MOAPA VALLEY WATER DISTRICT

WATER CONSERVATION PLAN

January 2016

OWNER:
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P. O. Box 257
Logandale NV 89021
(702)-397-6893

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Moapa Valley Water District (MVWD) provides potable water to customers within a service area that includes the towns of Overton, Logandale, Glendale, and Moapa. MVWD began water service in 1960 and since that time the service area has experienced an average population growth rate of approximately three percent per year. The most recent estimates indicate a current population of approximately 8,500 in the Moapa Valley area. A three to four percent per year average growth trend is expected to continue in Moapa Valley because of the areas favorable living conditions, which include a rural atmosphere and relatively short commute to Las Vegas. Generally speaking, the customer class that will experience the most growth will be residential with little growth being anticipated in the commercial and industrial classes.

According to Nevada Statutes Chapter 477 the MVWD was created for the purpose of "providing for the storage, conservation, distribution and sale of water within the District; authorizing the District to purchase, acquire and construct the facilities necessary to serve water to consumers within the District...". MVWD's primary goal is to deliver quality water to its customers. To achieve that goal, the existing water distribution system must be kept in good repair and new water infrastructure must be constructed to keep pace with growth. Additionally, existing water supplies must be properly managed and other potential water sources developed. An important part of that development and management is conservation.

Conservation is only effective if both water purveyors and customers participate in efforts to save. For its part, MVWD's conservation responsibilities include leak detection and system maintenance, water reuse where possible, public education, creation of financial and regulatory incentives, and all other conservation management practices. Management practices include balancing conservation measures with District revenue requirements so that high quality water delivery can be guaranteed.

Conservation by water customers is crucial to the success of the conservation plan. The highest use category in the MVWD service area is residential so it is important that residential customers use water wisely. The principle purpose for wise water use is not to diminish quality of life for residential consumers but to reduce waste. Because of this the most important consumer conservation measures include the elimination of leaks, the use of water efficient appliances and equipment, and the installation of efficient irrigation systems.

This conservation plan has been created with the above mentioned elements in mind and includes the following:

- Conservation goals
- Existing and planned conservation measures and incentives
- MVWD use profile
- Educational materials
- Landscape code
- Drought plan

This plan is compliant with Nevada Revised Statutes (NRS) sections 540.121 through 540.151 and is available for public inspection at the following location:

Moapa Valley Water District
601 N Moapa Valley Blvd
P. O. Box 257
Logandale NV 89021
(702)-397-6893

Public comments about this plan are encouraged. Written comments may be sent to the address above.

The following are the MVWD conservation goals. Some of these goals involve ongoing efforts and others are definite projects that will improve the Districts ability to manage available water. Project related goals will be revised or replaced by new goals as the conservation plan and District needs are periodically reviewed. Examples of ongoing goals include public education and leak detection.

1.1 Service

While conservation is important, it is just as important to make sure that MVWD receives enough revenue to continue providing efficient water delivery. All proposed conservation measures will be studied prior to implementation to insure that measures allow for maximum conservation without limiting or impairing MVWD's ability to provide optimal service.

1.2 Drought Plan Activation

Droughts can be difficult to define. For this reason parameters for determining the application of drought measures and specific levels of drought conditions need to be established in advance. For drought management, the Moapa Valley Water District plan uses four supply conditions: **(1) No Drought, (2) Drought Watch, (3) Drought Alert and (4) Drought Critical**. Since groundwater is currently the only source of supply for MVWD, elevation drops in well levels will be used as well as other conditions that are specific to the MVWD service area.

1.3 Effluent Use

MVWD has the goal of reusing an average 200,000 gallons per day of treated effluent from a new wastewater treatment facility. To achieve this goal MVWD and the Clark County Water Reclamation District have worked together toward the construction of the new treatment plant. The treated effluent could be used for parks, landscapes around public buildings and new golf courses.

1.4 Construction of a Demonstration Garden

As part of its five year plan, the district has included the construction of a demonstration garden. The purpose of the garden would be to promote the efficient use of water through low water use landscapes.

1.5 Schools Conservation Education

A few MVWD personnel have become certified water conservation practitioners by the American Water Works Association (AWWA). MVWD also purchased a groundwater model to be used for educational purposes. MVWD, in cooperation with local schools, will use these resources to offer water conservation instruction to school age children. Partnering with local schools will also allow for additional distribution of the educational materials already in use by the District. Additionally, these resources can be used in presentations at special events such as youth festivals, Boy and Girl Scout activities, and 4-H. To be successful in this effort MVWD will maintain a high profile among such organizations so that they are aware such presentations are available.

1.6 Unaccounted-for Water

MVWD has developed a plan to reduce unaccounted-for water. The plans goals include a reduction in unaccounted-for water to 10% in Fiscal Year (FY) 2014, 8% in FY 2015 and 6% in 2016.

1.7 Plan Review and Benchmarks

General benchmarks have been established by which the effectiveness of this conservation plan may be measured. Table 1.1 shows benchmarks for estimating residential water use that were taken from the Environmental Protection Agency (EPA) website.

