their Load Factor (see below) – they can significantly reduce costs – by reducing again the demand or power charge. If they are charged a power factor penalty – they

can also reduce or eliminate that charge by implementing power factor correction strategies (see below). And finally it should be noted that all of these strategies reduce environmental impacts by utilizing the power grid in a more efficient manner, thereby reducing the need for generation plant expansions.

L. RMP Energy Rates (as of summer of 2009)

To better understand potential energy savings, we need to understand better some of the rates offered by Rocky Mountain Power (RMP). The common rates used by water utilities is rate 6 and rate 23:

- **Rate 23** – Small Commercial – low demand < 30kw, This is the highest cost rate. **23B** is its power time of day off peak rate.
- **Rate 6** – Commercial – Medium Demand < 1 mw (most common pumping rate).
- **Rate 6B** - is its corresponding power time of day off-peak rate.
- **Rate 6A** – A commercial time of day energy rate. If you have a low load factor – you can save on this rate. It also has an off peak rate built in.
- **Rate 8** – Large commercial / industrial rate > 1 mw. Slightly lower rates but the off-peak period doubles in the summer months from 8 hours to 16 hours per day!
- **Rate 9** – Large industrial transmission rate. Should be considered if loads are consistently above 1-2 mw. Considerably lower rates and off peak periods are the same as rate 8, but you need to take the service from a transmission line at the high voltage side (primary metered), 46,000 volts and above, and construct, own, and operate a sub-station.
- **NOTE** - Rates can be changed by the user, but not more than once a year.

Off Peak Periods are as follows:

- The normal off peak periods for RMP are:
  - 11:00 PM to 7:00 AM all year
  - All day on weekends and holidays.
- For Rate 8 and 9 Customers they are:
  - 9:00 PM to 1:00 PM in the Summer Months, and
  - 11:00 PM to 7:00 AM in the Winter Months.
  - All day on weekends and holidays
- Summer months are May through September
- You lose the power demand savings if you go on peak for even a minute (except 6A).
- Rate 6B also has a 12 month Penalty – Be Careful!

M. Electrical Load Factors

The electrical Load Factor (LF) on a pumping system has a big impact on monthly rates and conservation planning. The Load Factor is a measurement of the amount of time a facility runs during the billing cycle. A large part of an electrical bill is the demand or peak power charge, and if a pumping system runs at a high capacity for a short time – the peak power (kw) charge is assessed – on as little as a 15 minute pumping period. If the pumping system can run longer – say 80% of the time, at a lower capacity – the same amount of water is pumped during a day or month, but the peak power charge is much less. LF is expressed as a percent (%), where 100% means the pumps ran

24/7. 50% means they ran half of the time during the billing period, etc. Most pumping facilities are designed by engineers to run for short periods normally (this allows for some future growth capacity), usually around 25% LF, and cost considerably more to run without any system management. Longer run periods are saved for emergencies or build-out. A Variable Frequency Drive (VFD) can have a big impact on Load Factors if run correctly, and can save on motor maintenance and efficiency as well. This is accomplished by running the pumping systems at a lower speed and flow rate. Also more motors at lower horsepower can increase the LF on a system.

N. A Closer Look - Potential Energy Savings Example for 1,000 ERC's:
APPENDIX H shows tables of the potential costs of pumping based on flow and ERC's for various pumping capacities and heads. These tables can be used to show the potential savings by moving to different rates and properly managing loads. As an example using a system of 1,000 ERC's, note the following:

- Current Energy Costs (typical rate 6 @ 20% LF):
  - Annual cost per ERC = $ 106.00
  - Times 1,000 ERC's = $ 106,000.00
- Moved to rate 6A with no LF change:
  - Annual cost per ERC = $ 79.00
  - Times 1,000 ERC's = $ 79,000.00 $ 27,000 dollar savings
- Rate 6 managed to 80% LF:
  - Annual cost per ERC = $ 42.00
  - Times 1,000 ERC's = $ 42,000.00 $ 64,000 dollar savings
- Moved to rate 6A and managed to Total Off-Peak:
  - Annual cost per ERC = $ 19.00
  - Times 1,000 ERC's = $ 19,000.00 $ 87,000 dollar savings
- For Larger users that can move to rate 8 or 9:
  - – even larger potential savings!

A Brief Note for Larger Users: The Off-Peak rate for rate 6 and the rates 8 and 9 look similar, but the following needs to be remembered:

- The Off-Peak periods for the number 6 rates (6A and 6B) can never go to more than 8 hours per day.
- The Off-Peak periods for the 8 and 9 rates go to 16 hours per day in the summer.
- Most pumping systems will need to go partially ON-PEAK in the peak months to meet the daily and monthly demands of the system when the limitation is only 8 hours per day.
- Rate 9 customers also have the option to buy power on the open market.
- This makes the savings for rate 8 and 9 larger than may appear in this simplified model, since the Off-Peak periods will likely be maintained.

O. A Conservation - Savings Management Cycle
(The greater the effort – the greater benefit)

- **Easy** – If you have a low LF, move to rate 6A.
- **Moderate** – Stay on rate 6 and Increase your LF by:
  - Managing your control scheme better (SCADA)
  - Installing VFD's on pumping systems
- **Harder** – Move your rate to 6A and shed your energy loads to Off-Peak periods.
- **Hardest** – If you are a large user – Move to rate 8 or 9 and go Off-Peak as much as is possible. Use high pump loads Off-Peak and reduce loads On-Peak – with large Load Factors. And investigate ASR and Energy Recovery.

P. Power Factor Correction – The Other Energy Conservation Strategy

Power Factor is a measurement of the reactive power in a system (VARS) and is an indicator of how inefficient a pumping drive system is. It is a function of the magnetizing energy of a motor and if it is less than 0.90, the utility will assess a penalty on systems monthly power bills. The penalty is usually an increase in on-peak kw power demand load, and can be quite costly in some situations. Typically this problem can be remedied by a VFD, or by adding properly sized capacitors to a pumping circuit. Mountain Regional Water has corrected all of their power factor penalties through these system upgrades.

Q. Summary

In summary – Mountain Regional Water District is in the process or has accomplished the following supply side or macro-conservation objectives, to not only save resources and money, but to demonstrate that conservation is more than simply a user solution. It needs to be taught and implemented by example.

