Las Virgenes Municipal Water District

FINAL

2010 Urban Water Management Plan

June 2011

carollo

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Las Virgenes Municipal Water District
2010 Urban Water Management Plan

Contact Sheet

Date plan submitted to the Department of Water Resources: June 29, 2011

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The Water supplier is a: **Municipal Water District**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Water, Wastewater, Recycled Water**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

Las Virgenes Municipal Water District

URBAN WATER MANAGEMENT PLAN

FINAL
June 2011

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Las Virgenes Municipal Water District

Urban Water Management Plan

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LIST OF ABBREVIATIONS

Abbreviation	Description
AB	Assembly Bill
ADD	Average Day Demand
af	Acre Feet
afy	Acre Feet per Year
BMP	Best Management Practices
BNR	Biological Nutrient Reduction
CDR	Center for Demographic Research
CIMIS	California Irrigation Management Information System
CRWQCB	California Regional Water Quality Control Board
CVP	Central Valley Project
DMMs	Demand Management Measures
DOF	Department of Finance
DPH	Department of Public Health
du/ac	Dwelling Units per Acre
DWR	Department of Water Resources
ETo	Evapotranspiration
FAR	Floor Area Ratio
FY	Fiscal Year
gpcd	Gallons per Capita per Day
gpm	Gallons per Minute
HGL	Hydraulic Grade Line
HOA	Home Owners' Association
IRP	Integrated Resource Plan
JPA	Joint Powers Authority
LA	Los Angeles
LVMWD	Las Virgenes Municipal Water District
MAF	Million Acre Feet
MFR	Multi-Family Residential
MG	Million Gallons
mgd	Million Gallons per Day
mg/l	Milligrams per Liter
MOU	Memorandum of Understanding
MWDSC	Metropolitan Water District of Southern California
NPDES	National Pollutant Discharge Elimination System
RUWMP	Regional Urban Water Management Plan
RW	Recycled Water
RWMP	Recycled Water Master Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAG	Southern California Association of Governments
SDP	Seawater Desalination Project
SFR	Single Family Residential
SWP	State Water Project
TDS	Total Dissolved Solids
TSD	Triunfo Sanitation District
TWRF	Tapia Water Reclamation Facility
ULF	Ultra Low Flush
UWMP	Urban Water Management Plan

Abbreviation	Description
UWMPA	Urban Water Management Planning Act
WBMWD	West Basin Municipal Water District
WCS	Water Code Section
WMP	Water Master Plan
WRF	Water Reclamation Facility
WSDM	Water Surplus and Drought Management
WSRP	Water Shortage Response Plan

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2010 Urban Water Management Plan
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Table I-2 Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Section 1.3 Appendix B
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Section 1.4 Appendix B
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Appendix B
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Section 1.3 Appendix B
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Appendix B
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Section 1.4 Appendix B
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix B
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Section 6.3

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 1.3 Appendix B
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 1.3 Appendix B
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Chapter 2 Figure 2.1
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Sections 2.3 and 2.4
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.3
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.3
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 2.2
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Section 6.1 Section 5.1 Tables 6.1 to 6.4
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Section 1.4

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		Not Applicable Until 2015
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 5.2 Table 5.3
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	[To Be Included In Appendix B]
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Table 5.4
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Section 3.1 Table 3.1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 3.5
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Section 3.5
16	Describe the groundwater basin.	10631(b)(2)		Section 3.5
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Section 3.5

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 3.5 Appendix C
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 3.5
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Section 3.5
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Section 3.5
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 7.6
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Section 7.2
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Section 3.6 Section 7.7
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Chapter 4
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Section 4.1

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Section 4.1
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Section 4.2
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Section 4.3
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Sections 4.2 and 4.3
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Section 4.4
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Not Applicable
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Section 3.5 and 3.6
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Sections 7.4 and 7.5
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Section 7.3
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Chapter 8

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Section 7.6.3
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Sections 8.1 and 8.2
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Section 8.2.1
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Section 8.2
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 8.2.3
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Section 8.4
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Section 8.3 Appendix E
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 8.6
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	Section 7.7

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Section 7.4 and 7.5
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Section 6.2
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Section 6.2
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Section 6.2
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Not Applicable
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Appendix F

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

2010 URBAN WATER MANAGEMENT PLAN

This executive summary provides an overview of the content included in Las Virgenes Municipal Water District's (LVMWD) 2010 Urban Water Management Plan (UWMP). The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions. This report, which was prepared in compliance with the California Water Code, and as set forth in the guidelines and format established by the Department of Water Resources, constitutes LVMWD's 2010 UWMP.

As required by the Urban Water Management Plan Act (Act), this document has been prepared with the participation of both public and in coordination with appropriate agencies. Specific coordination and participation are included in Chapter 1.

Since LVMWD's 2005 UWMP, several pieces of legislation have amended the Act. While all the applicable legislation is discussed in more detail in Chapter 1, the most notable of these is the 2009 Water Conservation Act (also known as SBx7-7) mandating a per-capita reduction of 20 percent by the year 2020.

LVMWD's service area is situated in western Los Angeles County and comprises a 122-square mile area (74,640 acres). The service area includes the incorporated cities of Agoura Hills, Calabasas, Hidden Hills and Westlake Village as well as unincorporated portions of Los Angeles County.

A large portion of the service area is undeveloped land, held in public ownership that will not require water service (35 to 40 percent of the total area is state and national parklands or other open space), while the remaining portion is primarily of mixed residential, commercial, industrial, and agricultural sectors.

LVMWD has seen a decline in the significant growth patterns in the late 1980's and early 1990's. Current and future population projections have been prepared based on an analysis of the 2000 U.S. Census Tract information and Southern California Association of Governments (SCAG) projections. LVMWD's 2010 population was just over 75,000. It is anticipated that LVMWD's service area population will grow to nearly 88,000 by 2035. The population projections are shown in Table ES.1 and depicted graphically along with historical population in Figure ES.1.

Table ES.1 Historic and Project Population					
2010 UWMP Projected Years	**2015**	**2020**	**2025**	**2030**	**2035**
Service Area Population(1)	77,285	79,984	82,718	85,323	87,811

Notes:
(1) Source: SCAG Population Projections by Census Tract

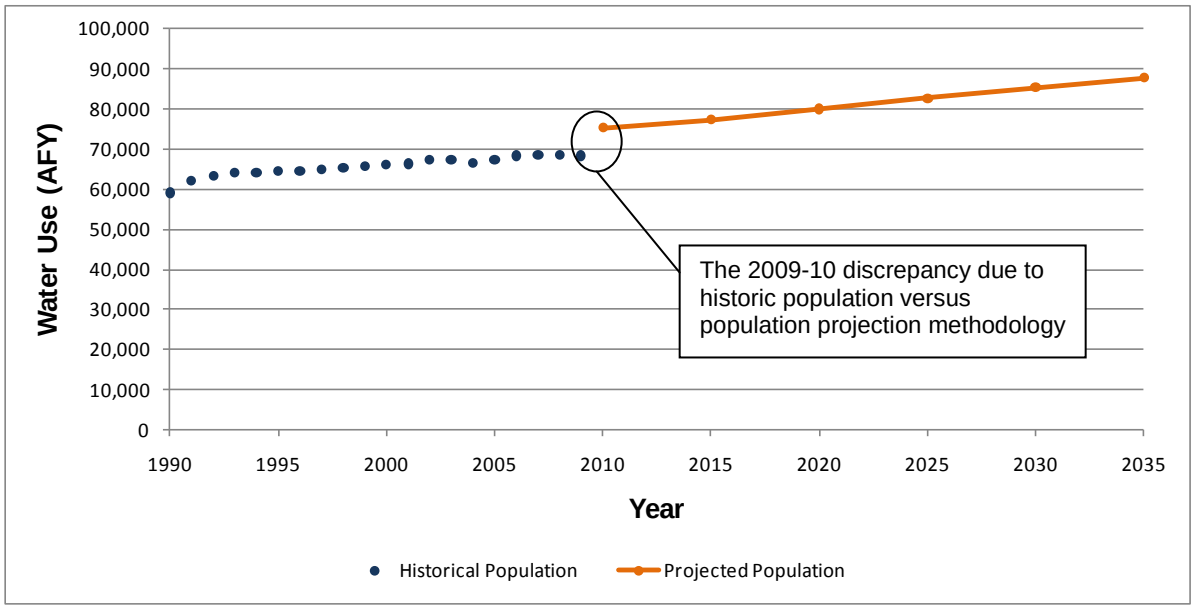

Figure ES.1 Historical and Projected Population

Located in the Santa Monica Mountains, LVMWD has very limited natural water resources. However, LVMWD has developed and integrated its water resources to provide recycled water for increased water reliability and conservation. This has included aggressive use of recycled water, some use of groundwater to augment recycled water supplies during peak demand seasons, and storage of potable water in Westlake Reservoir during low demand periods for use during the peak demand periods. LVMWD has optimized these limited water resources to supply the water demand for continued growth of the community.

LVMWD supplies approximately 18-19 percent of its total water demands from recycled water through the Tapia Water Reclamation Facility (TWRF). Groundwater underlying LVMWD's service area is of poor quality and is not currently used for the potable water supply system. However, it is used to augment supplies for the recycled water system during peak summer demand.

LVMWD's potable water is provided almost entirely through wholesale purchases from Metropolitan Water District of Southern California (MWDSC), which imports water from the State Water Project (SWP) and the Colorado River.

Water demands served by LVMWD are primarily residential, with commercial, industrial, and institutional comprising approximately eight percent of total usage. As of 2009, LVMWD maintains approximately 20,380 water meters with about 26,000 acre-feet of potable water annually. LVMWD's current per-capita consumption rate is 307 gallons per day per acre. Table ES.2 presents the demand projections through planning year 2035.

Table ES.2 Demand Projections

Year	Demand with Conservation (afy)	Population[(1)]	Per Capita Consumption (gpcd)
2010	25,958	75,384	307
2015	23,951	77,285	277
2020	22,034	79,984	246
2025	22,787	82,718	246
2030	23,504	85,323	246
2035	24,190	87,811	246

Notes:
(1) Population Projections from Table 2.2.

Incorporating reductions in per-capita water conservation associated with the Water Conservation Act requirement, projected demands are anticipated to decrease from 25,958 afy in 2010 to 24,190 afy in 2035. The projected water demand with conservation is presented along with historical demands in Figure ES.2.