TABLE 1.1

Residential Estimation Benchmarks

Type of Use	Likely Range of Values
INDOOR USES	
Average household size	2.0 – 3.0 persons
Frequency of toilet flushing	4.0 – 6.0 flushes per person per day
Flushing volumes	1.6 – 8.0 gallons per flush
Fraction of leaking toilets	0 – 30 percent
Showering frequency	0 – 1.0 showers per person per day
Duration of average shower	5 – 15 minutes
Shower flow rates	1.5 – 5.0 gallons per minute
Bathing frequency	0 – 0.2 baths per person per day
Volume of water	30 – 50 gallons per cycle
Washing machine use	0.2 – 0.5 loads per person per day
Volume of water	45 – 50 Gallons per cycle
Dishwasher use	0.1 – 0.3 Loads per person per day
Volume of water	10 – 15 gallons per cycle
Kitchen faucet use	0.5 – 5.0 Minutes per person per day
Faucet flow rates	2.0 – 3.0 gallons per minute
OUTDOOR USES	
Average lot size	5000 – 8000 square feet
Average house size	1200 – 2500 square feet
Landscape area	4000 – 5000 square feet
Fraction of lot size in turf	30 – 50 percent
Water application rates	1 – 5 feet per year
Homes with pools	10 – 25 percent
Pools evaporation losses	3 – 7 feet per year
Frequency of refilling pool	1 – 2 times per year

The benchmarks from table 1.1 can be used to estimate the daily ranges of personal and residential water usage. Table 1.2 shows the results of these calculations.

TABLE 1.2

Range of Water Use in Gallons per Day

Use	Per Individual (Low)	Per Individual (High)	Per Residence (Low)	Per Residence (High)
Toilets	6.4	48.00	19.14	143.52
Showers	0.00	75.00	0.00	224.25
Baths	0.00	10.00	0.00	29.90
Washing Machine	9.00	25.00	26.91	74.75
Dish Washer	1.00	4.50	2.99	13.46
Kitchen Faucet	1.00	15.00	2.99	44.85
Bathroom Faucet	1.00	9.00	2.99	26.91
Landscape	N/A	N/A	24.59	153.70
Total	**18.40**	**186.50**	**80.61**	**711.34**

The residential ranges in table 1.2 were established using an average household size of 2.99 persons per residence taken from the 2010 United States Census data for Moapa Valley. According to table 1.2, the average household would use 395 gallons per day (gpd). MVWD customers used 203 gallons per day per

residence in 2012. Although MVWD customer's average use is below 395 gpd, there is still room for improvement. Table 2.6 estimates that 10 percent of the total amount used from 1998 to 2020 can be conserved. By applying that same 10 percent to the average residential total over that same period of time (assuming the 2012 residential daily usage of 203 gpd), each residence should save approximately 180,000 gallons over 23 years.

This plan will be reviewed every five years and revised to meet the current specific conservation needs of the MVWD service area. Water use should be compared to historical usage information and estimates in section 2 as well as the benchmarks in table1.2.

1.8 Submeters

MVWD is considering the implementation of a sub-metering program for multifamily projects. The "NATIONAL MULTIPLE FAMILY SUBMETERING AND ALLOCATION BILLING PROGRAM STUDY" found that sub-metering achieves significant water savings compared with conventional single metering. The study was done with the cooperation of ten water utilities including SNWA. A copy of the executive summary of the study is included in Appendix F.

1.9 Plan Goal

The primary goal of the conservation plan is to encourage water conservation within the District.

END OF SECTION

This section outlines a profile of water production and use as well as a quantitative description of the MVWD water system that will include the following:

- Water rights information
- Existing supply sources and their production
- System water use profile with customer classifications and unaccounted for water
- Water use forecast using projected population growth

The purpose of this section is to compare water sources with demand and establish a basis for conservation measures and incentives.

2.1 Water Rights

2.1.1 Ground Water Rights. Table 3.3 is a summary of current ground water right permits held and applications filed by MVWD.

TABLE 2.1

Summary of MVWD Ground Water Rights

Logandale Well	Municipal	644.39	68524
Logandale Well	Municipal	280.55	69523*
Logandale Well	Irrigation	1,569.45	24007
Baldwin Spring	Municipal & Domestic	2,132.20	13445
MX-6 Well	Municipal	**	46932
Jones Spring	Municipal & Domestic	723.80	22739
Arrow Canyon Well #1	Municipal	**	55450
Arrow Canyon Well #2	Municipal	6792.71	66043
Arrow Canyon Well #1	Municipal	**	52520
Lytle Well	Irrigation	90	26371

**Permits 46932, 52520, 55450, and 66043 are combined.

2.1.2 Surface Water Rights. MVWD surface water rights exist via ownership of stock in the Moapa Valley Irrigation Company. Each preferred share is equal to 8.36 acre-feet annually (AFA) and common shares equal .79 AFA. MVWD owns 141.879 preferred shares or 1186 AFA (141.879 x 8.36) and 292.666 common shares or 231.20 AFA (292.666 x .79). Thus the MVWD total surface water rights amount to 1,417.20 AFA.

2.2 Supply Sources, Production and Storage

Table 2.2 shows 2012 average monthly demand and peak demand for each active well in the MVWD system. 2012. Table 2.3 shows annual averages and peaks for 2007 through 2012 for each well.

TABLE 2.2

Monthly Well Demand Summary for MVWD 2012

Name	2012 Average Monthly Demand (gal)	2012 Peak Demand (gal)	Month of Peak Demand
MX Well	2,125,916	8,593,000	May
Arrow Canyon Well	64,661,000	105,712,000	August
Baldwin Spring	462,500	3,821,000	March
Jones Spring	0	0	Not Applicable
Logandale Well	0	0	Not Applicable

TABLE 2.3

Well Demand Summaries for MVWD 2007 – 2012

Name	Average Annual Demand (gal)	Peak Demand (gal)	Year of Peak Demand
MX Well	43,979,614	125,056,000	2008
Arrow Canyon Well	644,963,833	801,705,000	2012
Baldwin Spring	215,506,151	380,041,000	2009
Jones Spring	103,880,500	228,880,000	2008
Logandale Well	73,804	73,804	2009

