Grand Water & Sewer Service Agency
Water Conservation and Management Plan

The Mission of Grand Water & Sewer Service Agency is: to utilize our expertise, knowledge, experience, and long range planning to secure and maximize the resources to protect our community's health and welfare by providing culinary water, irrigation water and wastewater collection services with a commitment to efficiency, sustainability, safety, and public awareness.

INTRODUCTION

In order to encourage the proper and sensible use of water and to preserve resources needed for the future of Spanish Valley, the Grand Water & Sewer Service Agency presents this Water Management and Conservation Plan. This plan is written to address the concerns of citizens and leaders of Spanish Valley and the State of Utah and to comply with the State of Utah Water Conservation Plan Act. As the Grand Water & Sewer Service Agency administers Grand County Water Conservancy District, Grand County Special Service Water District, and Spanish Valley Water & Sewer Improvement District this plan constitutes the water conservation plan for those entities.

Description of the Agency Service Area

The Grand Water & Sewer Service Agency (GW & SSA) serves drinking water and untreated agricultural water to the unincorporated area of Spanish Valley, south of the City of Moab in Grand County, Utah.

The climate of Spanish Valley is high desert with a mean annual precipitation of approximately 8 inches. Little of the precipitation on Spanish Valley enters the ground water system. The main contributor to ground water and surface streams is snowfall in the La Sal Mountains.

Spanish Valley is a mix of suburban and rural development. Population is most dense and lot size smallest near the Moab City limits. Population density thins as one moves south through the Valley. This area of lower density has experienced the most growth in the system over the past five years. The primary agricultural lands are in the area of the Grand/San Juan County line.

Description of the Drinking Water System

The drinking water distribution system along with the source wells and storage facilities that serve Spanish Valley were initially installed in 1981. The system, including additional source, storage and distribution, was improved and expanded in 2002. The source of water is from four wells which lie adjacent to the base of Johnson's Up-On-Top. The wells draw water from the Glen Canyon aquifer which is recharged by La Sal Mountain snow melt and is an EPA designated sole-source aquifer. Well production capacity is 3,285 gallons per minute. Four million gallons of drinking water storage is provided by a one million gallon steel tank and a three million gallon reinforced concrete tank.

The drinking water service area extends from the Moab City limits on the north to the Grand/San Juan County line to the south and from approximately Mill Creek Canyon and/or the base of Johnson's Up-On-Top to the east and the cliff escarpment to the west. *(See Map 1 in Appendix A)*

As of 2008 a total of 1648 residential and commercial connections are being served with an estimated population of 3,500.

Description of the Pressurized Irrigation System

The Sheley Tunnel/Ken's Lake/Pressurized Irrigation System, also known as the Mill Creek Project, was completed in 1981. Water is diverted from Mill Creek through Sheley Tunnel to Ken's Lake, a 2,610 acre foot capacity reservoir, which is able to produce 3,740 acre feet of water annually. The water from the Lake serves 760 acres of land through 149 connections.

All irrigation connections are metered. Meters are read a minimum of twice per irrigation season. Water is sold to customers on an annual basis. The amount of water required in Spanish Valley to grow alfalfa was 5 acre feet per acre. Water was originally sold to customers based on this irrigation water requirement. The duty for Spanish Valley was formally changed to 6 acre feet per acre in 2009. Future allocations will be determined based on this requirement *(See Map 2- Appendix A)*