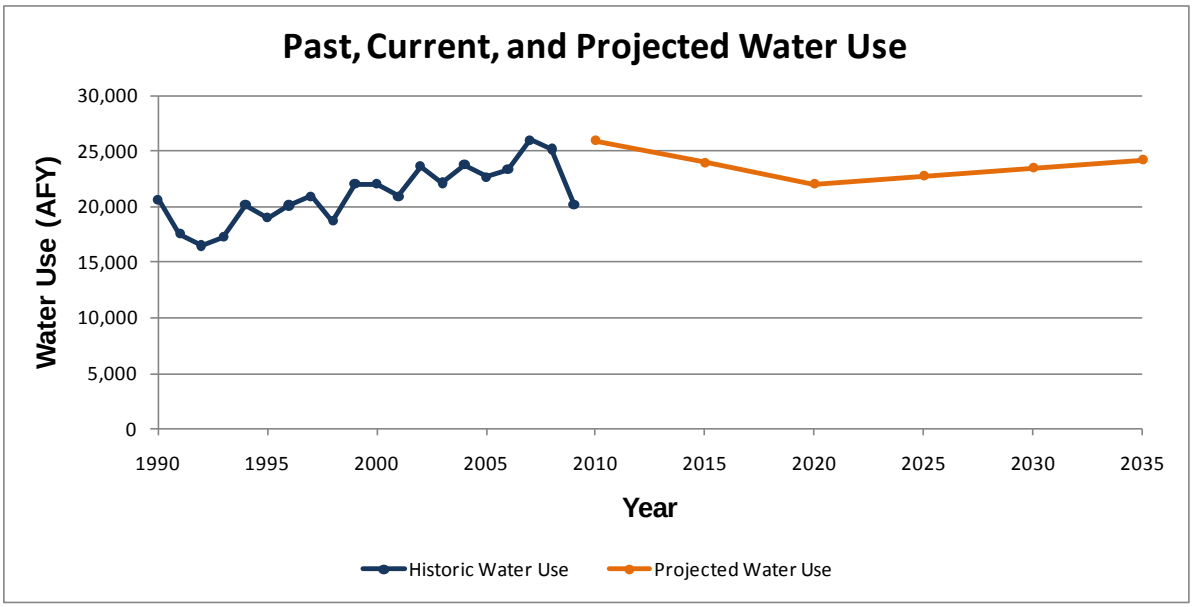

Figure ES.2 Past and Projected Water Use (with conservation)

The Water Conservation Act requires a per-capita reduction in water demand to a target level. Details of this calculation are provided in Chapter 6. LVMWD's baseline per-capita demand was calculated to be 307 gpcd. LVMWD's interim target per-capita demand for

Year 2015 is 277 gpcd, while LVMWD's Year 2020 Target is 246 gpcd. Demand projections incorporating population growth with the historic gpcd of 307 compared to the conservation gpcd of 246 by are shown Table ES.3 and graphically in Figure ES.3.

Table ES.4 Demand Projections with and without Water Conservation

Year	SCAG Population[(1)]	Water Demand without Conservation (afy)	Water Demand with Conservation (afy)
2010	75,384	25,958	25,958
2015	77,285	26,613	23,951
2020	79,984	27,542	22,034
2025	82,718	28,483	22,787
2030	85,323	29,380	23,504
2035	87,811	30,237	24,190

Notes:
(2) Population Projections from Table 2.2.

As listed in Table ES.2, the water conservation requirements of the Water Conservation Act reduce the projected water demand for year 2020 from 27,542 afy to 22,034 afy, a decrease of 5,508 acre-feet.

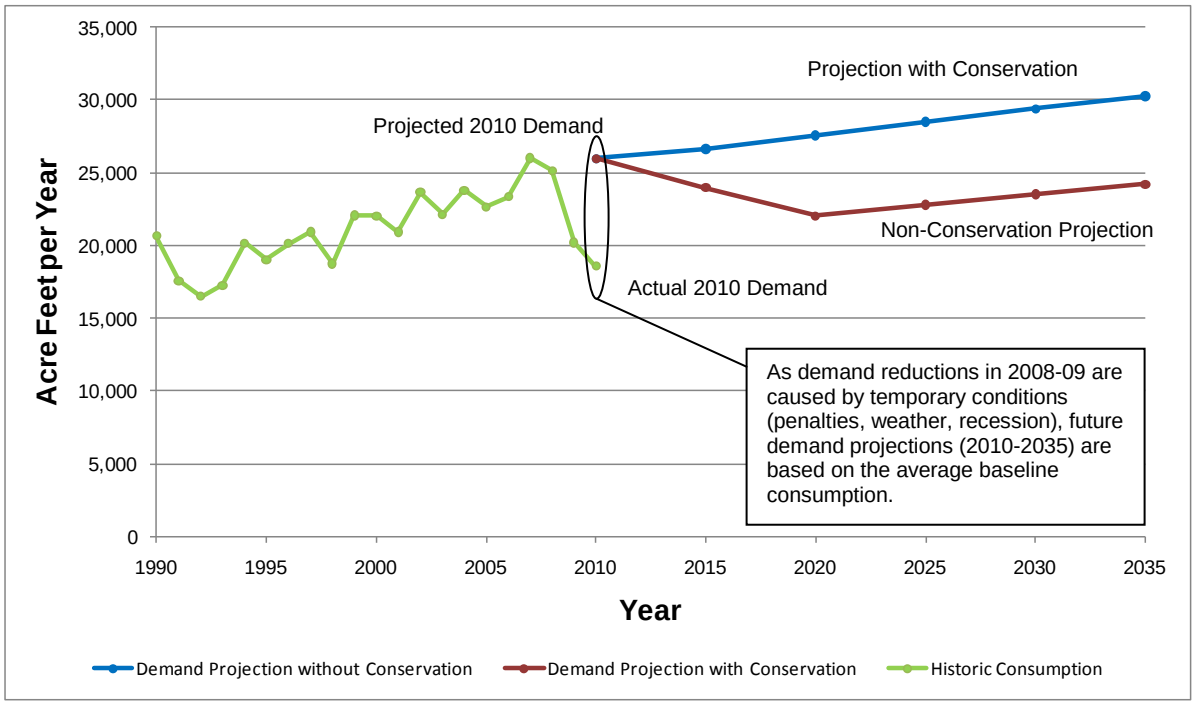

Figure ES.3 Projected Water Demands with and without Conservation

The year 2009 saw a dramatic decrease in volume of water consumed by both the region as a whole, as well as in per capita rates. Demand continued to decrease to the 2010 value of 18,591 af, shown in Figure ES.3 as the lower of the two values shown for 2010. The demand projections were derived from the population projections presented in Chapter 2 and the per-capita consumption targets discussed in Chapters 5 and 6. The historic water

demand value for 2010 shown in Figure ES.3 is different from the 2010 projection primarily due to water conservation requirements imposed by MWDSC for the year 2010. In response to MWDSC's stage two water allocation, LVMWD took steps to reduce demand to 18,591 af, 2% below the allocation.

Based on discussions with district staff it was decided to use the selected baseline per-capita water use (307 gpcd) rather than the 2009 or 2010 water consumption as a basis for future demand projections, which were calculated by multiplying the projected populations by the per-capita water use. As a result of this more conservative planning assumption, as the starting point of the projected demands in 2010 is much higher than the actual 2010 number.

As a member of the CUWCC and signatory of its MOU, LVMWD realizes the importance of the BMPs to ensure a reliable future water supply. LVMWD is committed to implementing water conservation and water recycling programs to maximize sustainability in meeting future water needs for its customers.

As LVMWD is completely dependent on a single source for its potable water, supply reliability is of particular concern to LVMWD. There are two aspects of supply reliability that can be considered. The first relates to immediate service needs and is primarily a function of the availability and adequacy of the supply facilities. The second aspect is climate-related, and involves the availability of water during mild or severe drought periods. Chapter 7 provides a detailed look at the water supply reliability during drought periods.

Based on the supply and demand comparison presented in Chapter 7, it can be concluded that LVMWD has sufficient supplies available to meet both potable and recycled water demands through 2035 under average, single dry year, and multiple dry year conditions.

To respond to potential water supply shortages, LVMWD has developed a Water Shortage Response Plan (WSRP) to be invoked during declared water shortages. This plan is an important document that explains how LVMWD will reduce demands during periods of reduced supply. In addition, LVMWD has also implemented several ordinances and resolutions related to promoting and implementing water conservation within its service area. For example, LVMWD has implemented a water budget based tiered rate structure to penalize excessive usage of water. Details of the WSRP and the related ordinances and resolutions are provided in Chapter 8.

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Chapter 1

INTRODUCTION

1.1 PURPOSE

The California Water Code requires urban water suppliers within the state to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR). The UWMPs, which must be filed every five years, must satisfy the requirements of the Urban Water Management Planning Act (UWMPA) of 1983 including amendments that have been made to the Act. The UWMPA requires urban water suppliers servicing 3,000 or more connections, or supplying more than 3,000 acre-feet (af) of water annually, to prepare an UWMP.

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, verify that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions. This report, which was prepared in compliance with the California Water Code and as set forth in the guidelines and format established by the DWR, constitutes the Las Virgenes Municipal Water District (LVMWD) 2010 UWMP.

1.2 BACKGROUND

1.2.1 Urban Water Management Planning Act

In 1983, State Assembly Bill (AB) 797 modified the California Water Code Division 6, by creating the UWMPA. Several amendments to the original UWMPA, which were introduced since 1983, have increased the data requirements and planning elements to be included in the 2005 and 2010 UWMPs.

Initial amendments to the UWMPA required that total projected water use be compared to water supply sources over the next 20 years, in 5-year increments. Recent DWR guidelines also suggest projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed and for use in developing Water Supply Assessments.

Other amendments require that UWMPs include provisions for recycled water use, demand management measures, and a water shortage contingency plan, set forth therein. Recycled water was added in the reporting requirements for water usage and figures prominently in the requirements for evaluation of alternative water supplies, when future projections predict the need for additional water supplies. Each urban water purveyor must coordinate the preparation of the water shortage contingency plan with other urban water purveyors in the area, to the extent practicable. Each water supplier must also describe their water demand management measures that are being implemented, or scheduled for implementation.

In addition to the UWMPA and its amendments, there are several other regulations that are related to the content of the UWMP. In summary, the key relevant regulations are:

- AB 1420: Requires implementation of demand management measures (DMMs)/best management practices (BMPs) and meeting the 20 percent reduction by 2020 targets to qualify for water management grants or loans.
- AB 1465: Requires water suppliers to describe opportunities related to recycled water use and stormwater recapture to offset potable water use.
- Amendments Senate Bill (SB) 610 (Costa, 2001), and SB 221 (Daucher, 2001), which became effective beginning January 1, 2002, require counties and cities to consider information relating to the availability of water to supply new large developments by mandating the preparation of further water supply planning (Daucher) and Water Supply Assessments (Costa).
- SB 1087: Requires water suppliers to report single family residential (SFR) and multi-family residential (MFR) projected water use for planned lower income units separately.
- Amendment SB 318 (Alpert, 2004) requires the UWMP to describe the opportunities for development of desalinated water, including but not limited to, ocean water, brackish water, and groundwater, as long-term supply.
- AB 105 (Wiggins, 2004) requires urban water suppliers to submit their UWMPs to the California State Library.
- SBx7-7: Requires development and use of new methodologies for reporting population growth estimates, base per capita use, and water conservation. This water bill also extended the 2010 UWMP adoption deadline for retail agencies to July 1, 2011.

The UWMPA is included for reference in Appendix C.