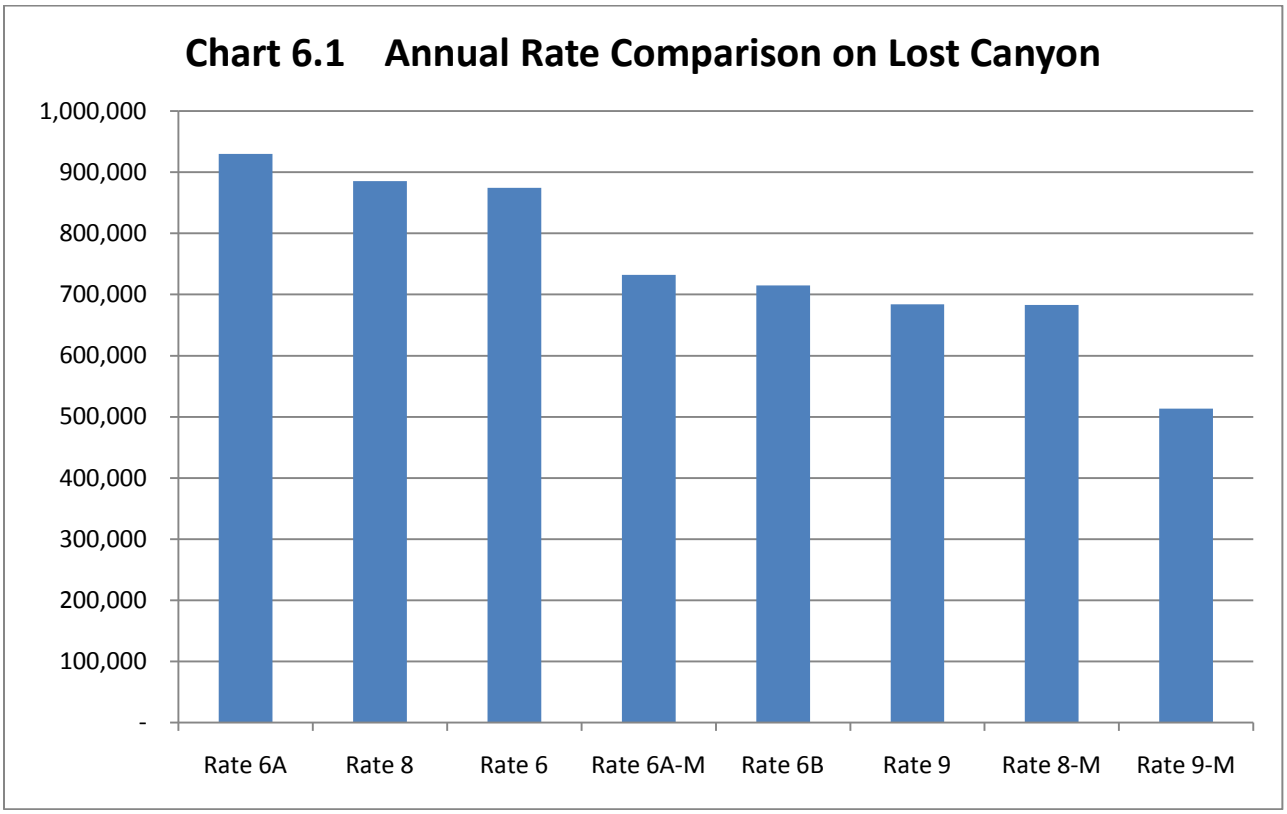
- In our large ground water systems – investigating ASR.
- Making our SCADA system smarter.
- Automating meter reading and billing systems.
- Choosing the correct power rates for each pumping service.
- Enlarging water storage systems if possible.
- Pumping OFF-PEAK as much as practicable.
- Educating customers on our conservation progress and how they can assist.
- Designing pumping plants with more smaller selectable pumps and motors, or with larger motors on VFD's to increase the Load Factors.
- Correcting power factor on accounts that are penalized.
- Investigating the Industrial Rate 9 feasibility on large projects.
- Recovering energy in PRV's if feasible.

6 Mountain Regional Energy Conservation Strategy

The following strategies are presented to better conserve and manage the electrical power and energy resources of the District. Many of these are just beginning and their successes will be addressed in future editions of this conservation plan:

1. Establish the best rates for each pumping facility and manage the largest energy sources and water sources first – in order of savings, to establish a productive and efficient off peak and on peak pumping strategy.
    a. Begin with Lost Canyon Pump Station (a 3+ megawatt facility). As an example, chart 6.1 below shows potential annual power savings on this one facility using different Rocky Mountain Power Rates at a managed Load Factor.
    b. Facilities and Plants with motors of 200 horsepower (hp) and above.
    c. Then facilities of 100 to 200 hp.
2. Establish Lost Canyon on rate 8 immediately (run-up power demand if necessary) to utilize longer off-peak times in the summer.
3. Move the Lost Canyon pump station eventually to an industrial transmission line customer (Rate 9) to achieve the greatest power savings possible and to increase its system reliability.
4. Establish Power Quality meters on the largest facilities with continuous logging capabilities if necessary to ensure that large electrical infrastructure is not damaged or affected adversely by problems in the electrical supply and distribution systems.
5. Because the District has over 50 power accounts, it is advised that we review Rocky Mountain billings more closely for any possible billing errors, and request corrections as soon as possible.
6. Increase the pumping Load Factors (LF) in District facilities to 75% or above.
    a. Train operators on the costs of running pumps for a short duration.
    b. Reduce unnecessary water tests when a source is down for a month or more.
    c. Implement a smarter SCADA grid system to look at and manage energy data more effectively.
    d. Install more and smaller pumps on new facilities to extend run times.
    e. Place larger pump facilities on Variable Frequency Drives (VFD's) to increase LF and reduce penalties associated with power factor problems.
    f. Increase reservoir sizes on new projects to facilitate more efficient off-peak pumping.
7. Investigate and implement an energy recovery project if feasible on large pressure reducing facilities.

8. Investigate and implement energy savings facilities on infrastructure, i.e. cheaper lighting, and space heating.
9. Investigate and implement a solar and/or wind power energy augmentation facility at our treatment plant, old ranch road, and future offices.
10. Test and reduce Reactive Power (power factor) and associated penalties on our pumping facilities.
    a. Install VFD's and/or capacitor banks on motor systems.
    b. Test and/or install filter reactors on current VFD's.
11. Eliminate small unnecessary electrical accounts, such as on SCADA only facilities – replace with solar systems if feasible.
12. Monitor electrical facilities for inefficient heat dissipation in their cooling systems, etc.
13. Provide projects that can reduce the peaking factor on the water system, i.e. the proposed Atkinson ASR project, or more irrigation storage projects.



7 Water Quality Benefits to Conservation

A well-developed conservation program also improves stream water quality by putting a significantly smaller burden on County storm water collection and discharge systems, and loading the streams with fewer nutrients. Over-watering caries nitrogen and phosphorus compounds into the stream environment, aiding in the rapid growth if aquatic plant and algae species, which in turn, can rob the stream of oxygen, a necessary component for the survival of aquatic wildlife. It has been said that, “green lawns, mean green streams”, and this is characteristic of the East Canyon stream environment.