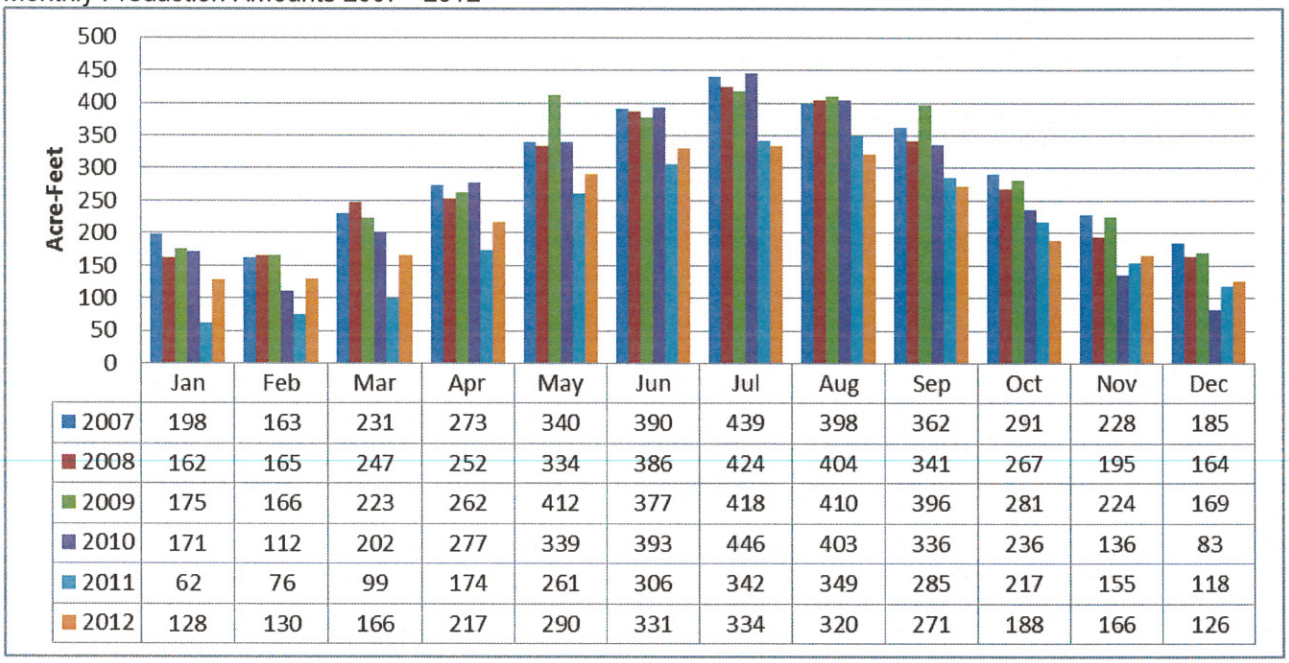
Figure 2.1 shows production amounts by month for the years 2007 through 2012. It is interesting to note that although there has been steady population growth in the Moapa Valley area during this period, water production has been steady with the exception of 2011 and 20012 when there was a production decrease.

Figure 2.2 graphs individual well production from 2007 through 2012. During this period the Arrow Canyon well made the greatest contribution to the system, producing an average of 68.5% of the total followed by Baldwin, Jones MX, and the Logandale Well. The groundwater basin for all wells is the Muddy River Springs.

Storage facilities for the district include: one, 3.0 million gallon tank; two, 1.5 million gallon tanks; two, 1.0 million gallon tanks; one, 200,000 gallon tank; and one, 100,000 gallon tank. Total storage capacity = 8.3 million gallons.