1.2.2 Previous Urban Water Management Plan

Pursuant to the UWMPA, the City previously prepared an UWMP in 2005, which was approved and adopted on November 8, 2005. This 2010 UWMP report serves as an update to the 2005 UWMP and pulls extensively from that report.

1.3 COORDINATION WITH APPROPRIATE AGENCIES

The UWMPA requires that the UWMP identify the water agency's coordination with appropriate nearby agencies.

> *10620 (d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.*

LVMWD is the sole water supplier and water management agency for the area. While preparing the 2010 UWMP, LVMWD coordinated its efforts with relevant agencies to ensure that the data and issues discussed in the plan are presented accurately. Table 1.1 summarizes how the UWMP preparation was coordinated with different agencies in area.

Table 1.1 Coordination with Appropriate Agencies

Check at least one box on each row	Participated in Developing the Plan	Commented on the Draft	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft Plan	Was Sent a Notice of Intention to Adopt	Not Involved/ Not Informed
Metropolitan Water District of Southern California					✓	✓	
City of Calabasas				✓	✓	✓	
City of Hidden Hills				✓	✓	✓	
City of Agoura Hills				✓	✓	✓	
City of Westlake Village				✓	✓	✓	
Triunfo Sanitation District					✓	✓	
Los Angeles County					✓	✓	

1.4 PUBLIC PARTICIPATION AND PLAN ADOPTION

The UWMPA requires that the UWMP show the water agency solicited public participation.

> *10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published … After the hearing, the plan shall be adopted as prepared or as modified after the hearing.*

In accordance with the UWMPA, the City held a public hearing and adopted the 2010 UWMP on June 14, 2011. A copy of the adopting resolution and resolution of intent to adopt are included in Appendix B. The hearing provided an opportunity for LVMWD's customers, residents, and employees to learn and ask questions about the current and future water supply.

A notice of the public hearing was published in the local newspaper on ---, notifying interested parties that the draft 2010 UWMP was under preparation. Pursuant to California Code Section 6066, a notification of the time and place of the public hearing was published in the local newspaper on April 21, 2011 and April 28, 2011. A copy of these notifications is included in Appendix B.

The Final Draft 2010 UWMP was presented to the LVMWD Board of Directors as an information item on April 12, 2011. The 2010 UWMP was then adopted by resolution of the LVMWD Board of Directors on June 14, 2011 following a public hearing. This public hearing provided an opportunity for LVMWD's customers, residents, and employees to learn and ask questions about the current and future water supply of LVMWD.

A copy of the resolution of the intent to adopt and the adoption resolution are also included in Appendix B.

1.5 REPORT ORGANIZATION

The UWMP contains eight chapters, followed by appendices that provide supporting documentation for the information presented in the report. The chapters are briefly described below:

Chapter 1 - Introduction. This chapter presents the purpose of this UWMP, describes the efforts of LVMWD to coordinate the preparation of the UWMP with appropriate nearby agencies, and discusses the measures used to solicit public participation in the UWMP.

Chapter 2 - Service Area. This chapter presents a description of the water purveyor's service area and various aspects of the area served including climate, population, and other demographic factors.

Chapter 3 – Water Supply Sources. This chapter presets a description of the LVMWD's water supply sources. The description of water supplies includes information on the usage of imported water and an overview of usage of recycled water as well as groundwater.

Chapter 4 – Recycled Water. This chapter includes information on LVMWD's existing recycled water system and usage, as well as the projected expansion of recycled water use per the most recent Recycled Water Master Plan prepared in 2007.

Chapter 5 – Water Demands. This chapter presents a discussion of water demands within LVMWD's service area and provides water demand projections through year 2035.

Chapter 6 – Water Conservation. This chapter provides analyses associated with calculations of the Water Conservation Act of 2009 water conservation target as well as a description of LVMWD's water conservation efforts and Best Management Practices (BMPs).

Chapter 7 – Water Supply Reliability. In this chapter, the UWMP seeks to address the reliability of LVMWD's water supplies. This includes a discussion on imported water reliability. In addition, there is an analysis of supply availability in a single dry year and in multiple dry years.

Chapter 8 – Water Shortage Contingency Plan. This chapter includes an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a draft water shortage contingency resolution or ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction.

Chapter 2

SERVICE AREA AND POPULATION

The Urban Water Management Plan Act (UWMPA) requires that the UWMP include a description of the water purveyor's service area and various aspects of the area served including climate and population.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

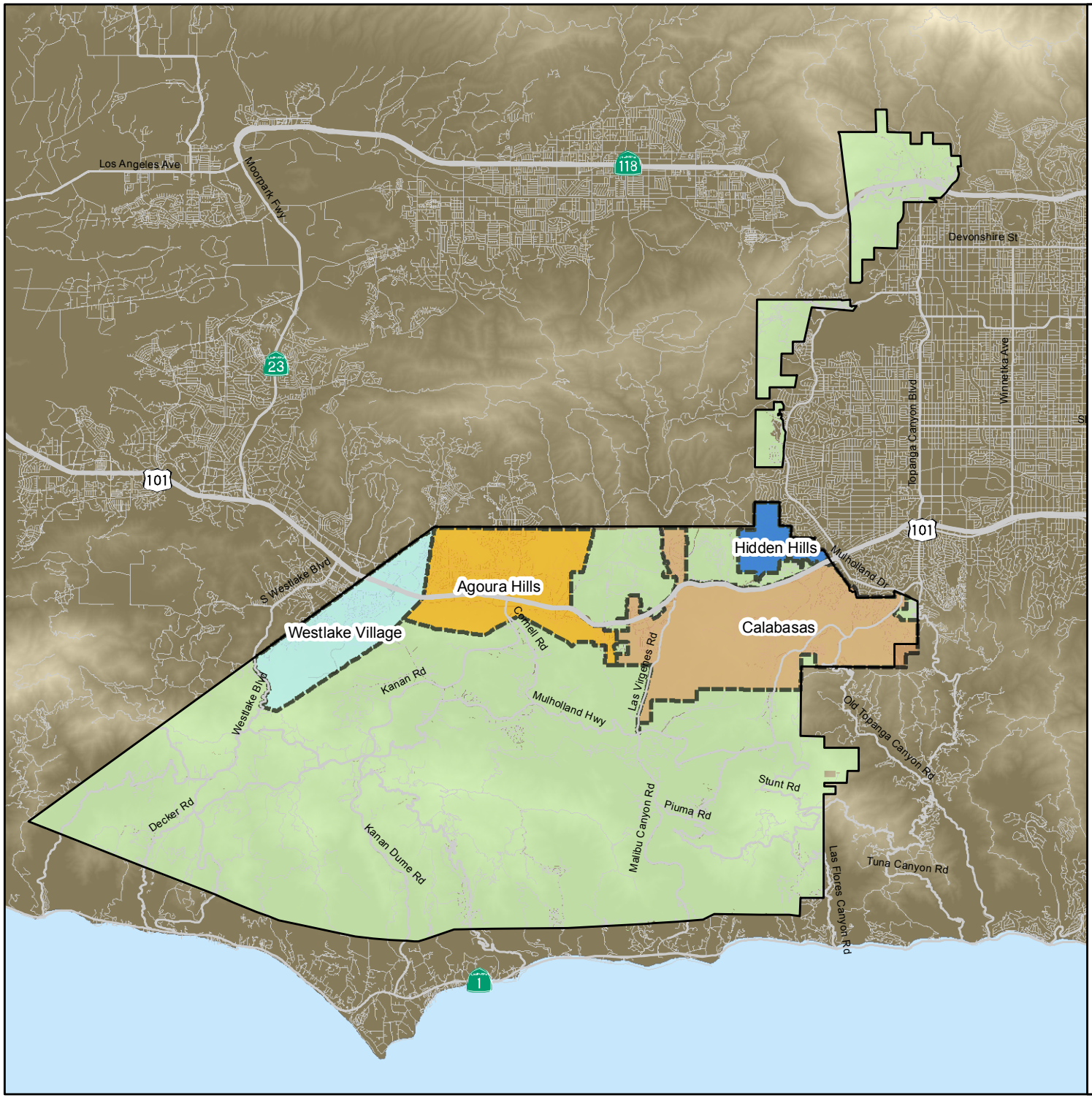
2.1 LOCATION

The Las Virgenes Municipal Water District (LVMWD) comprises a 122-square mile area (74,640 acres) in western Los Angeles County, including the Los Angeles/Ventura County boundary to the northwest and the City of Los Angeles to the east. As shown in Figure 2.1, the service area includes the incorporated cities of Agoura Hills, Calabasas, Hidden Hills, and Westlake Village as well as unincorporated portions of Los Angeles County.

2.2 LAND USE

A large portion of the service area is undeveloped land characterized by the Santa Monica Mountains that range in elevation from a few feet above mean sea level (msl) to elevations exceeding 2,500 ft-msl. As shown in Figure 2.2, these open space areas comprise about 35 to 40 percent of the total service area and are mostly held in public ownership, such as state and national parks that will not require water service The remaining portion is primarily of mixed residential and commercial, while only a small portion of the service area is designated as industrial and agricultural land use types.

There are several unique aspects of LVMWD's geography which must be considered when discussing regional water infrastructure. LVMWD's water demands are primarily residential, as opposed to commercial, industrial, institutional, or agricultural, so LVMWD's customer base consists of many small users (i.e., single family residential homes) with associated landscape irrigation. Secondly, because of LVMWD's rural location within the Santa Monica Mountains, the distribution systems are large and accommodate geographical challenges such as rapidly changing elevations. And while LVMWD benefits from a highly integrated recycled water system, effective distribution has been a continual challenge.



Legend

- Freeway
- Major Roads
- Agoura Hills
- Calabasas
- Hidden Hills
- Westlake Village
- Las Virgenes Water District Boundary

N

0 5,000 10,000 20,000 Feet

FIGURE2.1
Service Area
Las Virgenes Municipal Water District
2010 Urban Water Management Plan

LAS VIRGENES MUNICIPAL WATER DISTRICT

carollo
Engineers...Working Wonders With Water™

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2.3 POPULATION

The 1999 LVMWD Master Plan updated the population projection from the 1989 Master Plan for the service area. Projections within the 1999 Master Plan concur with a 1996 study that growth patterns would be significantly less than what had been previously anticipated for the late 1980's and early 1990's. The development pattern has been predominately commercial/office along the freeway corridor with some modest residential development and growth in smaller tracts.

As part of this UWMP, the future population projections have been updated based on an analysis of the 2000 U.S. Census Tract information and Southern California Association of Governments (SCAG) projections.

As part of the updated population projections, yearly historical population for the LVMWD service area, population, and active water connection numbers from each census tract were combined to form a person to connection ratio. The population per census tract data was pulled from the 2000 Census, while connection data was acquired from LVMWD billing records. Once this ratio was generated, yearly connection data was used to generate yearly population data.

SCAG establishes population projections for each census tract that falls within its member agency's geographical area. Once the appropriate census tracts had been established for historical population, these same tracts were used in tandem with SCAG census tract population projections to establish new future population data for LVMWD's service area.