As another often-unperceived penalty, through additions of stream nutrients, by improper irrigation practices, coupled with reductions in stream flows from over development, over appropriation of water rights in the Snyderville Basin, and the effects of droughts, everyone’s sewer bills may indirectly affected. The discharge permits of the Water Reclamation District are regulated by base flows and loadings of pollutants normally found in the stream, prior to the plant discharge. As these background levels increase, the amount or loading of discharged elements, such as phosphorus, must decrease, increasing significantly the treatment burdens on the Reclamation District, which costs are then in turn passed on to Basin customers.

This condition can be partly remedied through importation. Mountain Regional Water Special Service District is studying water well and possible future stream injection points with imported waters, to help protect the watershed environment. This would increase stream flows, reduce the impact of pollutants, such as nitrogen and phosphorus compounds, provide a more healthful environment to aquatic wildlife, and help recover the years of some aquifer over utilization.

8 Drought Management and Benefits from Conservation

Conservation for the District is ultimately a “Drought Insurance” policy. Development of these programs will pay back many times in the future. Conservation programs are currently being factored into District financial studies and Performa’s. A drought management plan and public notification or alerting system, with varying degrees of drought management, response, and mediation responses has been implemented in the last several years.

Mountain Regional has adopted much of the conservation goals of the publication, "Drought: a handbook for prevention and action", published by The Irrigation Association. The following excerpts are taken from that document:

Drought Misconceptions:

> **Drought is the result of lack of rainfall.** Drought is better described as a supply and demand issue. When the demand for water in a growing urban community outstrips the resources, drought is a result. That's why sensible

proactive policies and smarter use - and reuse - of water are keys to preventing drought.

Watering your lawn lightly will save water and keep landscaping alive. Light watering actually wastes water because it discourages roots from growing deeply, where the ground remains moist longer. As a rule, infrequent and deep watering is preferable.

One good rainfall is sufficient to restore the water supply during a hot, dry summer. The average rainfall produces an inch of water - equivalent to the amount of water that evaporates in a single day. It usually takes three months of concentrated rainfall to erase the effects of drought.

Water is a limited resource. Yes and no. A community can certainly run out of water, but water also is a renewable resource - and one that can be recycled. If homeowners and communities use water efficiently and take advantage of recycling technology that exists today, water emergencies would evaporate.

Restricting the water supply is the best way to conserve water in times of drought. Curtailing water use can lead to an immediate short-term drop in consumption, but it comes with a price - in higher temperatures and lower property values in residential areas, and in potentially causing homeowners economic harm. Educating the community about wise water management is a better long-term solution.

Facts:

Drought causes annual economic losses of $6-8 billion, more than the losses caused by floods ($2.41 billion) or hurricanes ($1.2-4.8 billion). (National Oceanic & Atmospheric Administration)

A garden hose is inefficient, because it spreads water unevenly. Watering in the heat of the day or in windy conditions wastes water, because it may evaporate or blow away.

Most established lawns, if allowed to go dormant during hot, dry weather, will rebound when rains return.

Using recycled water (treated to almost drinkable standards) on landscaping would save the U.S. enough fresh water in a year for everyone in New York City to take a 10-minute shower every day for 4 1/2 years.

A timed sprinkler system uses water efficiently, because it can be set to run overnight, when temperatures are coolest and the evaporation rate is lowest.

On a hot day, lawns will be 30 degrees cooler than nearby pavement, producing a moderating effect on the environment.

Landscaping can increase residential property values by 7 percent and add as much as 15 percent to the selling price of a home. (Gelman & Grey Research and Planning Services; Gallup Organization)

Water use - and waste - is determined more by people than by type of landscaping. A recent study found there was no appreciable difference between two similar-sized lawns, even though one homeowner used nearly 10 times more water than his neighbor.

Drought Management Recommendations:

Homeowners can implement the following water conservation strategies:

- Use a properly designed automatic irrigation system that has uniform water distribution
- Adjust water rates so excessive water users pay for the privilege of using too much water
- Cities should consider rebates for installing an upgraded outdoor watering system
- Encourage the use of an automatic rain shut-off device on sprinkler systems
- Consider using drip or micro irrigation for trees and shrubs
- Inspect and adjust automatic sprinkler controller bimonthly to correct run times
- Group plants together that have the same water requirement
- Use native plant material where appropriate
- Water lawns and plantings separately
- Keep grass extra long during the hot summer months. Never remove more than 25 percent of grass height.
- Cut back on watering until lawns and shrubs show some stress to conserve water
- Mulch flowerbeds and gardens with porous material to retain moisture
- Make people aware of the Evaporation/Transpiration (ET) rate, which measures the water requirements of plants. ET is much higher during daylight hours on a warm day, and varies with the type of plant used.
- Publicize a suggested amount of time each day to replace ET

- Audit irrigation systems. Trained individuals can evaluate sprinkler systems for uniformity and make suggestions that will improve performance and operation schedules. The audit will identify these conditions: broken or damaged sprinklers; correct adjustment of sprinklers to prevent watering of sidewalks, driveways, walls and other hardscapes; proper operating pressure (misting caused by high pressure, donut wetting patterns indicating low pressure); sprinkler height adjustment (grass interference with spray patterns); poor uniformity indicated by dry spots/wet spots; adjustment of sprinkler controller to match weather conditions.

Drought Action Steps:

In case of drought, District officials will take the following steps to curtail the use of water. The District assumes that we are always at a minimum Stage 1 condition:

Stage 1. Odd/even water days (or similar plans) are made mandatory for all outdoor uses. No restriction on time of day.

Stage 2. Stage 1 restrictions, plus watering using hand and hose sprinklers only between 8-8 a.m. and 8-10 p.m. Automatic irrigation system operation between 10 p.m.-5 a.m. No filling of swimming pools (although pools may be topped off). Only personal vehicles may be spray washed using an automatic shut-off nozzle.

Stage 3. Hand watering of gardens only. No car washing. Automatic irrigation systems may be used only between 8-8 a.m. on scheduled days.

Stage 4. Outside watering of gardens only with drip irrigation or saved shower water. New landscapes may be watered by permit only.

Stage 5. No outside water use except with saved shower water.

9 Cooperation

All District water conservation and management programs will be developed and implemented with the cooperation and partnership with Snyderville Basin Water Reclamation District (“SBWRD”), Park City, Summit County, and possibly other key partners in the future. It is very difficult to develop conservation programs when a jurisdiction acts as an “island”, independent of other water providers.