GROWTH PROJECTIONS

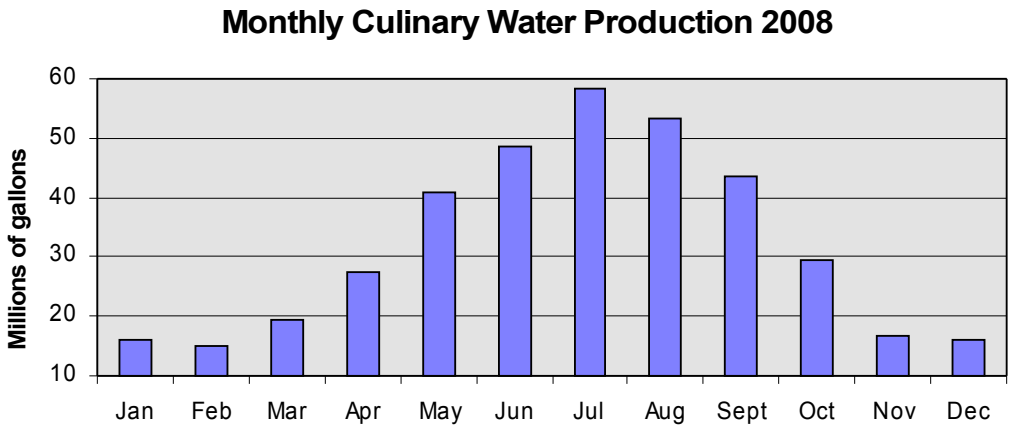
Drinking Water System

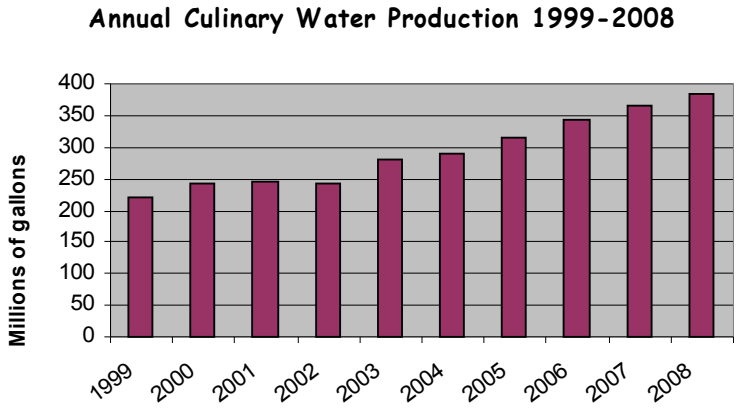
The number of connections on the drinking water distribution system that serves Spanish Valley has increased throughout its history. Data on numbers of connections did not begin to be kept until 1984. In 1984 there were 468 connections. The number of connections grew to 902 in 1998. The table below shows the historic growth rate of the system from 1999 to 2008. Average growth for the five year period 2004 through 2008 was 5.14%. For water development planning purposes, a projected growth rate of 6% is used by the Agency.

Annual Water Production 1999-2008

Water production per connection remained relatively stable from 1999 through 2008. The average water produced per connection per month over this time period was 17,948 gallons. The previous ten year average from 1989 to 1998 was 21,479 gallons per connection. The Agency implemented its Water Management and Conservation Plan in 1999. Average production is representative of both residential and commercial connections. Production numbers also include lost water due to leaks, fire flows, unauthorized use, etc…

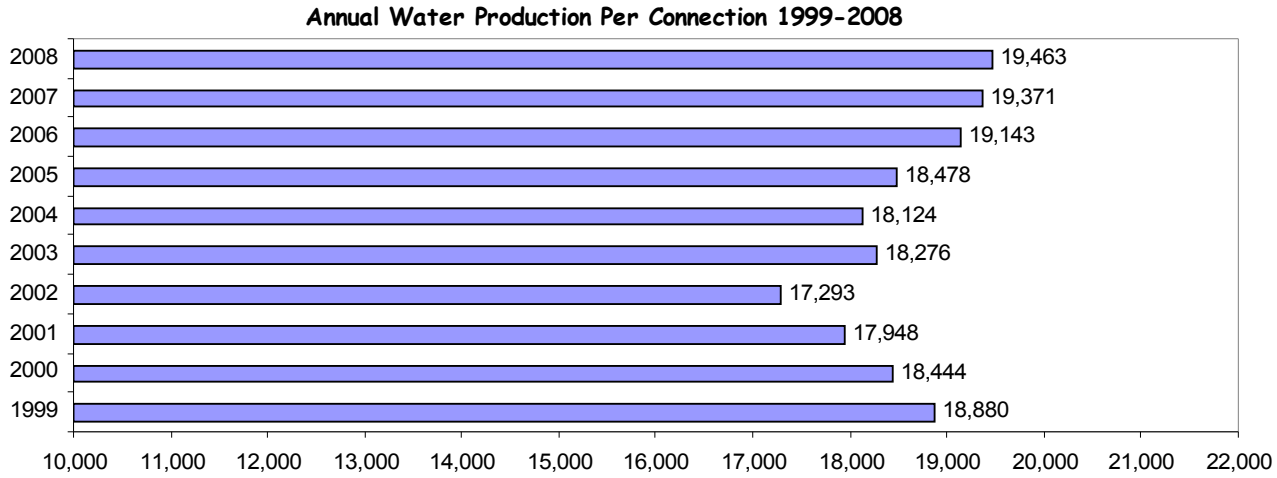
**In ratio this data is accurate. However, in 2009 a metering error was discovered and corrected. The water production for 2008, as reported, is significantly higher that what was actually delivered to the system.*