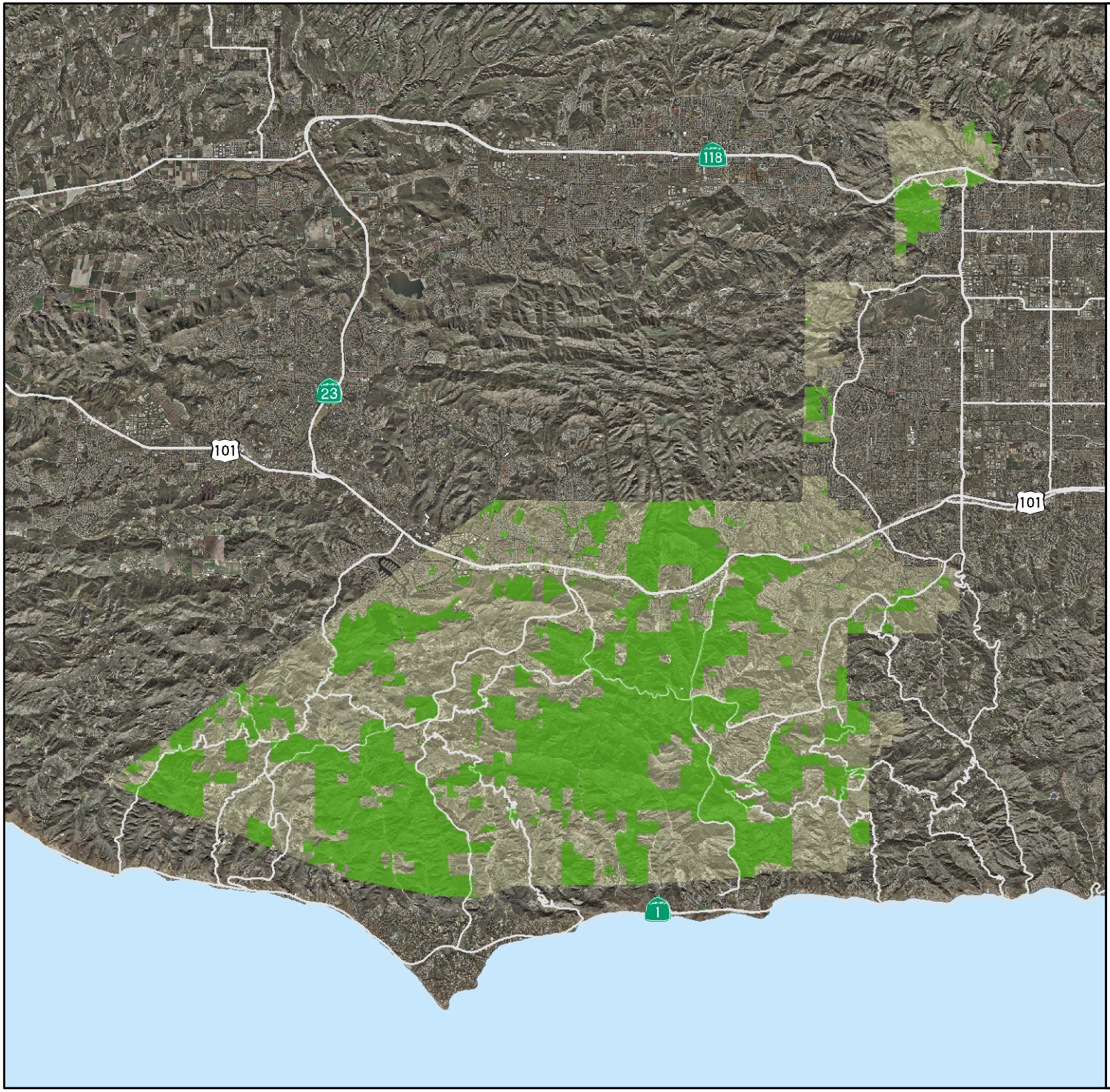
Based on the method described above, the LVMWD's 2010 population is estimated to be approximately 75,384. Population projections, shown in Table 2.1 and Figure 2.3, are used to forecast water requirements for LVMWD.

Table 2.1 Historic Projections

2010 UWMP Projected Years	2010	2015	2020	2025	2030	2035
Service Area Population(1)	75,384	77,285	79,984	82,718	85,323	87,811

Notes:
(1) Source: SCAG Population Projections by Census Tract (SCAG, 2007)

As shown in Table 2.1 and Figure 2.3, it is anticipated that LVMWD's service area population will grow by approximately 12,427 over the 25 years to around 87,811 in 2035. It should be noted that the population projections shown in this report are lower than population projections estimated in previous planning studies for LVMWD's service area. This reduction reflects the effect of the recent economic downturn as well as changes in land use planning. Also, historic population values and projected population values were generated using different methologies and data sets. For this reason, a slight discrepancy exists between the 2009 historical value and the future projections beginning in 2010.



Legend

- Preserved Natural Open Space
- Freeway
- Major Roads
- Las Virgenes Municipal Water District Boundary

0 5,000 10,000 20,000 Feet

FIGURE 2.2
Preserved Natural Open Space
Las Virgenes Municipal Water District
2010 Urban Water Management Plan

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Finally, while some of the 2010 census data recently became available, this new data does not contain information on several demographic factors, such as single family versus multi-family residents. Due to this lack of detail in the 2010 census data at this time, year 2000 census data was used to generate population estimates.

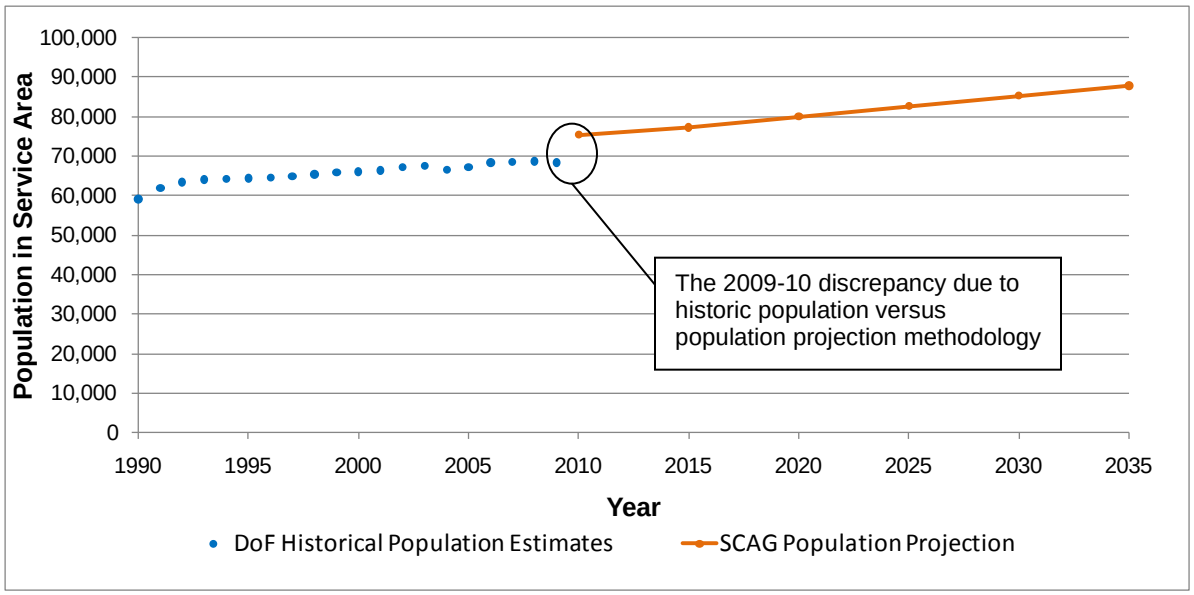


Figure 2.3 Historical and Projected Population

2.4 CLIMATE

LVMWD's service area climate is a semi-arid environment with mild winters, warm summers and moderate rainfall, consistent with coastal Southern California. The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or dry hot Santa Ana winds. The standard monthly average evapotranspiration (ETo) rates, rainfall, and temperature are summarized in Table 2.2.

Table 2.2 Climate Characteristics

Month	Standard Monthly Average ETo[1] (inches)	Monthly Average Rainfall[2] (inches)	Monthly Average Temperature[2] (°F)		
			Average	Minimum	Maximum
January	2.81	3.78	53.6	39.3	67.9
February	2.83	3.95	55.4	40.7	70.0
March	4.14	2.78	57.1	41.9	72.3
April	5.62	1.00	60.8	44.6	76.9
May	6.02	0.28	65.0	49.0	81.0
June	6.81	0.04	70.1	52.9	87.3
July	7.64	0.01	76.0	57.0	94.9
August	7.75	0.10	76.4	57.3	95.4
September	5.83	0.16	73.2	54.6	91.7
October	5.19	0.53	66.6	49.0	84.1
November	3.67	1.79	58.7	42.6	74.8
December	3.19	2.31	53.8	38.8	68.8
Annual	**61.50**	**16.83**	**63.9**	**47.3**	**80.4**

Notes:
(1) Source: California Irrigation Management Information System (CIMIS) Station 204 (CIMIS, 2010). Represents monthly average ETo from December 2006 to October 2010.
(2) Source: Western Regional Climate Center (WRCC) Station 041484 (WRCC, 2010). Represents monthly average data from July 1949 to December 2005.

As shown in Table 2.2, LVMWD's average monthly temperature ranges from about 54 to 76 degrees Fahrenheit (°F), with an annual average temperature of nearly 64°F. The daily extreme low and high temperatures have been measured to be 18°F and 116°F, respectively. ETo averages a total of 61.5 inches per year, while the average annual rainfall is nearly 17 inches. Records show that the monthly precipitation has been as high as 18 inches and as low as 0.0 inches. Most of the rainfall typically occurs during the period of November through April.

Chapter 3

WATER SUPPLY SOURCES

The UWMPA requires that the UWMP include a description of the agency's existing and future water supply sources for the next 20 years. The description of water supplies must include detailed information on groundwater supplies and the groundwater basin, potential opportunities for desalination of groundwater and seawater, and detailed information on the agency's imported water supplies.

3.1 OVERVIEW OF SUPPLIES AND DISTRIBUTION SYSTEMS

Located in the Santa Monica Mountains, LVMWD has very limited natural water resources and is currently limited to four sources: treated, potable water imported from Metropolitan Water District of Southern California (MWDSC), recycled water from the Tapia Water Recycling Facility (TWRF), groundwater from the Russell Valley Basin (which is only used to supplement the TWRF), and surface runoff into Las Virgenes Reservoir.

LVMWD has developed these water resources to provide increased water reliability and conservation. This approach has included aggressive use of recycled water, some use of groundwater to augment recycled water supplies, and reservoir storage of water during low demand periods for use during the peak demand periods. LVMWD has optimized these limited water resources to help supply the water demand for continued growth of the community.