10 Performance

Mountain Regional Water Special Service District has now established enough data to determine if conservation incentives and programs, initially established in 2003, not only through the implementation of conservation based water rates, but also limiting watering to twice a week, can be measured. Chart 3 in APPENDIX D demonstrates the annual cumulative monthly water consumption of the entire District, coupled with ERC growth rates. This chart uses the same data as the water loss charts, but shows the trend and inclining slope of Customer ERC growth over the years. The steeper slope of the customer growth, compared to the gentler slope of the source and demand profiles, indicate a consistent trend toward increased conservation by our customers. This is most likely a result of the conservation efforts of management and punitive rates of the District relative to higher water usage.

One problem that the District is experiencing, regarding water conservation, is the under-rating of Home Owners Association (HOA's) and other common space irrigation in developments. This category of users, generally responds less to conservation restrictions and rates, and puts extreme demands on the system, even in drought conditions. Part of this problem may be the vast amount of water that is needed on new developments, and to help portray a picture of a lush vegetative environment, thus assisting in the marketing of new properties. However, there is still a very high demand in the more established developments.

Another less common problem, associated with the above is that often these common area uses have seriously miss-stated demands in the planning phase, and as such, have not paid enough for Impact Fees or other associated buy-in costs. Their fiscal impact are made up therefore in the higher ascending block rates being attained on their monthly bills

11 District Irrigation Systems Conservation Standards

Standards have been developed by the District to aid in the development of Conservation policies, Programs, and Ordinances. These standards are used as a point of reference in the development or presentation of any conservation policies and are used in our public education campaigns such as bill stuffers, water fairs, and consumer confidence reports. APPENDIX I shows a typical irrigation scheduling program for Mountain Regional Water:

A. Plants well-suited to microclimate and soil conditions at site, require minimal water once established, are relatively free from pests and diseases, and are generally easy to maintain. (See Plant List below)

B. Plants with similar water needs should be grouped together. (See Plant List below)

C. Water-Conserving Plants should be placed on slopes exceeding 33 percent.

D. Pre-emergent herbicide and a minimum four-inches of mulch should be specified on plans.

E. Landscape Water Meters shall be installed separate from the water meter installed for indoor use on large or specified landscaping porjects.

F. Automatic controllers will be provided with multiple program and repeat cycle capabilities, automatic rain shut-off device, and a flexible calendar programs on landscaping watering systems.

G. On slopes over 33 percent, irrigation system shall consist of Drip Emitters, Bubblers or Sprinklers with a maximum Precipitation Rate of 0.85 inches per hour and adjusted sprinkler cycle times to eliminate Runoff.

H. Each irrigation or sprinkler valve shall irrigate areas with similar site, slope, and soil conditions and plants with similar water needs.

I. Turf and non-turf areas shall be irrigated on separate valves.

J. Drip Emitters and Sprinklers shall be placed on separate valves.

K. Drip Emitters or a Bubbler shall be provided to each tree, Bubblers with a maximum 1.5 gallons per minute shall be used. Bubblers for trees shall be placed on separate valves, unless otherwise permitted by the District.

L. Sprinklers will have matched Precipitation Rates within each valve.

M. Check valves are specified where low-head drainage will occur due to elevation differences.

N. Pressure compensating valves and sprinklers will be specified where significant variation in water pressure will occur.

O. Sprinklers shall be spaced at maximum 1.0 times radius of head for square spacing.

P. Pressure regulators shall be provided where static water pressure exceeds manufacturers maximum recommended operating pressure for the sprinkler heads.

Q. Drip irrigation will always be placed underground, except for temporary installations.

12 Residential Conservation Educational Information

The following educational information is used to assist residential and small business customers establish indoor and outdoor conservation practices in their homes and businesses. APPENDIX I shows a typical irrigation scheduling program for Mountain Regional Water:

Outdoor Water Use:

A. Water landscapes only as much as required by the type of landscape, and the specific weather patterns of your area, including cutting back on watering times in the spring and fall. We encourage our customers to utilize the weekly lawn watering guide located at www.conservewater.utah.gov.

B. Group plants in terms of water need, and zone sprinkler systems accordingly.

C. Encourage customers to alter parking strips by allowing more water-wise plantings.

D. Do not water on hot, sunny, and/or windy days. You may actually end up doing more harm than good to your landscape, as well as wasting a significant amount of water.

E. Sweep sidewalks and driveways instead of using the hose to clean them off.

F. Wash your car from a bucket of soapy (biodegradable) water and rinse while parked on or near the grass or landscape so that all the water running off goes to beneficial use instead of running down the gutter to waste.

G. Check for and repair leaks in all pipes, hoses, faucets, couplings, valves, etc. Verify there are no leaks by turning everything off and checking your water meter to see if it is still running. Some underground leaks may not be visible due to draining off into storm drains, ditches, or traveling outside your property.

H. Use mulch around trees and shrubs, as well as in your garden to retain as much moisture as possible. Areas with drip systems will use much less water, particularly during hot, dry and windy conditions.

I. Keep your lawn well trimmed and all other landscaped areas free of weeds to reduce overall water needs of your yard.

Indoor Water Use:

A. About two-thirds of the total water used in a household is used in the bathroom.

B. Concentrate on reducing your bathroom use. Following are suggestions for this specific area:

   a. Do not use your toilet as a wastebasket. Put all tissues, wrappers, diapers, cigarette butts, etc. in the trashcan.
   b. Check the toilet for leaks. Is the water level too high? Put a few drops of food coloring in the tank. If the bowl water becomes colored without flushing, there is a leak.
   c. If you do not have a low volume flush toilet, put a plastic bottle full of sand and water to reduce the amount of water used per flush. However, be

careful not to over conserve to the point of having to flush twice to make the toilet work. Also, be sure the containers used do not interfere with the flushing mechanism.

d. Take short showers with the water turned up only as much as necessary. Turn the shower off while soaping up or shampooing. Install low flow showerheads and/or other flow restriction devices.
e. Do not let the water run while shaving or brushing your teeth. Fill the sink or a glass instead.

C. When doing laundry, make sure you always wash a full load or adjust the water level appropriately if your machine will do that. Most machines use 40 gallons or more for each load, whether it is two socks or a week's worth of clothes.

D. Repair any leak within the household. Even a minor slow drip can waste up to 15 to 20 gallons of water a day.

E. Know where your main shutoff valve is and make sure that it works. Shutting the water off yourself when a pipe breaks or a leak occurs will not only save water, but also eliminate or minimize damage to your personal property.

F. Keep a jar of water in the refrigerator for a cold drink instead of running water from the tap until it gets cold. You are putting several glasses of water down the drain for one cold drink.

G. Plug the sink when rinsing vegetables, dishes, or anything else; use only a sink full of water instead of continually running water down the drain.

13 Conservation Plant Lists

Plant lists assist in the education, planning, and implementation of any conservation program. The following plant lists are submitted by the District for use in the two main climates, presented geographically in the District. Use of plants listed below, or the like, by customers developing landscapes in the District, can result in honest reductions to typical water patterns, common in the past. The District will investigate further incentives, to assist in the utilization of xeriscaping or low impact water designs in new or remodeled landscaping projects.