FIGURE 2.1

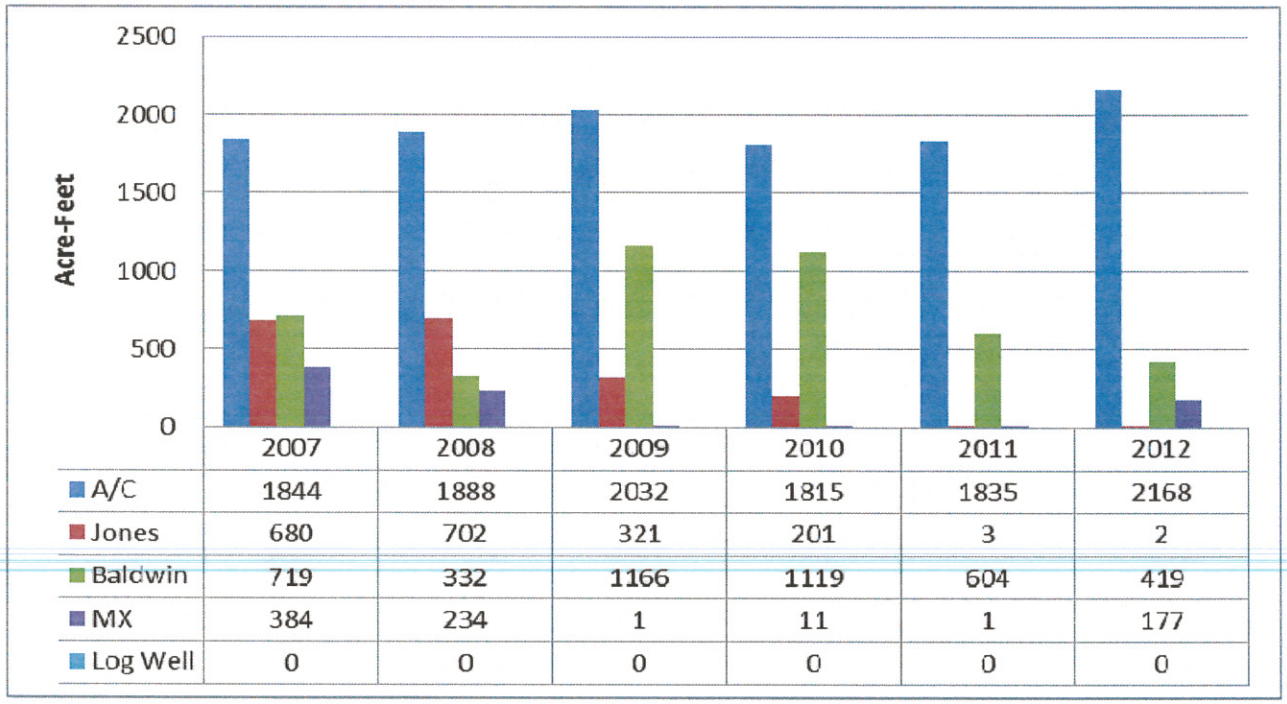
Monthly Production Amounts 2007 - 2012



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	198	163	231	273	340	390	439	398	362	291	228	185
2008	162	165	247	252	334	386	424	404	341	267	195	164
2009	175	166	223	262	412	377	418	410	396	281	224	169
2010	171	112	202	277	339	393	446	403	336	236	136	83
2011	62	76	99	174	261	306	342	349	285	217	155	118
2012	128	130	166	217	290	331	334	320	271	188	166	126

FIGURE 2.2

Annual Well Contributions 2007 - 2012



	2007	2008	2009	2010	2011	2012
A/C	1844	1888	2032	1815	1835	2168
Jones	680	702	321	201	3	2
Baldwin	719	332	1166	1119	604	419
MX	384	234	1	11	1	177
Log Well	0	0	0	0	0	0

2.3 Water Use Profile

MVWD provides water for the following basic categories of water consumers:

- Metered Customers
- Hydrants, including construction use
- County
- Cemeteries
- Miscellaneous

The yearly total of water sold in each of these basic customer categories is included in table 2.4.

TABLE 2.4

Amount of Water Sold to All Customers 2010 through 2012 (Acre-feet)

Customer	2010	2011	2012
Metered	1925.85	1796.21	1818.32
Hydrant	34.96	47.35	62.47
County	357.06	412.34	414.37
Cemeteries	16.40	24.30	18.60
Miscellaneous	7.48	4.38	4.22
NV Energy	273.69	85.15	50.31
Total	**2615.44**	**2369.73**	**2368.29**

Metered customers are further classified according to connection type. Metered classifications include:

- Single-family residential.
- Multi-family residential, including apartments and mobile home parks.
- Industrial
- Commercial, including retail businesses, hotels and motels, and services.
- Institutional, including county, state and church use.

Table 2.5 shows the number of meters and units served for the metered customer classifications. Because of their low usage there are approximately 17 non-residential (commercial, etc...) meters included in the single-family residential category. Hotel and motel meters include units with and without kitchens.

TABLE 2.5

Metered customers

Customer Class	Customer	No. of Meters	Units Served
Single-family residential	Home owners	2744	2744
Multi-family residential	Apartments, Mobile home parks	26	464
Commercial	Service businesses, Retail, Hotels and Motels	79	87
Industrial	Manufacturers	15	15
Institutional	County, State, Churches	60	60

Figure 2.3 shows the gallons per capita per day residential use for 2007 through 2012. The chart demonstrates that per capita use has declined since 2010. To obtain these results, single-family and multi-family residential consumption numbers were combined and divided by total population estimates.

FIGURE 2.3

Residential Use per Capita per Day

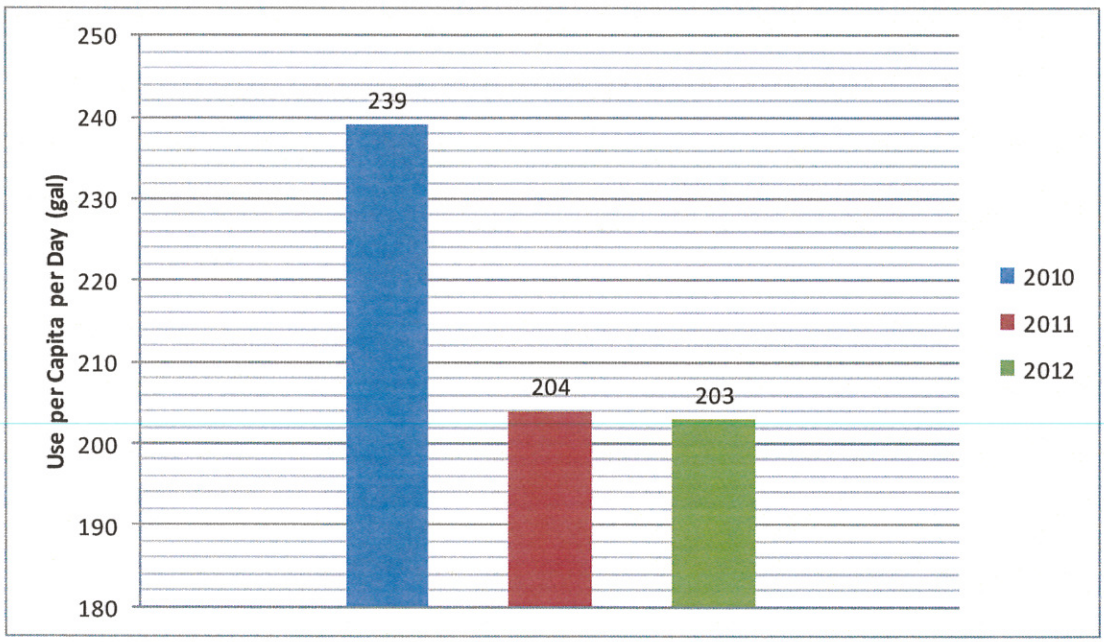


Figure 2.4 is the metered customer water use profile based on the number of meters for each category in table 2.4. Figure 2.5 is the water use profile for all customers both metered and non-metered and it includes the percentage of unaccounted-for water. Both charts are based on data covering the period from July 2011 to June 2012.