LVMWD operates two water distribution systems, the potable water distribution system and the recycled water distribution system. Both systems are schematically presented in Figure 3.1. The following sections provide more details on each system, while very detailed information can be found in the *Integrated Water System Master Plan Update* and the *Recycled Water System Master Plan Update*, that were both prepared in 2007 by LVMWD.

3.1.1 Potable Water System

LVMWD's potable water distribution system includes 25 storage tanks, 24 pump stations, and about 339 miles of pipelines. LVMWD maintains 22 main pressure zones due to the mountainous topography of its service area. For billing purposes, the pressure zones are categorized into five pressure zone levels based on hydraulic grade line (HGL).

3.1.2 Recycled Water System

LVMWD's recycled water distribution system consists of 62 miles of pipelines, 3 storage tanks, 3 open reservoirs, and 4 pump stations. More details on LVMWD's recycled water system can be found in Chapter 4 of this UWMP.

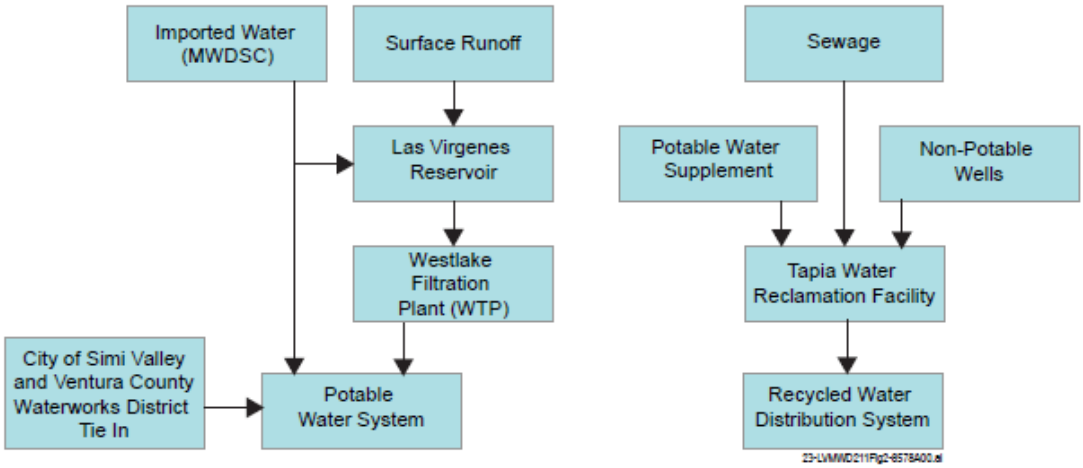


Figure 3.1 Existing Distribution System

3.1.3 Water Supply Sources Overview

LVMWD's potable water is provided almost entirely through wholesale purchases from MWDSC. The imported water supplied to LVMWD originates from the State Water Project (SWP). LVMWD receives imported water on its eastern side and then distributes it to its customers through its potable water distribution system.

Potable water enters LVMWD's potable water distribution system from four locations: three imported water connections from MWDSC and the treatment facility at the Las Virgenes Reservoir. There are other small connections with Ventura County Water Works District to provide supply at Woolsey Canyon and Upper Box Canyon. However, these connections account for less than one percent of LVMWD's potable water deliveries.

In addition to the imported water, which represents the bulk of LVMWD's supply, LVMWD has developed some additional local resources. The first of these is Las Virgenes Reservoir, a local water storage reservoir with 9,600 acre-foot (af) capacity. The reservoir provides seasonal balancing between supply and demands, and is supplied with imported water from MWDSC. In addition, surface runoff helps recharge the reservoir, typically offsetting evaporation losses.

The second local source is groundwater, which is used to supplement recycled water flows from TWRF. LVMWD has two groundwater wells that are used in this manner to supplement its recycled water system. Due to high levels of iron and manganese, groundwater pumped from these wells needs to be treated first. To avoid the need of a separate treatment facility, the pumped groundwater is discharged into the sewer collection system when additional recycled water is needed. After mixing and conveyance, this water is treated at the TWRF. After treatment at the TWRF, this local groundwater is used to supplement the recycled water system.

3.2 GROUNDWATER

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a) [to 20 years or as far as data is available]. If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

10631 (b) (1) A copy of any groundwater management plan adopted by the urban water supplier…

10631 (b) (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or board has adjudicated the rights to pump groundwater…For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted…

10631 (b) (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic records.

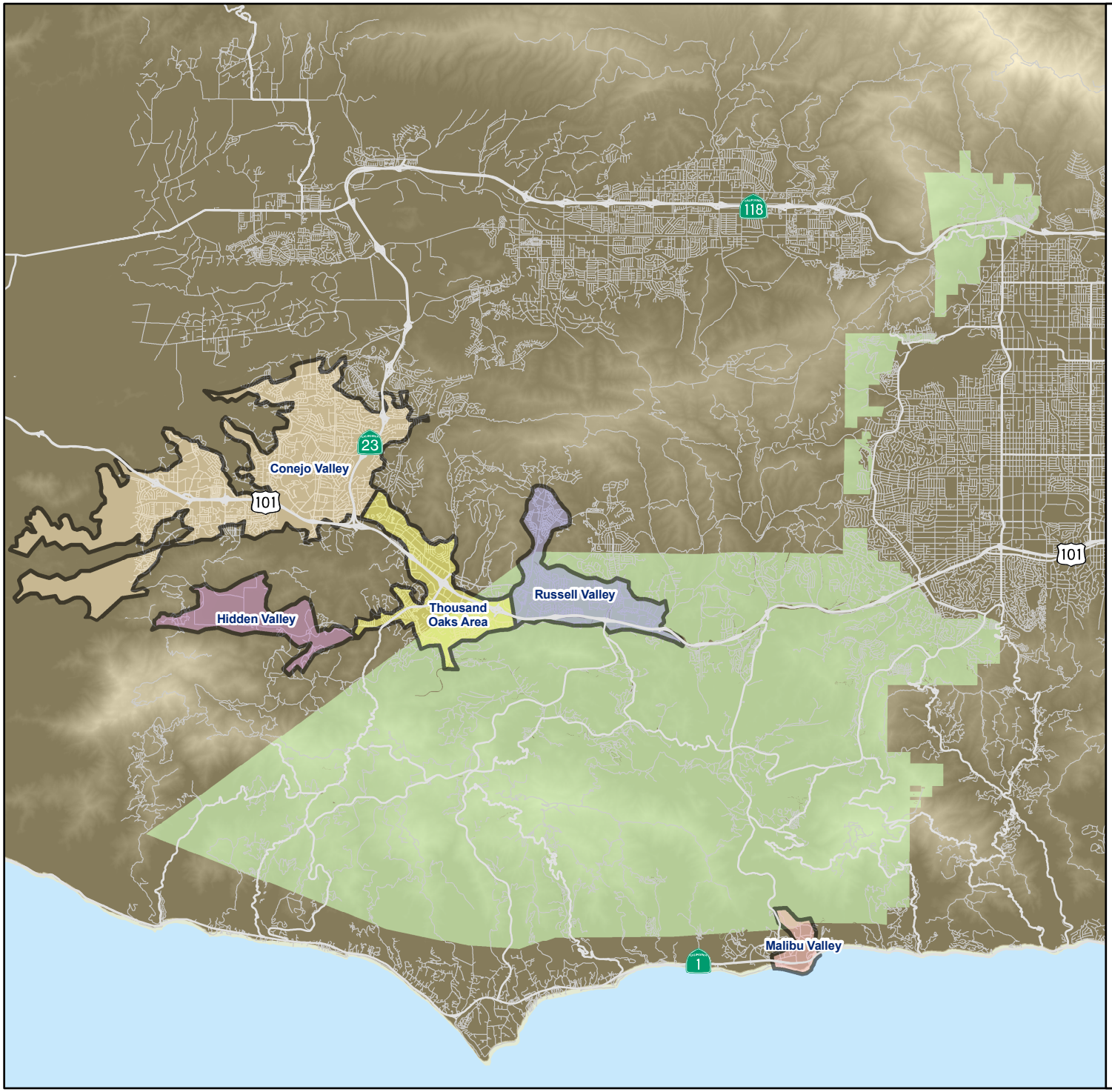
10631 (b) (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonable available, including, but not limited to, historic use records.

Groundwater underlying LVMWD's service area is of poor quality and is not currently used for the potable water supply system. However, it is used to augment supplies for the recycled water system. Currently, LVMWD operates two groundwater wells in the Russell Valley groundwater basin; Westlake Well 1 and Westlake Well 2. Both wells pump water from the Russell Valley groundwater basin with a maximum projected yield of 400 afy. The combined capacity of these two wells is approximately 1.15 mgd, or 800 gpm.

3.2.1 Groundwater Basin Description

The Russell Valley groundwater basin (Basin), shown on Figure 3.2, is a relatively small alluvial basin bounded by semi-permeable rocks of the Santa Monica Mountains. Triunfo Creek drains the valley into Malibu Creek. The Basin underlies a surface area of about 3,100 acres or five square miles.

Water bearing formations include Holocene age alluvium that averages about 35 to 55 feet thick and groundwater is unconfined. Recharge is predominantly from percolation of rainfall and from irrigation runoff. It is not known how much groundwater is currently in storage. It is estimated that the aquifer may have a total storage capacity of about 11,000 af (DWR, 2003).



Legend

Groundwater Basin

- Hidden Valley
- Conejo Valley
- Russell Valley
- Thousand Oaks Area
- Malibu Valley
- Freeway
- Major Roads
- Local Streets
- Las Virgenes Municipal Water District Boundary

N

0 5,000 10,000 20,000 Feet

FIGURE 3.2
Ground Water Basins
Las Virgenes Municipal Water District
2010 Urban Water Management Plan

LAS VIRGENES MUNICIPAL WATER DISTRICT

carollo Engineers...Working Wonders With Water™

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Another water bearing formation underlies the alluvium to great depths and is comprised of volcanic rocks and older Tertiary sedimentary rocks. This formation is called the Conejo Formation and can be as thick as 2,000 feet in some areas. The fractured volcanic rocks can have high porosity and produce well yields from 200 to 400 gpm. The two Westlake Wells are screened in this formation.

According to California's Groundwater Bulletin 118 (included in Appendix D), groundwater quality is generally sodium bicarbonate or calcium bicarbonate, but also may have areas with a calcium magnesium sulfate nature (DWR, 2003). Total dissolved solids (TDS) content usually ranges from 800 to 1,200 milligrams per liter (mg/l). TDS content may extend as high as 2,800 mg/l in some areas. Sulfate content averages 300 mg/l in most wells and is probably due to the volcanic basalt that constitutes the basement rock of the aquifer.

The California Department of Water Resources (DWR) has not identified the Russell Valley groundwater basin as adjudicated and is not in an overdraft condition (DWR, 2005). Therefore, there are no defined legal pumping rights for LVMWD.

3.2.2 Historical Groundwater Concerns

Groundwater levels in the basin have been lower in the past than they are currently. In the past and into the mid 1970's groundwater was being pumped by private and public users in larger quantities than currently. Once LVMWD improved the water supply systems in the service area and neighboring systems came on line, this allowed imported water to dominate local supply. These actions caused groundwater pumping to decline.