Annual Water Production Data Table 1999-2008

Year	Production Per Connection Per Year	Average Production Per Connection Per Month
1999	222,025	18,880
2000	206,772	18,444
2001	197,436	17,948
2002	183,900	17,293
2003	219,315	18,276
2004	217,496	18,124
2005	221,744	18,478
2006	229,717	19,143
2007	232,455	19,371
2008	224,171	19,463



Average Use Per Connection

Since the implementation of the Water Management & Conservation Plan in 1999 the average metered use per connection has been monitored. Per Capita use has not been tracked due to the large number of resort and second homes in the service area. The 2010 Census may provide more information that will enable more accurate gallons per capita per day tracking.

Year	Active Connections	Average Monthly Use Per Connection
1999	961	17,263
2000	1019	17,232
2001	1059	16,453
2002	1126	15,325
2003	1228	14,711
2004	1296	15,398
2005	1370	15,350
2006	1464	15,011
2007	1516	16,715
2008	1602	14,655

Drinking Water System Overuse and Losses

The primary overuse on the Drinking Water System is associated with outdoor watering. The Agency's secondary water project will help mitigate the problem of overuse of culinary water on part of the system. However, it is the Agency's position that the primary solution to any outdoor overuse is consumer education. The Agency provides materials at time of service request and through mailings which provide customers with information on correct outdoor watering practices. Free gauges are also available at the Agency office for customers to effectively measure outdoor water use. The Utah State University Extension Service also provides information and on-site assistance to water users upon request.

In addition to the above measures, the Agency will promote additional outdoor conservation practices beginning in the spring of 2010. The Agency will ask that no outdoor watering occur between the hours of 10 a.m. and 6 p.m. for those customers who use culinary water outdoors. The program will be promoted with a combination of newspaper advertising and direct mailings to customers.

Another source of "lost" water on drinking water systems is through unmetered construction water use. Agency policy requires all construction water to be metered. A water truck loading facility, with appropriate meter and backflow device, is located at the Agency office and utilized as the sole source of hauled construction water. Portable hydrant meter usage is only permissible through the Agency manager under special circumstances.

It was determined in 2009 that meters used on Agency wells and SCADA systems were inaccurate. Agency staff contracted for a professional team to calibrate the meters and Agency engineers worked with the SCADA system to correct the inaccuracies. Discrepancies in the amount of water pumped from the wells and the amount of water delivered were corrected; however, 2008 data shows increased losses of approximately 30%. Subsequent loss data shall be more accurate.

IRRIGATION SYSTEM USE

Irrigation water peak use also occurs during mid-summer months. Irrigation water use differs from drinking water use in that the water demand is based on crop need and no winter use is required. The pressurized irrigation system from Ken's Lake is deactivated and drained each winter. The period of use on the irrigation system is typically March 15 through November 1. The majority of agricultural users in the valley grow alfalfa. However, there are several customers growing other crops such as grapes and commercial vegetable gardens.