FIGURE 2.4

Use percentages for metered customer classifications

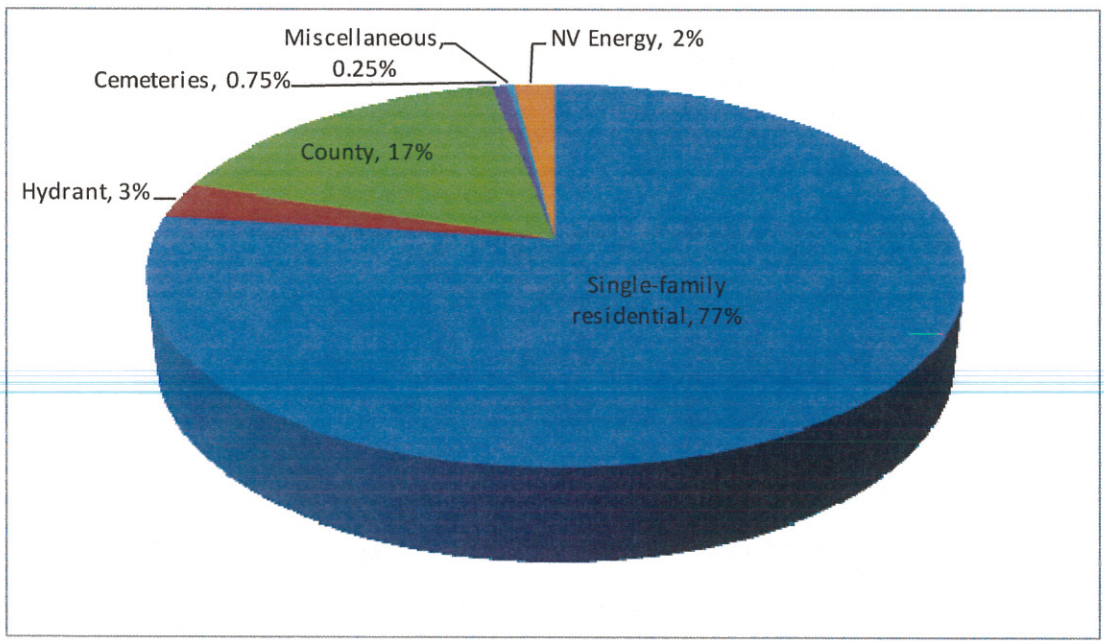
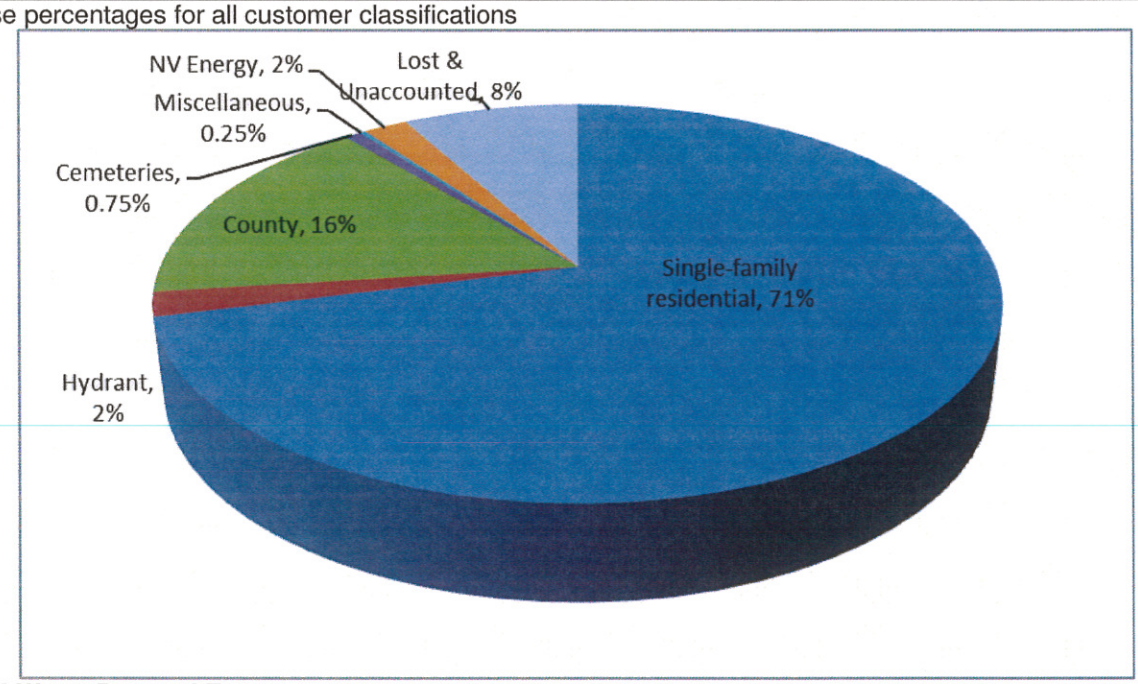


FIGURE 2.5

Use percentages for all customer classifications



2.4 Water Demand Forecast

Table 2.6 and Figure 2.7 are taken from Chapter 5 of "Wastewater Flow Projections", of the Northeast Clark County 208 Water Quality Management Plan Amendment. The MVWD demand forecast is higher than that in the 208 plan amendment because of different population estimates; however the projected water rights are adequate to meet the demand in either case.