The California Water Plan Update, however, does state that groundwater overdraft is a challenge for the South Coast Hydrologic Region, which includes the Russell Valley groundwater basin.

3.2.3 Groundwater Pumping

The groundwater pumped by LVMWD from its two wells is used to supplement its recycled water system during peak demand season. Groundwater pumping is used only to supplement recycled water and is not a part of the supply of the potable water system.

The amount of groundwater pumped from the Basin through the Westlake Wells over the last five years is presented in Table 3.1.

Table 3.1 Historical Groundwater Pumped from Basin						
	Groundwater Used to Supplement Recycled Water System (afy)					
	2005	**2006**	**2007**	**2008**	**2009**	**2010**
Russell Valley	235	80	265	314	182	224

As shown in Table 3.1, annual use of the groundwater wells varies significantly since LVMWD only uses the wells to supplement recycled water supplies during periods of peak demands.

Projections of groundwater to be pumped from the Basin are presented in Table 3.2. These projections are based on the assumption that groundwater will be required to supplement wastewater flows for production of recycled water for two months out of each year.

Table 3.2 Groundwater Pumping Projections for Basin					
	Groundwater Used to Supplement Recycled Water System (afy)				
	2015	**2020**	**2025**	**2030**	**2035**
Russell Valley	216	216	216	216	216
Notes: Average pumping 2005 -2010 was 216 afy. Pumping expected to remain constant in the future					

As shown in Table 3.2, it is anticipated that the amount of groundwater obtained from the Basin will be relatively consistent. However, actual usage will vary significantly since LVMWD only uses the wells to supplement recycled water supplies during periods of peak demands.

3.3 LAS VIRGENES RESERVOIR

The Las Virgenes Reservoir is located just south of Westlake Village and is owned and operated by LVMWD. This reservoir, with a total capacity of 9,600 af, provides seasonal storage to balance differences between supply and demands. In low demand years LVMWD puts surplus water into the reservoir, while in high demand years LVMWD draws upon the reservoir to meet the increased demands. It also provides emergency storage capacity that can be used during an imported water outage. This reservoir is filled with imported water and is withdrawn and replenished as needed.

Water withdrawn from the reservoir is treated at the Westlake Filtration Plant. Filtration at the plant is accomplished through 10 filtration units containing diatomaceous earth filtration

media. The filtered water is then disinfected with chloramines. The plant is rated for 15 mgd and typically operates during periods of peak demand in the summer.

While the reservoir's watershed area does not supply a significant source of water in most years, it provides runoff sufficient to offset evaporative losses. In wet years, significant inventories can be realized. Based on an assumed watershed area of 550 acres, the watershed is estimated to receive about 770 af annually. Average evaporation losses are estimated at about 700 afy.

The total volume of the reservoir typically fluctuates by several hundred to more than 1,000 af each year. Since its creation, the reservoir has remained at a volume of approximately 7,300 af, but occasionally drops below 4,000 af during dry months, and reaches over 9,000 af when recharge water is purchased from MWDSC.

3.4 IMPORTED WATER

10631 (k). Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that indentifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same 5 year increments, and during various water year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan information requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

Imported water is LVMWD's primary water supply and supplies virtually all potable water demands. LVMWD's imported water supplier is MWDSC, which imports water from northern California through the SWP and the Colorado River to meet the needs of 26 member agencies across six Southern California counties. LVMWD is one of MWDSC's 26 member agencies.

Currently, the configuration of MWDSC's distribution system provides LVMWD solely with SWP water originating from northern California through the Sacramento-San Joaquin Bay-Delta. The SWP water is treated at Jensen Filtration Plant in Granada Hills prior to delivery to LVMWD.

The projected volumes to be imported from MWDSC are provided in Table 3.3. These projections are calculated based on the demand projections provided in Chapter 5. It should be noted these supply projections do not incorporate water conservation associated with the Water Conservation Act of 2009.

Table 3.3 Current and Projected Water Supply

Supply Source	Annual Supply (afy)					
	2010	2015	2020	2025	2030	2035
Wholesaler (MWDSC)	20,212	26,613	27,542	28,483	29,380	30,237
Total	**20,212**	**26,613**	**27,542**	**28,483**	**29,380**	**30,237**

Notes:
Supply shown is based on the demands projected in Chapter 5 without incorporating water conservation associated with the Water Conservation Act of 2009 discussed in Chapter 6. The calculations used for the demands are based on a per-capita demand of 307 gpcd and the population projections from Chapter 2.

As shown in Table 3.3, LVMWD's potable water demands are anticipated to be supplied entirely through imported water from MWDSC, increasing from 20,212 afy in 2010 to 30,237 afy in 2035.

As mentioned previously, LVMWD maintains three connections to the MWDSC system. The current and design capacities of each of these connections are listed in Table 3.4.

Table 3.4 Capacity of Imported Water Connections

Connection Name	MWD Pipeline Designation	Current Capacity (gpm / cfs)
LV1	West Valley Feeder No. 1	11,000 gpm (24 cfs)
LV2	Calabasas Feeder	20,000 gpm (45 cfs)
LV3	West Valley Feeder No. 2	2,000 gpm (4 cfs)
Total		**33,000 gpm (73 cfs)**

Notes:
(1) Source: 2007 Integrated Systems Master Plan (Boyle 2007a)

As shown in Table 3.4, LVMWD's total instantaneous imported water supply capacity is 33,000 gpm, or 73 cfs.

In addition to the imported water connections with MWDSC, LVMWD also receives approximately 150 afy of treated imported water from the City of Simi Valley and the Ventura County Waterworks District. Interconnections with these agencies provide potable water to two small areas in the hills west of the San Fernando Valley. These areas are geographically isolated, and not connected to the rest of the LVMWD distribution system, although LVMWD plans to connect these customers to the main potable water distribution system according to the 2005 UWMP (Psomas, 2005).

3.5 RECYCLED WATER

As of 2009, LVMWD currently supplied about 19 percent of its customers demands with recycled water. LVMWD supplies recycled water to its service area from the TWRF. With a total capacity of 16 MGD, recycled water from the TWRF is primarily used for landscape irrigation and is relied upon extensively during periods of peak seasonal demands. The recycled water system will be discussed in more detail in Chapter 4.

3.6 DESALINATED WATER

Opportunities for future desalinated water supplies are discussed at the end of Chapter 7.

Chapter 4

RECYCLED WATER

This chapter includes information on water recycling and its potential for use as a water source for the Las Virgenes Municipal Water District (LVWMD) in accordance with the Urban Water Management Planning Act (UWMPA).

UWMPA:

> *10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:*
>
> *10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.*
>
> *10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.*
>
> *10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse determination with regard to the technical and economic feasibility of serving those uses, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.*
>
> *10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.*
>
> *10633 (e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.*
>
> *10633 (f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems and to promote recirculating uses.*

4.1 COLLECTION AND TREATMENT SYSTEMS

The Tapia Water Reclamation Facility (TWRF) is operated jointly by the Las Virgenes – Triunfo Joint Powers Authority (JPA), a JPA formed between the LVMWD and Triunfo Sanitation District (TSD) in 1964. TWRF was initially constructed in 1965 with an initial capacity of 0.5 mgd. The plant is located on Malibu Canyon Road at the southern edge of LVMWD's wastewater service area, as shown on Figure 4.1, and provides primary, secondary, and tertiary treatment for wastewater contributed by both LVMWD and TSD from their respective service areas.

The current design treatment capacity of TWRF is 16 million gallons per day (mgd) but it is undergoing planned modifications which are expected to reduce its rated capacity to an average of 12 mgd. The modifications are necessary to improve the nutrient removal

capabilities of the plant. Currently, the plant produces about 9.5 mgd during the summer, without supplement from the Westlake wells.

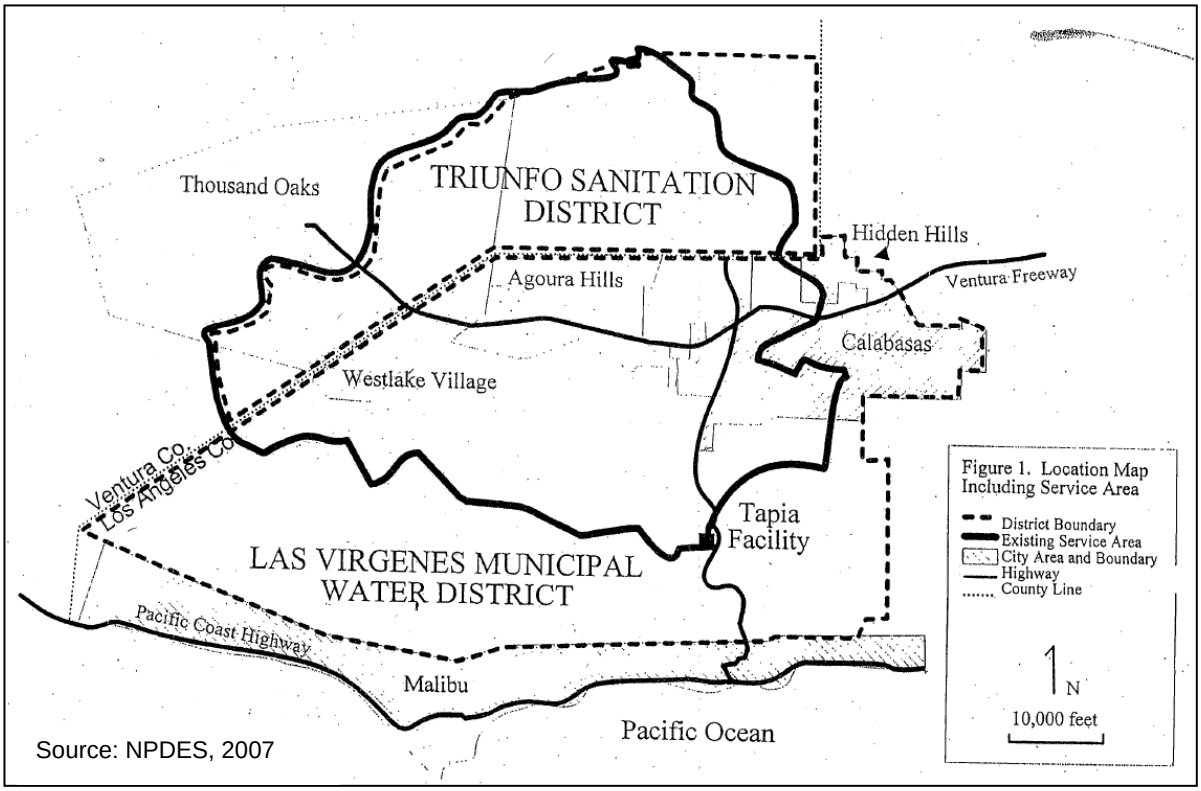

Figure 4.1 Tapia WRF Tributary Area

The average daily flows to TWRF are fairly constant, but do show some seasonal variation. Maximum dry weather flow is 10.3 mgd, while minimum dry weather flow is 9.0 mgd, with an average of about 9.5 mgd. During storm events the daily flows into the TWRF can double due to inflow and infiltration into the sewer mains. Since TWRF supplies recycled water to both TSD and LVMWD, wastewater flows from LVMWD only comprise a portion of the total influent to TWRF.