USE for HIGH MOUNTAIN DESERT LANDSCAPES *(Most of Snyderville Basin)*

Scientific Name	Common Name	Native Species = N
Agave harvardii	Harvard Agave	
Albizia julibrissin	Mimosa Silk Tree	
Artemisia frigida	Fringed Sage	N
Artemisia tridentata	Big Sagebrush	N
Astragalus utahensis	Utah Ladyfinger	N
Atriplex canescens	Four-Wing Saltbrush	N
Berlandiera lyrata	Chocolate Flower	
Bouteloua gracilis	Blue Grama Grass	N
Caesalpina gillesi	Yellow Bird of Paradise Shrub	
Callirhoe involucrata	Poppy Mallow	
Calylophus hartwegii fendleri	Sundrops	N
Campsis radicans 'Flava'	Yellow Trumpet Creeper	
Campsis tagliabuana 'Madame Galan'	Trumpet Vine	
Castilleja sp.	Indian Paintbrush	N
Caragana arborescens	Siberian Peashrub	
Celtis occidentalis	Common Hackberry	
Delosperma cooperi	Hardy Ice Plant	
Ephedra viridis	Green Mormon Tea	N
Fallugia paradoxa	Apache Plume	N
Festuca ovina glauca 'Elijah Blue'	Elijah Blue Fescue	
Forestiera neomexicana	New Mexican Privet	
Gaillardia x grandiflora 'Burgundy'	Burgundy Blanket Flower	
Gaura lindheimeri 'Siskiyou Pink	Gaura	
Gutierrezia sarothrae	Snakebrush	N
Hesperaloe parviflora	Red Yucca	
Hesperaloe parviflora 'Duet'	Duet Red Yucca	
Juniperus horizontalis 'Bar Harbor'	Bar Harbor Juniper	
Juniperus osteosperma	Utah Juniper	N
Juniperus scopulorum	Rocky Mountain Juniper	N
Linum perenne lewisii	Blue Flax	N
Miscanthus sinensis 'Goliath	Japanese Silver Grass	
Miscanthis sinensis 'Zebrinus'	Zebra Grass	
Oenothera caespitosa	Tufted Evening Primrose	N
Penstemon barbatus	Scarlet Bugler	N
Penstemon eatonii	Firecracker Penstemon	N
Penstemon palmeri	Palmer's Penstemon	N
Penstemon pinifolius	Pineleaf Penstemon	N
Pinus edulis	Pinyon Pine	N
Ratibida columnifera	Mexican Hat	
Salvis argentea	Silver Sage	
Schizachyrium scoparium	Little Blue Stem	
Sempervivum species	Hens and Chicks	
Shepherdia rotundifolia	Roundleaf Buffaloberry	N
Sorghastrum nutans 'Sioux Blue'	Indian Grass	
Sphaeralcea caespitosa	Cushion Globemallow	N
Sphaeralcea grossulariaefolia	Gooseberry-leaf Globemallow	N
Stanleya pinnata	Prince's Plume	N
Viquiera multiflora	Showy Goldeneye	N
Yucca baccata	Banana Yucca	
Yucca filamentosa 'Ivory Tower'	Ivory Tower Yucca	N
Zauschneria latifolia	Hummingbird Flower	N

USE for WOODLAND LANDSCAPES
(Mainly North Facing High Elevation Wooded Canyons, such as Summit Park and the Colony)

Scientific Name	Common Name	Native Species = N
Acer ginnala	Amur Maple	
Acer glabrum	Rocky Mountain Maple	N
Aethionema grandiflorum	Persian Stonecress	
Agastache rupestris	Sunset Hyssop	
Alnus incana	Thinleaf Alder	
Andropogon gerardii	Big Blue Stem	
Aquilegia caerulea 'McKana Mix'	McKana Columbine	
Arctostaphylos uva-ursi	Kinnikinnick	N
Aster frikartii 'Monch'	Monch Aster	
Cercocarpus ledifolius	Curlleaf Mountain Mahogany	N
Festuca ovina glauca 'Elijah Blue'	Elijah Blue Fescue	
Fragaria 'Pink Panda'	Pink Panda Strawberry	
Gazania linearis x Colorado Gold	Hardy Gazania	
Juniperus communis 'Repanda'	Repanda Juniper	
Lavandula angustifolia	English Lavender	
Lavandula x intermedia 'Fred Boutin'	Fred Boutin Lavender	
Lonicera heckrotii	Honeysuckle	
Malus 'Royalty'	Royalty Crabapples	
Nepeta spp.	Catnip	
Oenothera missouriensis	Missouri Evening Primrose	
Osteospermum barbariae compactum	Purple Mtn.Sun Daisy	
Pachistima canbyi	Dwarf Mountain Lover	N
Penstemon strictus	Rocky Mountain Penstemon	N
Petrophytum caespitosum	Rockmat	N
Pinus flexulis 'Vanderwolf's Pyramid'	Vanderwolf's Pine	N
Potentilla fruticosa 'Jackmanii'	Jackman's Potentilla	N
Prunus virginiana	Chokecherry	N
Quercus gambelii	Gambel Oak	N
Rhus aromatica 'Gro-Low'	Grow Low Sumac	N
Ribes alpinum 'Green Mound'	Green Mound Currant	
Ribes aureum	Golden Currant	N
Schizachyrium scoparium	Little Blue Stem	N
Symphoricarpos albus	Snowberry	N

14 Conservation Rules and Regulations Implemented by District

The following excerpts of Rules and Regulations have been adopted by the District, to further the objectives of the District Water Resource Management and Conservation Plan as presented in this document. The quoted and pertinent sections are in italics with some introductions before each section. The following sections are extracted in their entirety from the most recent Rules and Regulations as adopted by the Administrative Control Board and in effect as of the date of this Water Resource Management and Conservation Plan:

In section 4.4 below, the District has adopted rules to facilitate the timely and efficient usage of irrigation or secondary water delivered from the Lost Canyon Project. This policy also minimizes the impacts of large water users such as golf courses and parks on the existing tenuous groundwater system of Snyderville Basin and critical treatment plant capacities:

4.4 Irrigation Water Service

The development of irrigation water from sources of supply that are of lower quality or untreated, such as untreated Project water and/or wastewater reuse will increase the supply of good quality Project water available for culinary use, as well as extend the use of good quality groundwater sources within the County and Snyderville Basin. As such, the acquisition of water rights and the development of these types of sources of supply for the distribution of irrigation water for irrigation of golf courses, parks, yards, and open spaces, in new developments if available is authorized, and encouraged, factoring in the relevance of section 4.6 below, and conforming with the following policies and regulations:

A. Irrigation Policy.

1. Raw untreated irrigation water can only be developed from the Importation Project(s), and not from other groundwater or surface water sources located within the Snyderville Basin, thus increasing basin water availability and possible return flows to the stream systems. To the extent Project water is used, these Rules and Regulations which pertain to the use of Project water for culinary use shall apply, including, without limitation, payment of Project Impact Fees, assessments, and water service fees and charges at new rates ranging up to possibly the culinary water rates.