The 208 plan estimate shows demand with and without conservation. Although the chart seems to indicate that demand with conservation is not substantially different than demand without, the total water saved over the 22 year period would be 10 percent of the total amount consumed, or 9186 acre-feet. The amount conserved is equivalent to two years supply of water.

TABLE 2.6

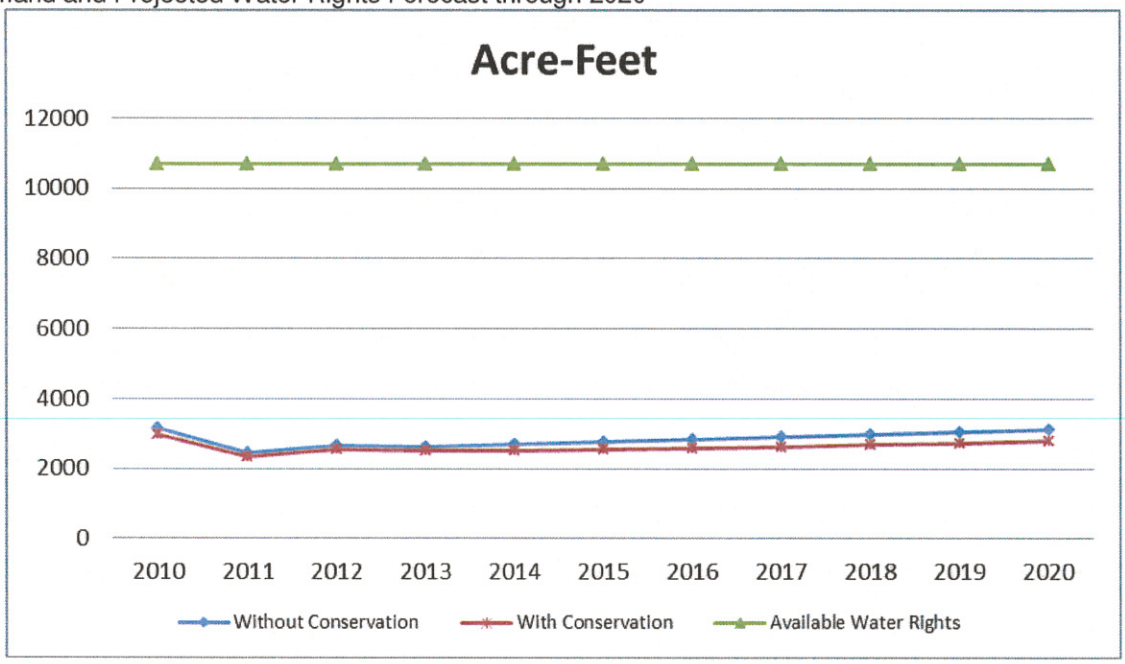
Estimated 208 Plan Water Demands and Amount Saved Through Conservation (AFY)

Year	No Conservation	Conservation	Amount Saved
2010	3,147	2,987	160
2011	2,445	2,323	122
2012	2,667	2,534	133
2013	2,628	2,497	131
2014	2,681	2,520	161
2015	2,748	2,555	193
2016	2,817	2,592	225
2017	2,887	2,627	260
2018	2,959	2,693	266
2019	3,033	2,730	303
2020	3,109	2,798	311

Total	31,121	28,856	2,265

FIGURE 2.6

Demand and Projected Water Rights Forecast through 2020



END OF SECTION

Conservation incentives are those things that increase awareness and encourage conservation. There are three general categories of conservation incentives; Educational, Financial, and Regulatory. MVWD has implemented educational and financial incentives and is subject to the regulatory incentives governing Clark County. This section covers the incentives that are currently in place in MVWD as well as those planned for the future.

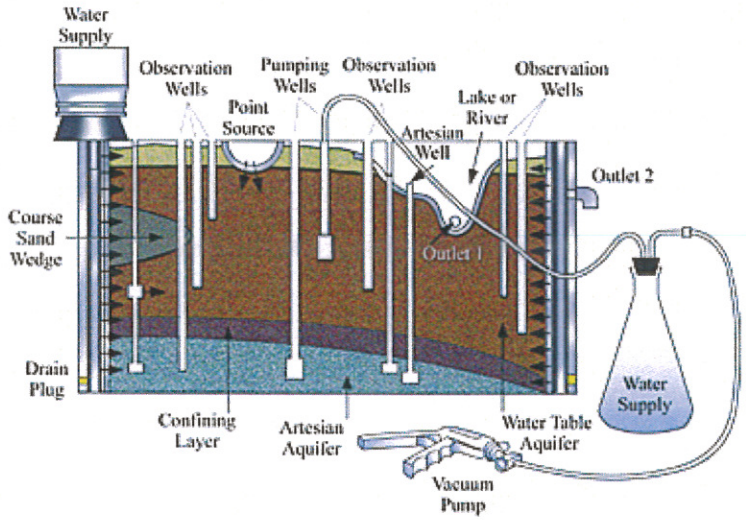
3.1 Educational Conservation Incentives

3.1.1 Literature. MVWD has a number of educational pamphlets that relate to water conservation, most of which have been published by the American Water Works Association (AWWA). MVWD distributes these materials to water customers in May of even years and November of odd years. Appendix A has a summary of that literature and samples of the guides.

3.1.2 Ground Water Model. MVWD purchased a ground water model (see figure 3.14) to use in school presentations. These presentations will be done periodically within the local school district.

FIGURE 3.1

University of Nebraska Standard Ground Water Model



3.1.4 Education for Large Water Consumers. Certain MVWD customers consume large amounts of water as a natural result of their functions. These customers have the responsibility of irrigating landscapes that may include large turf areas. Schools, county facilities, and cemeteries are among such users. MVWD can encourage these entities to use water more efficiently by sponsoring courses offered by the Irrigation Association. These courses provide information on irrigation techniques including audits, design, installation and maintenance. Information for the Irrigation Association may be found at www.irrigation.org.