Table 4.1 presents the current and projected wastewater collected from LVMWD's service area along with the current and projected annual recycled water supplies to LVMWD's recycled water distribution system.

Table 4.1 Wastewater Collection and Treatment

Type of Wastewater	Projected Annual Flow (afy)					
	2010	2015	2020	2025	2030	2035
Wastewater Collected and Treated in Service Area(1)	6,721	7,141	7,561	7,981	8,401	8,821
Volume that Meets Recycled Water Standard(2)	6,721	7,141	7,561	7,981	8,401	8,821

Notes:
(1) Flow projections for 2010 and 2030 based on ERU growth projections from 2007 Recycled Water Master Plan (RWMP) (Boyle, 2007b). Remaining years were linearly interpolated as the 2007 RWMP did not phase intermediate years.
(2) This table assumes that all of the wastewater entering the facility will be receive tertiary treatment. Since the recycled water uses are irrigation in nature and subject to seasonal peaking, not all of the annual flows are used in the recycled water system.

The projections of wastewater flow shown in Table 4.1 are derived from the 2007 RWMP (Boyle, 2007b), which provided wastewater flow projections for 2010 and 2035. During periods of low irrigation demand discharge outside the recycled water distribution system is necessary.

Historically, excess wastewater was discharged into Malibu Creek. After the Los Angeles Regional Water Quality Control Board (RWQCB) issued National Pollutant Discharge Elimination System (NPDES) order number R4-1997-0136 and several related amendments, TWRF can no longer discharge recycled water into Malibu Creek during the months of April through November (LARWQCB, 1997).

The wastewater collection system includes the capability of discharging to the City of Los Angeles Department of Public Works' sewer system through an interconnection. This capability is not planned to be used on a regular basis. Further information on these flows was not available for this report.

Table 4.2 lists current and projected disposal flows for each of the discharge bodies discussed above.

Table 4.2 Disposal of Non-Recycled Wastewater

Method of Disposal	Treatment Level	Annual Discharge Flow (afy)					
		2010	2015(2)	2020(2)	2025(2)	2030(2)	2035(2)
Discharge to Malibu Creek	Tertiary	3,410	3,410	3,410	3,410	3,410	3,410
Discharge to LA Sewer(3)	Raw	-	-	-	-	-	-
Land Spraying	Tertiary	280	280	280	280	280	280
Discharge to LA River Basin	Tertiary	429	429	429	429	429	429
Total(1)		**4,119**	**4,119**	**4,119**	**4,119**	**4,119**	**4,119**

Notes:
(1) Values provided by LVMWD
(2) Projected values held at 2010 volumes
(3) While LVMWD can divert to LA Sewer prior to treatment, discharge to City of Los Angeles sewers is not anticipated for future disposal of non-recycled wastewater. Information on flows to City of Los Angeles sewers not available.
(4)The volumes being disposed of include water from all of TSD service area

During periods of peak demands, wastewater flows are not sufficient to meet recycled water demands. LVMWD supplements its recycled water with two sources - groundwater from the Westlake Wells and potable water. Supplementing with potable water is possible at three locations in the recycled water system, listed as follows:

- Cordillera Tank (1,200 gpm capacity)
- Reservoir 2 (about 2,100 gpm capacity)
- Morrison Tank (about 1,000 gpm capacity)

The amount of supplemental imported water is on average about 150 afy. In addition, the amount of groundwater from the Westlake Wells is on average about 240 afy (Psomas, 2005).

4.2 CURRENT RECYCLED WATER USES

Since TWRF began supplying recycled water in 1972, LVMWD has aggressively pursued the development of a recycled water market. By requiring all non-residential landscaping located along the district's recycled water distribution main lines to be designed or converted to utilize recycled water for landscape irrigation, LVMWD now serves 605 of the 863 dedicated irrigation accounts within their service area with recycled water. TSD also serves recycled water from the TWRF to Calleguas Municipal Water District.

Recycled water use within LVMWD's service area is predominately for landscape irrigation. While the RWQCB has permitted TWRF tertiary treated water for spray landscape irrigation, agriculture, and industrial uses, recycled water uses by LVMWD's customers are almost exclusively for landscape irrigation due to limited industrial and agriculture water use within LVMWD's service area.

Table 4.3 summarizes current recycled water usage by use type (solely landscape irrigation) and presents a comparison between the projected use in the 2005 UWMP and the actual recycled water use.

Table 4.3 2005 UWMP Projected 2010 Recycled Water Use Compared to 2010

User Type	Treatment Level	Projected[(1)] 2010 RW Demand (afy)	Actual RW Demand FY2009/10 (afy)
Landscape	Tertiary	5,260	4,522
Total		**5,260**	**4,522**

Notes:

1) Source: 2005 UWMP (Psomas, 2005)

As shown in Table 4.3, LVMWD supplied 4,522 afy of recycled water in Fiscal Year 2009 – 2010 (FY2009/10), less than the projected recycled water in the 2005 UWMP of 5,260 afy. It should be noted that recycled water use in FY2007/08 and FY2008/09 were 5,696 afy and 5,429 afy, suggesting that the reduced usage seen in FY2009/10 may be due to the recent economic downturn and residual effects of water conservation efforts in 2009 and 2010 (customers may be more water conscious, even when irrigating with recycled water).

Over the last 38 years, the amount of recycled water demand has generally increased, although the increase has not been steady or uniform. Maps from the 2007 RWMP (Boyle, 2007b) showing LVMWD's existing distribution system are included in Appendix H.

4.3 POTENTIAL USES AND PROJECTED DEMAND

LVMWD service area is nearly build out; none of the individual cities served by LVWMD's are anticipating large developments in the future. The smaller sized developments that are expected to be built in the next few decades are anticipated to lack major recycled water customers, such as schools and parks. In order for demands to keep up with any potential increases in supply, therefore, LVMWD will need to make a concerted effort to maximize the use of recycled water whenever new developments occur or large customers sign up for service. The conversion of estate-sized residential customers to recycled water user may also be needed, though it should be noted that this will need to be closely coordinated with the California Department of Public Health's (DPH).

Shown in Table 4.4 are the projected demands broken down by use type, as determined by an analysis of billing records in LVMWD (Boyle, 2007b).

Table 4.4 Recycled Water Uses – Actual and Potential

User Type	Treatment Level	Projected Recycled Water Demand (afy)					
		2010	2015	2020	2025	2030	2035
Landscape	Tertiary	4,522	4,878	6,185	7,493	8,800	9,062
Total		**4,522**	**4,878**	**6,185**	**7,493**	**8,800**	**9,062**

Notes:
(1) Customer demands based on a percentage breakdown of Recycled Water Demands by customer (Boyle, 2007b)
(2) The RW demand values shown exceed the flow values in Table 4.1 because the volumes shown above include well water supplementation, and Table 4.1 does not includes the TSD service area which does not overlap LVMWD

As shown in Table 4.4, landscape irrigation demands are anticipated to increase from the current demands of 4,522 afy to 9,062 afy. When compared to the wastewater projections in Table 4.1, annual wastewater flows are anticipated to be insufficient to meet recycled water demands by 2030.

Maps showing potential users identified in the 2007 RWMP (Boyle, 2007b) are included in Appendix H.

4.4 INCENTIVES AND PLANNING

In the 1980s and 1990s, the recycled water system was viewed as a means of utilizing a valuable resource, the effluent from the TWRF. The recycled water system is no longer just a means of using a resource, but is also viewed as a means of meeting changing regulatory NPDES discharge requirements. An order by the Los Angeles RWQCB requires LVMWD to stop discharging recycled water into Malibu Creek from April 15th through November 15th. This order is the culmination of increasing restrictions over the years and has far ranging implications on how LVMWD might design and operate its recycled water system, which in turn affects the way its potable water system will be operated.

As LVMWD sewer flows increase, a larger amount of recycled water will need to be used to avoid discharges to Malibu Creek during the prohibition period. These increases should be combined with further efforts to encourage and expand recycled water use, primarily by upgrading the supply and transmission system. Design or construction of many projects is already underway. There are also some facilities in the system that should be replaced, modified, or refurbished for other reasons. These facilities were identified and reviewed in the 2007 RWMP (Boyle, 2007b).

To further incentivize recycled water usage, MWDSC has implemented a variety of conservation programs throughout its member agencies. In terms of incentivizing recycled

water, MWDSC periodically surveys its member agencies for planned projects to coordinate local supply projections and plans. Changes in long-term strategies, regulations, funding priorities, and new opportunities contribute to changing outcomes. To date, MWDSC has invested $244 million in recycling programs and $102 million for groundwater recovery through its member agencies.

Plans for further expansion and optimization of LVMWD's recycled water system were developed as a part of the 2007 RWMP (Boyle, 2007b). As noted in the RWMP, LVMWD's opportunities for expansion of the recycled water system are limited by the wastewater flow projections for its service area. As discussed previously, LVMWD currently must supplement the recycled water system with potable water during peak demand periods.

Expanding the use of recycled water for demands that do not peak seasonally, such as dual-plumbing systems and recirculation systems would allow more year-round usage of recycled water. LVMWD's customer base, lacking significant industrial or commercial office customers, preclude extensive use of recycled water for these types of demands.

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Chapter 5

WATER DEMANDS

5.1 GENERAL

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) identify the quantity of water supplied to the agency's customers including a breakdown by user classification.

UWMPA:

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the- following uses:
>
> (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.
>
> (2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

5.2 PAST, CURRENT, AND PROJECTED WATER USE

This section describes the historical, current, and projected water use through year 2035. It also describes the types of customer accounts in LVMWD and the breakdown of accounts throughout the system.

5.2.1 Customer Accounts

As of 2009, LVMWD maintains approximately 20,380 water meters. LVMWD classified these meters into the following categories: 18,734 residential, 792 commercial, and 854 industrial (LVMWD, 2010d). This account breakdown shows that more than 90 percent of the accounts are classified as residential, while the remaining billing classification represent less than ten percent of LVMWD's accounts. The average number of accounts from Fiscal Year 2007 – 2008 (FY2007/08), FY2008/09, and FY2009/10 is shown in Figure 5.1. The data Figure 5.1 is based on is included in Table 5.3.