2. To reduce the summer demand peaking factor, projects utilizing irrigation water may be required to provide active storage systems, to as great an extent as possible, as part of any necessary and accompanying pumping and distribution systems, all of which must be constructed according to District standards and engineering reviews. The volume of storage will have an impact on the final irrigation rate determined by the District for the development.

3. Irrigation rates will be determined on a project by project basis, and included in the Irrigation Supply Contract (as noted below).

4. Residential un-metered secondary irrigation systems will not be allowed within the District.

5. All irrigation water proposals and contracts must be approved by the Management and the Administrative Control Board of the District. Irrigation water is meant to be provided to the following types of larger developmental

uses, and not to individual un-metered residential users – more typical of a secondary water system:

a. Common open space, greater than a cumulative acreage of 5 acres or more.

b. Road or transportation corridors landscaping, greater than 1,000 linear feet in length.

c. Recreational water features such as ponds and lakes, greater than 2 acres in surface area.

d. Golf Courses.

e. Recreational ball fields and parks, greater than 3 acres in area.

f. Environmental remediation projects such as wetlands development as approved on a case by case basis by the District.

g. Other uses as approved by the Administrative Control Board and District Management.

6. A conservation plan must be prepared and approved by the District, demonstrating that conservation measures will be implemented in the landscaping designs, ensuring that irrigation water will be conserved and not be used in a manner that wastes more water than would be utilized if culinary quality water were used.

7. All approved irrigation projects (and appropriately sized sub-projects of a larger project) must be master metered by District approved Magnetic Type or similar type Flow meters designed to accurately meter water carrying suspended solids.

8. The irrigation water is delivered "as-is", and has no warranties or guarantees of any kind as to any water quality parameters. The Developer is responsible for any pre-treatment equipment necessary to use the water on the user's site, and such equipment will be owned and properly maintained by the owner.

9. Key irrigation system transmission piping, metering, storage, and pumping facilities, which can serve more than the immediate project will be owned and operated by the District. Internal distribution type related infrastructure will be properly maintained and owned by the developer or owner.

10. Irrigation projects which extend facilities to their location must size transmission related facilities to a size that will allow the irrigation service to be extended beyond their development, as determined solely by the District.

11. All irrigation projects will be designed with proper accommodations for future or potential wastewater re-use additions. The Snyderville Basin Water Reclamation District input and approval may be needed in such designs and applications.

B. <u>Irrigation Water Supply Contract</u>. If available, the Developer will execute an irrigation water supply contract with the District which shall set forth, among other things, impact fees and rates, the quantity of irrigation water to be supplied, the place of use for such irrigation water supply, describe the water rights and sources of supply to be utilized by the District in providing such service pursuant to the District's water rights and water source development requirements. Irrigation water service will be provided by the District on an equal basis with all other irrigation customers within the District, but may be curtailed in pressure or availability during periods of drought or water loss.

Culinary sources and systems will always take precedence over irrigation systems when public health, safety, or need exists.

C. *Irrigation Water Distribution System. The internal and external irrigation water distribution system within the Development, including irrigation water transmission lines and laterals, pump stations, pressure regulation equipment, meters and meter stations, water storage reservoirs or ponds and all other equipment and facilities necessary for the transportation and delivery of irrigation water within the Development will be constructed by Developer, at its sole expense. The internal water distribution system shall be approved and constructed in accordance with the District's standards and specifications. Any booster stations, pressure reducing valves and/or storage facilities shall be placed at elevations which will be compatible with existing pressure zones within the District's system. These improvements shall not be connected to the District's main irrigation transmission system until they have been inspected and approved by the District's engineers and accepted by the District. Title to external improvements shall be transferred to the District upon their inspection and approval in consideration for the District's assumption of the perpetual obligation of operation, maintenance, repair and replacement of these improvements and its obligation to provide service to the development project in accordance with its rules and regulations. The external irrigation water distribution system will be transferred at no cost to the District for operation and maintenance as part of the District's irrigation water distribution system. All internal infrastructures, as determined in extent solely by the District, will be operated and maintained by the Developer or owner in perpetuity. All internal irrigation infrastructures must also be properly separated and adequate protections afforded to prevent the possible cross connection contamination of any adjacent culinary water systems, using approved backflow protection devices and technology.*

In section 7.8 below, the District is ensuring that all of the users are properly metered and are not sharing meters or common connections, thus promoting a higher conservation ethic:

7.8 One Structure Per Meter

All uses of culinary and irrigation water from the District's culinary and irrigation water distribution systems, including fire hydrants (construction water), shall be metered. Not more than one structure or building shall be connected to any one culinary water meter without the prior written approval of the District. Multiple dwelling (condominium type) units will be serviced by individual unit meters, which can be read in one location. Anyone using water through an un-metered connection, without the express prior written authorization of the District, shall be prosecuted under the theft of services statutes of the State of Utah.

In section 12.0 below, the District establishes rules and penalties for users that abuse or waste the Districts water resources. Included are definitions, penalties and enforcement criteria. The District has to date, strictly enforced this section:

12.0 WASTING OF WATER PROHIBITED

12.1 General

It is a violation of these Rules and Regulations to waste water and to allow any appliance, fixture, equipment, sprinkler system, faucets, or other similar water-using facility to leak, overflow or operate in a wasteful manner, or for a customer to use water for purposes other than those for which the customer paid upon requesting service.