The U.S. Agriculture Stabilization and Conservation Service provides data on net irrigation required by alfalfa in Spanish Valley which equates to irrigation demand.

Month	% Irrigation Required	Delivery Rate of 3,740 AF per Year
March	1.2%	45 AF
April	7.0%	262 AF
May	13.4%	501 AF
June	19.9%	744 AF
July	23.7%	886 AF
August	18.4%	688 AF
September	11.6%	434 AF
October	4.7%	176 AF
Total	**100%**	**3,740 AF**

Irrigation water deliveries are dependent upon surface water flows in Mill Creek. The amount of water available for a given year is therefore dependent upon the mountain snow pack accumulated over the winter months. Years of below normal precipitation can cause insufficient water to be available for irrigation needs. Since the Mill Creek Project was completed in 1981 six years, 1989, 1990, 1994, 2002, 2003 and 2009, have provided water less than that required. During years of insufficient water the Agency is able to pump water to the irrigation system to supplement surface water flows. If restrictions to irrigation use are required, all customers' water use is reduced on an equal basis. Use in excess of restricted amounts is charged at the penalty rate of $133.78 per acre foot and/or service disconnect.

Water Resources

GW & SSA administers the water rights of its forming entities, Grand County Water Conservancy District and Spanish Valley Water & Sewer Improvement District.

Grand County Water Conservancy District holds a number of water rights which are not able to be developed within the Spanish Valley service area. For the purpose of this plan only those rights which could or are being used within the service area will be noted.

Right #	Annual Quantity	Description
05-418, 05-740	395.5 AF	Right assigned to Beeman Well, designated M & I
05-475, 05-906, 05-1062	2924.26 AF 965 AF to be diverted initially while monitoring.	Assigned to Chapman and Spanish Valley Wells.
05-148, 05-492, 05-681, 05-3343, 05-3344	571.796 AF	Assigned to George White Wells # 4 & # 5
05-278, 05-550, 05-437, 05-737,	193.5 AF	50 year agreement with White Land Co. LLC terminating in 2053 which allows drinking water production in exchange for irrigation water.
05-1523	4124.05 AF	District ownership in Moab Irrigation Company - M & I
05-1285, 05-2802	2,121.93 AF	Assigned to Shumaker & Cemetery Wells. This water designated M & I

Water Sources

The following wells are developed for drinking water production:

Source	Discharge
George White Well # 4	1060 GPM
George White Well # 5	650 GPM
Chapman Well	1350 GPM
Spanish Valley Well	225 GPM

In addition, the following sources have been developed to provide supplemental water to Moab Irrigation Company or the pressurized irrigation system. Pumping these wells maintains diversions to Ken's Lake. Of these wells, the Betty Schumaker Well #3 and the Andrea Well have the potential to be developed for drinking water use.

Source	Discharge
Schumaker Well #1	1000 TO 450 GPM
Schumaker Well #3	350 GPM
Cemetery Well*	150 GPM
Lance Well	170 GPM
Petty Well	150 GPM
Beeman Well	1000 GPM
Corbin Well**	1000 GPM
Andrea Well – undeveloped	300 GPM

*under contract with Moab Cemetery District
**under contract with City of Moab

PROJECTED WATER NEEDS AND DEVELOPMENT

The 1996 Public Facilities Analysis performed by Hoffman Planning Associates estimated 7,965 Equivalent Residential Units (ERUs) would ultimately be served by the GW & SSA drinking water system. Water presently developed and water available for development will supply most of the water required for build out. In addition to presently developed water an additional 350 gpm of source capacity and 566 AF per year would be available from Schumaker Well #3 if it were converted to drinking water use. If the Chapman Well is developed at full capacity it will be capable of producing 2,000 gpm to a maximum of 3,084 AF per year. At build out Ken's Lake will be used for secondary water.

2008 ERUs served: 1,840 ERUs

Current production will serve 2,741 ERUs.

All wells at full capacity will serve 3,826 ERUs.

All wells at full capacity and Ken's Lake used as secondary water will serve 7,353 ERUs.