3.2 Financial Conservation Incentives

3.2.1 Rates. MVWD uses an inclining block rate structure, meaning that rates increase with consumption and thus encourage conservation. Rates within the district are divided into two classes; residential and commercial/industrial. Table 3.1 shows residential rate blocks and table 3.2 commercial/industrial.

TABLE 3.1

Residential Rates

Class	Meter Size	No. of Single Family Units	Service Charge	Block	$ per 1000 gallons	Limit*
R2	¾" – 1"	1	$29.79	1	$2.14	Up to 8,000
				2	$2.37	Next 42,000
				3	$2.60	Over 50,000
R4	1 ½	3 or 1 ½ Meter	$79.44	1	$2.14	Up to 8,000
				2	$2.37	Next 42,000
				3	$2.60	Over 50,000
R5	2"	1 or More	$113.64	1	$2.14	Up to 8,000
				2	$2.37	Next 42,000
				3	$2.60	Over 50,000

TABLE 3.2

Commercial/Industrial Rates

Class	Meter Size	Service Charge	Block	$ per 1000 gallons	Block Usage
C1	¾" / 1"	$37.51 / $45.01	1	2.14	15,000 / 30,000
			2	2.37	85,000 / 120,000
			3	2.60	100,000 / 150,000
C2	1 ½"	$79.44	1	2.14	30,000
			2	2.37	170,000
			3	2.60	200,000
C3	2"	$113.64	1	2.14	50,000
			2	2.37	200,000
			3	2.60	250,000
C4	3"	$201.91	1	2.14	200,000
			2	2.37	800,000
			3	2.60	1,000,000
C5	4"	$310.04	1	2.14	1,000,000
			2	2.37	3,000,000
			3	2.60	4,000,000
C6	6"	$579.25	1	2.14	1,000,000
			2	2.37	3,000,000
			3	2.60	4,000,000

3.2.2 Savings from Efficient Plumbing Fixtures. Even though the Federal Energy Policy Act (FEPA) has mandated the manufacture and installation of efficient plumbing fixtures since 1994, there are still inefficient fixtures and appliances in use. Table 3.3 shows the potential savings from efficient fixtures.

TABLE 3.3

Potential Water Savings

Fixture*	Fixture Capacity	WATER USE (gpd)		WATER SAVINGS (gpd)	
		Per Capita	Per Household**	Per Capita	Per Household**
Toilets***					
Efficient	1.5 gal/flush	6.0	16.2	N/A	N/A
Low-Flow	3.5 gal/flush	14.0	37.8	8.0	21.6
Conventional	5.5 gal/flush	22.0	59.4	16.0	43.2
Conventional	7.0 gal/flush	28.0	75.6	22.0	59.4
Showerheads†§					
Efficient	2.5 [1.7] gal/min	8.2	22.1	N/A	N/A
Low-Flow	3.0 to 5.0 [2.6) gal/min	12.5	33.8	4.3	11.7
Conventional	5.0 to 8.0 gal/min	16.3	44.0	8.1	22.0
Faucets†§					
Efficient	2.5 [1.7] gal/min	6.8	18.4	N/A	N/A
Low-Flow	3.0 [2.0] gal/min	8.0	21.6	1.2	3.2
Conventional	3.0 to 7.0 gal/min	13.2	36.6	6.4	17.2
Fixtures Combined					
Efficient	N/A	21.0	56.7	N/A	N/A
Low-Flow	N/A	34.5	93.2	13.4	36.4
Conventional	N/A	54.5	147.2	33.5	90.4

Source: Amy Vickers, "Water Use Efficiency Standards for Plumbing Fixtures: Benefits of National Legislation", *American Water Works Association Journal.* Vol 82 (May 1990): 53

*Efficient = post-1994, Low-Flow = post-1980, Conventional = pre-1980; **Assumes 2.7 persons per household.

***Assumes four flushes per person per day. Does not include losses through leakage.

†For showerheads and faucets: maximum rated fixture capacity [measured fixture capacity]. Measured capacity equals about 2/3 the maximum.

§Assumes 4.8 shower-use-minutes per person per day and 4.0 faucet-use-minutes per person per day.

The potential savings shown in table 3.3 could make a plumbing retrofit program feasible.

3.3 Regulatory Conservation Incentives

3.3.1 Codes and Ordinances. The landscape code for the MVWD service area is found in the Clark County Unified Development Code (Title 30), Chapter 30.64. The code is called "Site Landscape and Screening Standards" and is known as the landscape development code. It includes an extensive plant list which is included in Appendix C.

Currently there are no golf courses in the MVWD service area but it is likely that at least one will be constructed in the near future. Prior to construction a code requiring use of treated effluent for golf course irrigation should be established.

END OF SECTION

This section describes current and planned conservation measures within the MVWD service area. A conservation measure is a device or practice that reduces water consumption. Conservation measures are divided in to two fundamental categories; 1. Hardware or equipment and, 2. Behavior or management practices. Examples of hardware measures include low-volume toilets and irrigation rain sensors. Examples of behavioral measures include not using the toilet as a trash can and watering lawn less frequently.

Some conservation measures are mandated by state and/or federal laws and others are voluntarily implemented by local water purveyors and/or customers. This section describes both current MVWD conservation measures and those that the District plans to implement in the future.

4.1 Plumbing Standards

The most recent federal plumbing standards (table 4.1) are included here since these standards are applicable to the MVWD service area. It is valuable to include California's standards for reference since in most cases California's requirements are more stringent. The comparison infers that there are plumbing fixtures available that exceed federal efficiency requirements thereby offering consumers alternatives that maximize conservation efforts.