A. *Purpose. This article is not intended to regulate or prevent the beneficial use of water on property within the District service area. It is intended to prevent and discourage the waste of water within the District service area.*

B. *Wasting water defined, prohibited. No person shall waste any water supplied within the District service area. In general, the water is put to waste if it is not beneficially used and it is hereby determined that the waste of water specifically includes but is not limited to the following:*

1. *Water running off a landscaped area to another area where it is not beneficially used such as to a street, sidewalk, gutter, alley, public utility easement or parking area paved or unpaved;*

2. *Washing vehicles in a driveway in a manner that uses excess water beyond that reasonably necessary for washing and rinsing;*

3. *The hosing down of driveways, sidewalks and other landscape should be limited and accomplished in a way that the water will run off into other landscaped areas, but, in no event, in a manner that uses excess water beyond that reasonably necessary for washing and rinsing; or*

4. *Any use of water in excess of that reasonably necessary to accomplish the intended task.*

C. *Causes of wasting water. A typical significant cause for the waste of water is the failure to properly maintain outdoor watering systems. Specific examples of such failure to maintain include but are not limited to the following:*

1. *Damaged or missing spray heads;*

2. *Damaged or missing bubbler heads;*

3. *Damaged or missing drip irrigation lines;*

4. *Failure to properly maintain berms, laterals and pipes for urban irrigation; or*

5. *Failure to properly maintain automatic timing systems on landscape watering.*

D. *Leakage, escape of water prohibited. It is hereby prohibited for anyone to permit the excess use, loss or escape of water through breaks, leaks or malfunction in the water user's plumbing or distribution facilities for any period of time after such escape of water should have reasonably been discovered and corrected.*

12.2 Appeals and Exceptions

A. *Application for exemption. The District's Chief Engineer may grant an exemption for the uses of water otherwise prohibited hereby if he/she finds and determines that compliance with this article will be detrimental to the health, safety and welfare of the public. The District's Chief Engineer may grant such exception only upon an application in writing, which sets forth the specific facts, and circumstances which applicant claims to justify the granting of a variance. Upon granting any such exception, the District's Chief Engineer may impose any conditions he determines to be reasonable and proper. The conditions shall include, at a minimum, a water conservation audit of the applicant's facility.*

12.3 Enforcement

A. First violation. For a first violation, the District shall issue a warning by written notice of first violation and provide educational materials on water conservation and the written policy for the watering schedule including times, to the water user violating the provisions of this article. The District may however make additional contacts and verbal notifications prior to a first violation being determined.

B. Second violation (for the same matter). The District shall issue a second written notice of violation to the water user for a second violation of this article within a twelve (12) month period. A fine as specified in the current District Rate Resolution will be added to the water bill for the address with the violation. The District may however make an additional contacts and verbal notifications prior to a second violation being determined.

C. Third violation (for the same matter). The District shall issue a third written notice of violation to the water user for a third violation of this article within a twelve (12) month period. A fine as specified in the current District Rate Resolution will be added to the water bill for the address with the violation. The District may however make an additional contacts and verbal notifications prior to a third violation being determined.

D. Fourth violation (for the same matter). The District shall issue a fourth written notice of violation to the water user for a fourth violation of this article within a twelve (12) month period. A fine as specified in the current District Rate Resolution will be added to the water bill for the address with the violation. The District may however make an additional contact and verbal notifications prior to a fourth violation being determined.

E. Subsequent violations (for the same matter) after the fourth violation; discontinuance of service. For any violation subsequent to the fourth violation of this article within twenty-four (24) months after the date of issuance of notice of first violation, a penalty as specified in the current District Rate Resolution will be added to the address that the violations occurred. The District shall discontinue water service with written notification to that customer at the premises or to the meter where the violations occurred. In addition, the District may require a security deposit. The District shall also be entitled to file an action to force compliance with these Rules and Regulations by injunctive and other appropriate legal relief.

12.4 Notice

A. Written notice. A written notice shall be issued for each violation. The first notice shall be delivered in person or by regular mail to the water user. All subsequent notices will be delivered in person or by certified mail to the person identified on the account for the meter through which the wasted water was supplied. The notice will:

1. Inform the water user that second, third, fourth or subsequent violation of these regulations, above, has occurred;

2. Specify when the previous violation(s) (of the same matter) occurred;

3. Inform the water user of the requirement for water audit and the development of a compliance schedule indicating when required measures will be completed;

4. *Inform the water user that failure to correct the problem within the time limit provided for in the compliance schedule will result in another notice of violation; and*

5. *The notice shall contain, in addition to the facts of the violation, a statement of the possible penalties for each violation and a statement informing the customer of his right to a hearing on the violation. The effective date of violation shall be the date of issuance of the notice of violation.*

12.5 Hearings

A. *Right to hearing. Any person against whom a penalty is levied pursuant to this section shall have a right to a hearing with the Administrative Control Board.*

B. *Reservation of rights. The rights of the District pursuant to this article are cumulative to any other right or ordinance of the District in relation to the water user. All monies collected by the District pursuant to any of the penalty provisions of this article shall be deposited in the District operating account.*

In section 13.0 below, the District has established and codified its water conservation standards and regulations. Projects who do not implement water conserving measures in their design can be denied water service letters from the District, thus prohibiting the County from issuing building permits to the relevant project.

13.0 WATER CONSERVATION

13.1 General Regulations

Mountain Regional Water Special Service District takes water conservation very seriously. All customers and users of retail water within the District shall conform to these regulations and if adopted, the most recently adopted or amended District Water Conservation Plan.

13.2 Wholesale Customers

Wholesale customers of District water may be required to furnish to the District a copy of an adopted and implemented conservation plan within three (3) months of a written request from the District.

13.3 County Conservation Ordinance

Any Conservation Ordinance adopted by the County shall take precedence to these Rules and Regulations where any conflict may exist.

13.4 Violations

The violation of any major conservation regulation under this resolution, the Conservation Plan of the Development, or the Conservation Plan of the District may result in a thirty percent (30%) water conservation violation surcharge or penalty being added to each monthly water bill for retail customers. This surcharge or penalty is calculated as a percentage of the total bill, including base fees plus any applicable overage charges.

13.5 Enhanced Irrigation for Major Developments

Any major development (over 30 ERC's or irrigated land exceeding 5 acres) serviced by the District grants an implied consent to the District through receipt of District water services to allow for the installation, maintenance, and monitoring of weather, rainfall, and/or evapotranspiration calculation equipment on their property to better monitor optimum water needs for the development. New developments may be required to install this equipment at developer expense, using the same procedures as outlined for other water distribution facilities in these regulations.

13.6 Water Conservation Reports and Plans

A. <u>New non-residential buildings or structures, "Water Conservation Report".</u> The District may request that a "Water Conservation Report", signed by a Utah registered architect or engineer be filed with the District before a District Water Availability and Concurrency Letter and/or water connection is issued or allowed for new non-residential buildings or structures unless. A "Water Conservation Report" shall contain the following:

1. A detailed section on proposed uses of water in the industrial process which must demonstrate conservation-oriented techniques, and that the water use is employing the latest commercially available technology consistent with reasonable economic return;

2. A section which reports on the exterior landscaping design, describing how native plants and xeriscaping techniques will be employed where possible, along with water efficient and non-wasteful irrigation systems.

3. A section, which notes all other areas of, planned conservation in interior/exterior water use, which demonstrates a bona fide commitment to reasonable conservation efforts.