It is recognized that questions remain regarding the total quantity of water available from ground water aquifers. Accordingly, the Agency shall support and help facilitate additional studies that will lead to a better understanding of Spanish Valley's hydrologic system. The Agency has been actively pursuing funding of the USGS Study under the Federal Water Resources Development Act for the past several years through our State Legislators. As of the 2010 funding cycle; the project is not funded.

WATER CONSERVATION MEASURES AND PROGRAMS

Grand Water & Sewer Service Agency's Water Conservation Measures and Programs shall fulfill two objectives:

1. To encourage water conservation on a day-to-day basis.
2. To enforce water conservation during times of emergencies and/or drought.

The drinking water measures and programs shall differ from the irrigation water measures and programs based on the specific needs and makeup of those systems.

Daily Conservation

Grand Water & Sewer Service Agency recognizes that the amount of water conserved by each connection is dependent upon the type of activity that a connection serves. Each commercial connection may have a differing ability to conserve. Conservation for residential connections is largely dependent upon the lifestyle of each resident, and increased conservation may require lifestyle changes. While it is not the Agency's intent nor purpose to dictate individual lifestyle choices the Agency will enact measures and programs which encourage and reward choices which result in the conservation of water.

Outdoor Watering Restrictions

Watering during the heat of the day between 10:00 a.m. and 6:00 p.m. is recognized as inefficient use of outside water. The Agency shall ask all users of water to restrict outside watering during that time period. Water users shall be informed periodically by use of mailings, bill inserts, brochures, and news media.

Conservation Goals

The Conservation Program goal for the drinking water system is to reduce the 19 year average use per connection per month of 18,762 gallons by 25%. This would result in usage of 14,072 gallons per connection per month. The target date for this goal is 2010. In 2008, average use per connection was 14,655 a difference of 583 gallons per connection or 4.1% above goal. The Agency will work to meet or exceed this goal by the original date of 2010. The 2010 Census data should better prepare the Agency to measure gallons per capita per day. The goal for the drinking water system is to remain 5% below the state average of 183 gpcd or 174 gpcd.

The Conservation Program goal for the pressurized irrigation system shall be water use at or below the six (6) acre foot per acre irrigation demand. As water rights in Spanish Valley are dependent upon the beneficial use of 6 AF/ac, no attempt to conserve agricultural water below that rate should be attempted.

The pressurized irrigation system is expanding for outdoor secondary water use. All new residential development is required to install secondary irrigation piping for connection to the irrigation system. Water rights were purchased by the Agency in 2009 to facilitate this growth. A two-year pilot project is underway for existing residential customers. It is anticipated that existing residential users will be able to connect to the irrigation system for the 2011 watering season. This measure should reduce outdoor culinary water use proportional to the number of users who connect annually.

Water Rates

GW & SSA has set water rates which encourage the conservation of water. The water rates must also be sufficient to cover the cost of operation, maintenance, and indebtedness. The financial goal of the Agency is to maintain a financially viable water system.

Drinking Water Rates

Agency drinking water rates are designed to discourage overuse through a tiered rate schedule.

Residential	
Base rate (no water)	$16.00
0-10,000 gallons	$.60/1000
11,000 - 15,000 gallons	$.90/1000
16,000 gallons and up	$1.90/1000

Commercial	
Base rate (no water)	$22.00
0-10,000 gallons	$1.20/1000
11,000 and up	$2.10/1000

Irrigation Water Rates

Irrigation water rates are set to encourage correct use of water on irrigated agriculture. This is done by penalizing water use in excess of the irrigation demand. Irrigation water rates are as follows:

AF Required	**Price/AF**
0 - 4.9 AF	$45.50/AF or $130.00 - whichever is greater
5 - 14.9 AF	$39.98/AF
15 - 24.9 AF	$37.19/AF
25 - 49.9 AF	$35.94/AF
50 - 124.9 AF	$28.80/AF
125 AF and up	$27.00/AF
Use over required or restricted	$133.78/AF

Water rates will be reviewed on an annual basis. The review will include a determination that the rate structure is meeting the financial requirements of the Agency as well as the effectiveness of its conservation aims. The conservation committee will make recommendations concerning conservation goals to the Agency board annually.