TABLE 4.1

Federal and California Plumbing Standards

	FEDERAL ENERGY POLICY ACT (FEPA)		CALIFORNIA	
Device	**Manufacture**	**Effective Date**	**Sale and Installation**	**Effective Date**
Shower Heads	2.5 gpm*	1/1/94	2.5 gpm	3/20/92
Lavatory Faucets	2.5 gpm	1/1/94	2.2 gpm	3/20/92
Sink Faucets	2.5 gpm	1/1/94	2.2 gpm	3/20/92
Metering Faucets	*	1/1/94	†	7/1/92
Tub Spout Diverters	Not included in FEPA		0.1 to 0.3‡	3/20/92
Residential Toilets	1.6 gpf	1/1/94	1.6gpf	3/20/92
Flushometer Valves	1.6 gpf§	1/1/97	1.6 gpf	1/1/92
Commercial Toilets	1.6 gpf	1/1/97	1.6 gpf	1/1/94
Urinals	1.0 gpf	1/1/94	1.0 gpf	1/1/92

* Gallons per minute.
** 0.25 gal/cycle (pertains to maximum water delivery per cycle.
† Hot water maximum flow rate range from 0.25 to 0.75 gal/cycle and/or from 0.5 gpm to 2.5 gpm, depending on controls and hot water system.
‡ 0.1 (new), to0.3 gpm (after 15,000 cycles of diverting).
§ Gallons per flush.

4.2 MVWD Conservation Measures

4.2.1 MVWD Supervisory Control And Data Acquisition (SCADA). Although the SCADA system itself does not conserve water, it is a management tool that can be used to conserve. SCADA can be used to detect distribution system leaks and to regulate pressure. Pressure regulation can help to reduce the amount of water lost when leaks occur or when valves are left open. SCADA is considered a management practice conservation measure.

4.2.2 Training. MVWD has two service personnel trained in conservation. The training is done through the AWWA with both employees are AWWA conservation certified. This is a management practice measure.

4.2.3 Wastewater Reuse. Currently the sewer ponds in Overton, Nevada have an average inflow of .201 million gallons per day. MVWD worked with the Clark County Water Reclamation District on a project to build a wastewater treatment plant in order to reuse the approximately 200,000 gallons per day of wastewater. The treated effluent could be used to irrigate public parks, landscaping around public buildings, construction projects, and golf courses (there are currently no golf courses in the MVWD area but there soon will be).

4.2.4 Meter Calibration Program. MVWD has a meter calibration program that includes periodic testing of meters within the service area. The service area has been divided into four routes. The program is progressing slowly but steadily since calibration takes approximately fifteen minutes per meter.

4.2.5 Bowman Reservoir Surface Water Treatment Project. Per an April 2005 Water Treatment Evaluation done by Black and Veatch, MVWD is "evaluating the use of Bowman Reservoir as a viable source of potable water supply". The use of water from the reservoir would require that it be treated.

4.2.6 Leak Detection and Repair. The detection and repair of leaks is an ongoing measure for MVWD and the district has put great effort into the maintenance of the delivery system. As part of its effort to find leaks, MVWD commissioned a survey by Utilities Services Associates in November 2001. The survey detected only one leak and it was repaired. As a result of the survey it was determined that the most cost effective way for water systems this size to find leaks is through customer notification and field observation by MVWD personnel.

4.2.7 Drought Measures. Nevada Statutes chapter 477 section 3 item 14 states that MVWD has the power "To restrict the use of district water during any emergency caused by drought". The MVWD Drought Response Water Conservation Implementation Plan includes measures for residential, commercial, industrial, and institutional water use. It also contains specific factors that trigger drought declarations in the MVWD service area (see section 1.2) A copy of the Drought Plan is included in Appendix D.

4.3 Consumer Conservation Measures

4.3.1 Sub-metering. Sub-meters are meters installed in the main water lines that enter the individual units of multi-family properties (apartments, condominiums, duplexes, etc...) and/or subdivided areas of commercial, industrial, or institutional (ICI) facilities. Traditionally such properties and facilities were built with one master meter that served the entire complex or facility. Sub-meters can be used as a measure that property or company owners can use to conserve water and cut costs. Submetering has the following basic advantages:

- Decrease in overall water consumption of 18% to 39%[1]
- Fair allocation of water costs to residents.
- Potential increase in property owners net operating income.
- Increase in water use efficiency
- Proper allocation of water costs within ICI operations

[1] *Submetering, RUBS, and Water Conservation,* prepared for the National Apartment Association and the National Multi Housing Council by Industrial Economics Incorporated, June 1999.

In residential applications, sub-meters can reduce consumption by making the individual users responsible for their own water bill. When water use by multi-family units is measured by a single meter, leaks in individual units often go undetected. Measuring the consumption of each unit may also discourage waste.

In ICI applications separate meters can by used for individual processes thereby encouraging use efficiency. Landscape irrigation can be monitored separately from facility use. In institutions such as universities, water costs can be directed to the departments that use the water. Manufactures can cut costs and determine which processes or equipment needs to be improved or replaced.

There are some disadvantages to sub-metering. Retrofits may be expensive and may prove to be economically unfeasible. Also some of the financial incentive for landlords to install conservation devices (low-volume toilets and low-flow fixtures) is removed. These shortcomings however are not present in new construction. Whether new construction or retrofit, consideration should be given to both conservation and cost.

4.3.2 General Consumer Conservation Measures. Consumer residential, landscape, industrial, commercial and institutional measures are included in Appendix B.

END OF SECTION