B. <u>Additions, alterations or repairs to existing non-residential buildings or structures, "Water Conservation Report."</u> Additions, alterations or repairs may be made to any existing nonresidential building or structure without requiring compliance with 13.1 above provided the addition, alteration or repair conforms to that required for a new building or structure and provided that the additions, alterations or repairs within a twelve (12) month period do not exceed fifty percent (50%) of the value of the existing building or structure. When additions, alterations or repairs within any twelve (12) month period exceed fifty percent (50%) of the value of an existing building or structure, a "Water Conservation Report" may be requested by the District in accordance with this section. Failure to submit a report within three (3) months of a written request from the District shall be grounds to withhold a Water Availability and Concurrency Letter or for termination of water service to the project or development.

C. <u>Water plan required for new non-residential users greater than 9,000 gallons per day.</u> New non-residential users who have an estimated annual use which averages nine thousand (9,000) gallons per day or more (excluding turf-related facilities) may be required to submit a "water use plan" sealed by a Utah registered architect or engineer that it complies with this section as a condition to a water connection to the District. Failure to submit a plan within three (3) months of a written request from the District will result in the withholding of Water Availability and Concurrency Letters for the project. The "water use plan" shall contain at least the following:

1. A description of any available water conservation training programs offered to employees. Employee training information may be offered by the District to the facility after the construction is completed;

2. *Whether alternative water sources will be used (i.e., effluent, poor quality groundwater or other non-groundwater sources);*

3. *Operating levels of total dissolved solids (TDS) or conductivity for cooling towers and total cooling capacity if applicable;*

4. *Whether the user will use the best available conservation technologies in accordance with existing process uses (i.e., re-circulating systems for process water, alternative dust control methods, automatic shut-down devices to eliminate continual running water);*

5. *Any plans for the reuse of wastewater or process water at the facility; and*

6. *Type of landscaping and irrigation system. Including details of the exterior landscaping design, describing how native plants and xeriscaping techniques will be employed where possible, along with water efficient and non-wasteful irrigation systems.*

13.7 Irrigation Schedules and Restrictions

The District may curtail outside watering in any fashion it deems necessary to protect its water supplies during drought conditions or failure of one or more water sources. Restrictions may be set as voluntary or mandatory. If restrictions are mandatory, the District may impose fines and/or penalties to enforce the restrictions on a level to be set at the time, depending on the seriousness of the water shortages. In all cases, and for all types of customers in the District, whether a drought condition exists or not, outside watering will be scheduled at a maximum interval of every other day.

13.8 Conservation Implementation

The District may withhold Water Availability and Concurrency Letters and/or Will-Serve Letters for any project or development that fails to implement water conservation measures outlined in the District's Water Conservation Plan in the design and operation of the project(s).

In section 14.0 below, the District establishes a policy for declaring water emergencies and rationing water in scarcities:

14.0 EMERGENCY SITUATIONS

In times of water shortage due to drought or any other natural or man-made condition or occurrence, the District shall have full authority to declare a water emergency, and to ration or otherwise regulate the distribution and use of culinary and/or irrigation water through the District's culinary and/or irrigation water systems. Such action by the Administrative Control Board may include a moratorium on new water connections until the emergency has been alleviated.

In section 16.0 below, the District has established rules dealing with water features and ponds, etc. These facilities have proved to be major contributors to water losses in our mountain environment if they are not properly constructed and maintained:

16.0 PONDS, SWIMMING POOLS, AND OTHER WATER FEATURES

Any pond, swimming pool, or other water feature utilizing and storing more than 5,000 gallons of District water shall receive approval in writing by the District prior to construction. Prior to granting approval of the use of District water for the operation of the water feature, the owner or customer may be required to:

A. Submit a plan of the facility to the District, certified by a registered engineer of the State of Utah, demonstrating that the feature is safe, will not waste water, and will be properly lined in a manner that will prevent the loss or waste of water into the soil or surrounding properties.

B. Demonstrate that a reduced pressure detector assembly or air gap backflow prevention system is implemented to protect the District culinary water facilities from possible cross-connections as per the Backflow regulations contained herein.

C. Install a separate water meter for the system, apart from the meter serving the customer.

D. Allow for the inspection of the system by District personnel at any time to verify the system integrity and immunity from leaks.

E. Stipulate that the initial and future filling(s) shall be coordinated by telephone with the District to verify the availability of water, and that the feature may be taken out of service in the event that a water emergency or drought condition exists.

F. Pay a special (higher) culinary water rate (if adopted in a rate resolution) for the filling and subsequent water deliveries necessary to maintain the water feature(s).

G. Construction or wholesale water with their accompanying charges and fees, may not be utilized for one-time or the seasonal filling of water features or ponds

H. Irrigation storage ponds must be designed to be actively filled and drained throughout the irrigation season, and to act as an appropriate buffer from peak daily or seasonal irrigation demands. Liners should be designed to accept dry and wet conditions, be immune from animal damage, and incorporate any necessary and adequate safety designs (i.e. fencing, bank stabilization, and access).

I. Ponds and reservoirs that are subject to State of Utah Division of Water Rights, Dam Safety approvals and inspections must be approved and permitted by the same, and all inspection and approval records must be made available to the District at any time.

J. All ponds that require water rights approvals or change applications approvals can not be placed into service until the same is approved and documentation of such provided to the District.

In section 20.0 below, and in other agreements, the District establishes a working relationship with the local water reclamation district to allow for projects promoting conservation, water quality preservation, and water re-use.

20.0 SNYDERVILLE BASIN WATER RECLAMATION DISTRICT

Pursuant to a Memorandum of Understanding (MOU) between the District and Snyderville Basin Water Reclamation District (SBWRD) jointly developed to facilitate a working relationship and agreement to improve water quality and quantity within the Snyderville Basin area through joint cooperation on various projects, etc. The District grants to SBWRD permission to use its water system(s) at no charge for flushing and cleaning of its facilities as long as there is not a water shortage and water is available in the respective area(s). SBWRD shall notify the District by telephone of it's schedule and planed amount of water needed for a given period prior to using the system and shall also provide to the District on a monthly basis an accounting of the estimated amount of gallons used for a designated period and which system the water was drawn from, thus enabling the District to be able to account for the water in its audits and leak surveys, etc. The District shall also cooperate with Snyderville Basin Water Reclamation District on planning and implementation of water reuse efforts that benefit our mutual customers and do not degrade water quality and critical stream flows.

.

In section 23.0 below, the District sets up a mechanism to allow for the banking of water rights to protect them from possible forfeiture and non-use:

23.0 BANKING OF WATER

The District may at its sole discretion and by agreement or contract "Bank" or hold water rights in its name for customer's current and/or future needs to protect said rights from possible forfeiture or non-use. The District may utilize these rights in the interim holding periods for any purpose, to ensure that the rights are kept in a state of beneficial public use. The District shall not however commit the rights to a permanent use for other projects, unless authorized by the "banking" agreement. All costs associated with the "banking" of water shall be born by the applicant for such service.