Education

Grand Water & Sewer Service Agency shall endeavor to educate all of its customers on proper and conservative water use. News media, handouts, and seminars may be used to accomplish this education.

Drinking Water System

Education for drinking water customers may include but is not limited to:

A. Information on household water saving devices
B. Information on innovative landscape methods
C. Proper outside water use data
D. Information on leak detection and repair
E. Information on household activity consumption rates
F. Any other information that the Agency Board deems necessary

Irrigation Water System

Education for irrigation water customers may include but not be limited to:

A. Correct application rates for various crops.
B. Soil moisture content testing.
C. Irrigation system efficiency.

WATER SYSTEM MONITORING

Drinking Water System

A water audit is performed at least once per year for the drinking water system. The audit shall consist of a comparison of the total water delivered to the system and the total water delivered through customer meters. The Agency currently monitors production and usage on a monthly basis and documents known losses daily. If the undocumented losses are greater than 15% an aggressive leak detection program is instituted to track the source of lost water.

All connections to the drinking water system are metered. Meters are read monthly. Ten percent of customer meters will be tested, repaired, or replaced each year. Master meters shall be professionally calibrated as needed. Known system leakage shall be promptly repaired.

Irrigation Water System

Known system leakage and Ken's Lake seepage shall receive a high priority repair status. Due to the large volumes of water transmitted through the irrigation system and the relative inexpensiveness of that water (as compared to drinking water) cost – benefit – risk analysis will be performed to determine when repair of Ken's Lake seepage is required. Irrigation distribution system leakage shall be promptly repaired. Some loss of water to Ken's Lake can be attributed to non-native, water intensive, plant species like the tamarisk and Russian olive. A large scale physical removal of invasive species at the inlet of the lake was performed in 2006-2007.

Irrigation system metering accuracy has improved over the last few years. The Agency has replaced some larger meters with smaller sonic meters on landscape connections. The radio-read sonic meters are also in use by the secondary water pilot project. Larger meters designed for this purpose are being tested by the Agency currently. An aggressive meter replacement program is scheduled for 2010.

DROUGHT MEASURES

A drought is an extraordinary circumstance wherein sufficient water for all needs may not be available. For the purpose of this plan a drought may be either naturally caused by lack of precipitation or mechanically caused by failure of water production or distribution facilities.

Drinking Water System

Preserving sufficient water for household use and fire protection during a drought shall be the primary goal of this plan. Depending upon the severity of the situation GW & SSA may:

1. Request that water use be minimized (voluntary restrictions).
2. Require outdoor watering only during specific times of the day.
3. Require outdoor watering scheduling.
4. Restrict all outdoor water use.

Customers of the water system shall be informed of measures taken to conserve water through local media including print, radio, television, and Agency mailings. In instances where the ability to provide water is not remedied by the above measures the Agency's Emergency Action Plan shall be put into effect.

Irrigation System

The Agency will make every effort to forecast drought situations prior to or early in the irrigation season. Through monitoring of snow pack, stream flow and reservoir storage data a prediction of water amounts available for the ensuing season should be available by April 15th of each year. Irrigation water customers will then be informed of water availability for the season so they may plan their irrigation use. Customers will also be informed of any changes to water availability predictions that occur during the season. The Agency's Board of Directors shall have the right to allocate available water among the water users. The Agency will give preference in allocation to domestic and municipal supply needs through exchange agreements. The Agency shall also have the right to terminate irrigation service to any customer who exceeds or refuses to comply with mandated allocations.

ANNUAL REPORT TO THE AGENCY BOARD

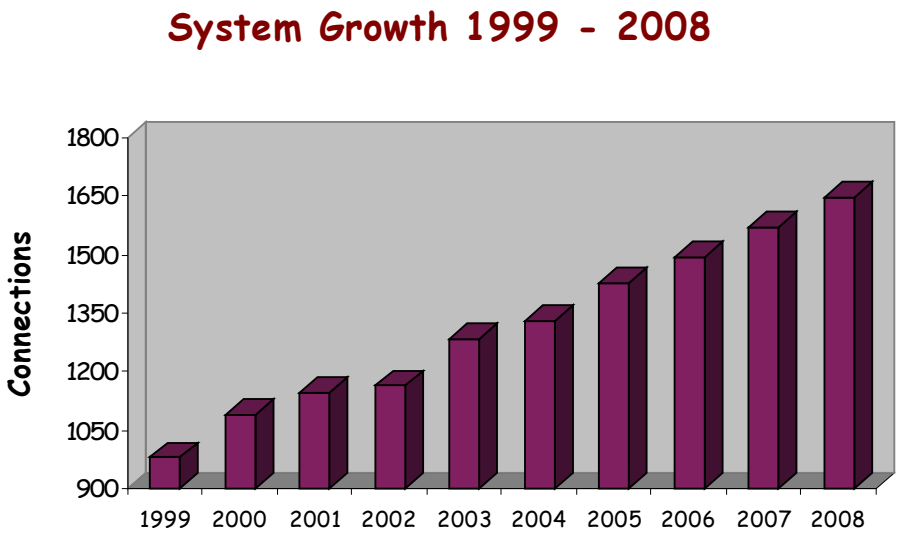
A portion of the Agency's annual report discusses the Water Conservation Program. That portion discusses progress and accomplishments of the Water Conservation Program. Recommendations of changes to the program may also be made in the annual report.

WATER MANAGEMENT AND CONSERVATION PLAN REVIEW AND UPDATE

This plan shall be updated by the GW & SSA Board and/or a committee designated by that Board at least every five (5) years. Following the review, updates to the plan shall be recommended and enacted as determined by the Agency Board. The conservation committee will meet quarterly for discussion, planning and review of the plan and the goals set herein.

Year	Connections	% of Growth
1999	980	5%
2000	1089	10%
2001	1146	5%
2002	1164	1.6%
2003	1283	10.2%
2004	1331	3.74%
2005	1426	7.14%
2006	1492	4.63%
2007	1570	5.23%
2008	1648	4.97%

Average growth over the 10 year period from 1999-2008 is 5.75%



Irrigation/Secondary System

Growth on the irrigation water delivery system has changed little over the years. All water developed through the Mill Creek Project has been sold. New connections are made as large water users subdivide their land and sell portions of their allotment. Moab Irrigation customers who move into the district may also change the point of diversion of their shares to Ken's Lake and water is delivered through the system to their new residence.

The conversion of agricultural lands to more suburban/urban uses will affect the irrigation system over time. The Agency adopted resolution #2009-04-16 that requires all new residential and commercial development install a secondary water system to irrigate the new development. The secondary system will employ ground water rights purchased by the Agency that will be pumped from the Valley Fill Aquifer into the irrigation system. In 2009, the Agency purchased 395.5 acre feet of water for this purpose. The Agency also began a two-year pilot project in one neighborhood in Spanish Valley. The residents on Beeman Rd. (Map 3 – Appendix A) were invited to purchase a secondary connection and use untreated water for lawn and garden purposes. This area was chosen because there was an abandoned culinary line in the road that could easily be connected to the irrigation system. The Agency sends periodic surveys and bill comparisons to the ten participants. At the end of the project, a determination will be made as to the efficacy of the project and the ability to provide the service on a large scale to individual property owners. The Agency believes that employing a system wide secondary system will help to preserve and extend the life of our pristine culinary aquifer.

DRINKING WATER SYSTEM USE

Drinking water average monthly use per connection, for 2008, in Spanish Valley was 14,655 gallons. As would be expected, the highest periods of water use are during the summer months. Historically, July has been the peak use month followed by June and August. The peak daily demand on the drinking water system is 2.8 million gallons. The peak monthly demand was August of 2008 when 44,547,000 gallons were delivered. The peak year was 2008 with a total of 281,868,000 gallons of metered usage.