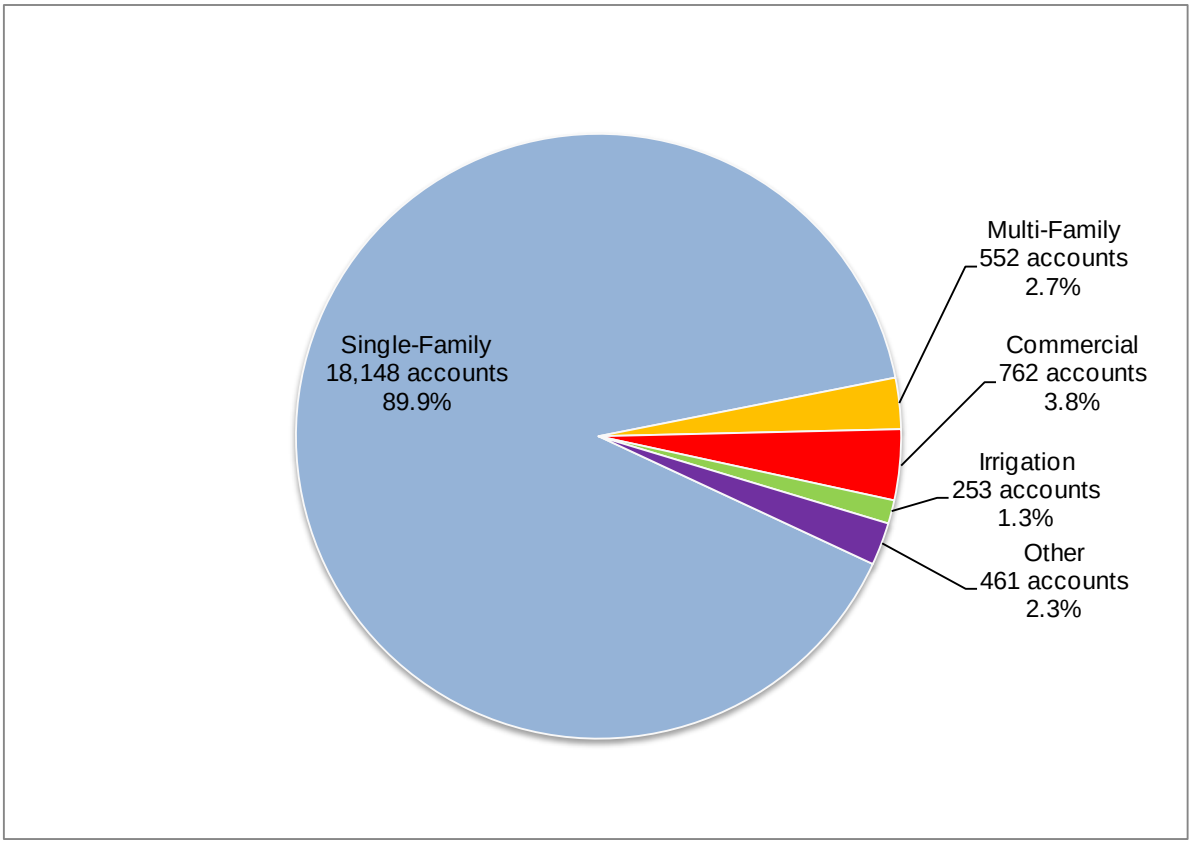

Figure 5.1 – Breakdown of Accounts by Account Type

As shown in Figure 5.1, residential accounts compose the majority of the accounts, with single family composing 90 percent and multi-family composing 3 percent of total account distribution. Commercial represents 4 percent, while irrigation and other account for 1 percent and 2 percent respectively. These percentages were used to project the number of accounts by type shown in Table 5.3. The total number of accounts for each projected year was determined by using the average account-to-demand ratio for the same fiscal year period. This average ratio was applied to the water demand for all projected years, followed by using the account type breakdown listed above to divide the total number of accounts into account types.

Residential water demands account for over 85 percent of the total system demand, while commercial, industrial, and institutional uses combined comprise only 8 percent of total usage.

5.2.2 Historical Water Use

The historical water use since 1990 is listed in Table 5.1 and shown in Figure 5.2. Population is included for the same time period, estimated based on calculations from the number of service connections installed each year.

Table 5.1 Historical Water Use

Year	Potable Water Demand (afy)	Population[1]	Per Capita Consumption (gpcd)
1990	20,653	59,154	312
1991	17,580	62,014	253
1992	16,518	63,398	233
1993	17,278	64,045	241
1994	20,174	64,228	280
1995	19,026	64,438	264
1996	20,133	64,637	278
1997	20,919	64,885	288
1998	18,734	65,349	256
1999	22,046	65,896	299
2000	22,020	66,076	298
2001	20,923	66,404	281
2002	23,646	67,299	314
2003	22,147	67,457	293
2004	23,790	66,612	319
2005	22,654	67,279	301
2006	23,334	68,319	305
2007	26,006	68,606	338
2008	25,154	68,654	327
2009	20,212	68,382	264
Average	**21,147**	**65,657**	**287**

Notes:

(1) Historic population estimates were calculated from the number of service connections installed each year between 1990 and 2010. A benchmark of the year 2010 was used based on census data (USCB, 2000).

As shown in Figure 5.2, the historical water use has varied substantially from year-to-year, with a general increasing trend through 2007. Water demands have dropped in the most recent years, most likely due to a combination of factors such as absence of hot summers, the economic downturn, and water conservation efforts by LVMWD.

Another observation that can be made from Figure 5.1 is LVMWD's potable water demand varied more than the total population in the period 1990-2009. As a matter of fact, the historical demands in this period varied between 16,518 afy (1992) and 26,006 afy (2007), which is a 45 percent variation around the average water use of 21,147 afy, while the population only varied 15 percent in the same period. This difference is reflected in the variation in per-capita water demand as listed in Table 5.1.

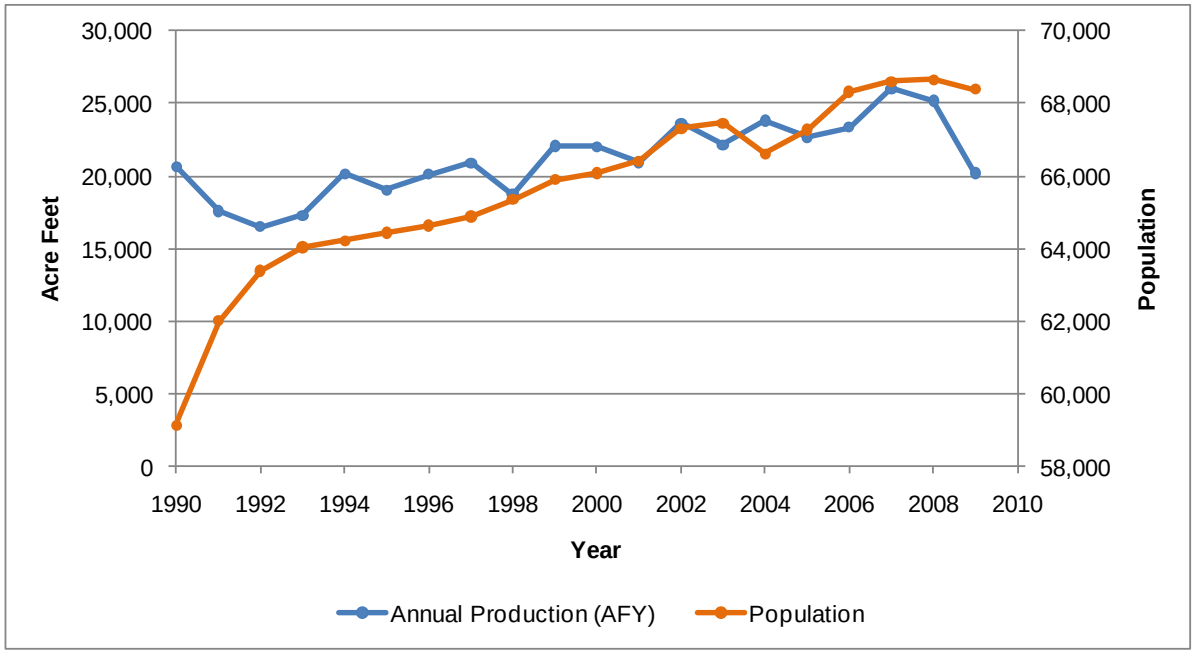

Figure 5.2 – Production and Population Over Time

5.2.3 Current Water Use

In 2009, LVMWD supplied 20,212 afy, which is equivalent to 18 million gallons per day (mgd). With a population of approximately 68,000, this water use equates to an average per capita consumption of 264 gallons per capita per day (gpcd).

While the water demand and population data in Table 5.1 show growth occurring within LVMWD, of equal importance is the per capita consumption within the region. The per capita consumption is an indication of an average amount of water consumed per person per day for a calendar year.

The historical per capita consumption rate was used in combination with the population projections from SCAG (see Chapter 2) to estimate LVMWD's future water demands. These demand requirements were then used to evaluate the adequacy of existing supply sources. This is the same method used in LVMWD's 2007 Integrated Water System Report.

As shown in Table 5.1 and Figure 5.2, the population estimates show considerable growth in 1990 and 1991 while water demand declined in the same year. This decline in water demand is associated with the multiple year drought in 1990 through 1992. Based on discussions with LVMWD staff, LVMWD placed a moratorium on new connections around this time due to concerns with the 1990 through 1992 drought. As a result, a significant number of new service connections were installed prior to the date the moratorium went into effect. Thus, the effect seen in significant population growth is not a representation of actual growth in population, but rather an effect of the calculation methodology that uses

the number installed service connections in those years. It should be noted that the number of active service connections is not available this far back and therefore the number of installed connections was used.

Overall, the population and water demand for LVMWD have both grown steadily since 1990, although growth has tapered slightly in the most recent years. This contrasts with LVMWD's per capita consumption, which has fluctuated continuously for the entire 20 year period. This fluctuation indicates that, while growth within the region has been consistent, average yearly water consumption for each person living in the LVMWD service area has varied.

Figure 5.2 further illustrates the long term behavior of population and water demand within LVMWD. It is important to note the interrelation between the two curves, and also how recent trends suggest a possible reduction in growth, but not necessarily per capita consumption.

5.2.4 Projected Water Use

Based on the future trends in population obtained from the Southern California Association of Governments (SCAG) and established per capita water consumption rates, LVMWD's future water requirements are estimated and summarized in Table 5.2 and Figure 5.3. The per capita water consumption rates are determined by establishing consumption targets to meet future water conservation requirements throughout the state.

Table 5.2 Demand Projections

Year	Demand (afy)	Population[(1)]	Per Capita Consumption (gpcd)
2010	25,958	75,384	307
2015	23,951	77,285	277
2020	22,034	79,984	246
2025	22,787	82,718	246
2030	23,504	85,323	246
2035	24,190	87,811	246

Notes:
(1) Population Projections from Table 2.2.

Total projected demand is anticipated to undergo a gradual decrease until the year 2020, and then resume increasing in a manner similar to the last 20 years. This demand projection is based on per capita consumption rates which have been specifically calculated to satisfy the water conservation targets laid out in the Water Conservation Act of 2009. Put simply, the listed per capita consumption values will allow LVMWD to realize a 20 percent reduction in water use in the 2020 based on historic trends. More details regarding the per capita consumption rates presented in Table 5.2 can be found in Chapter 6.

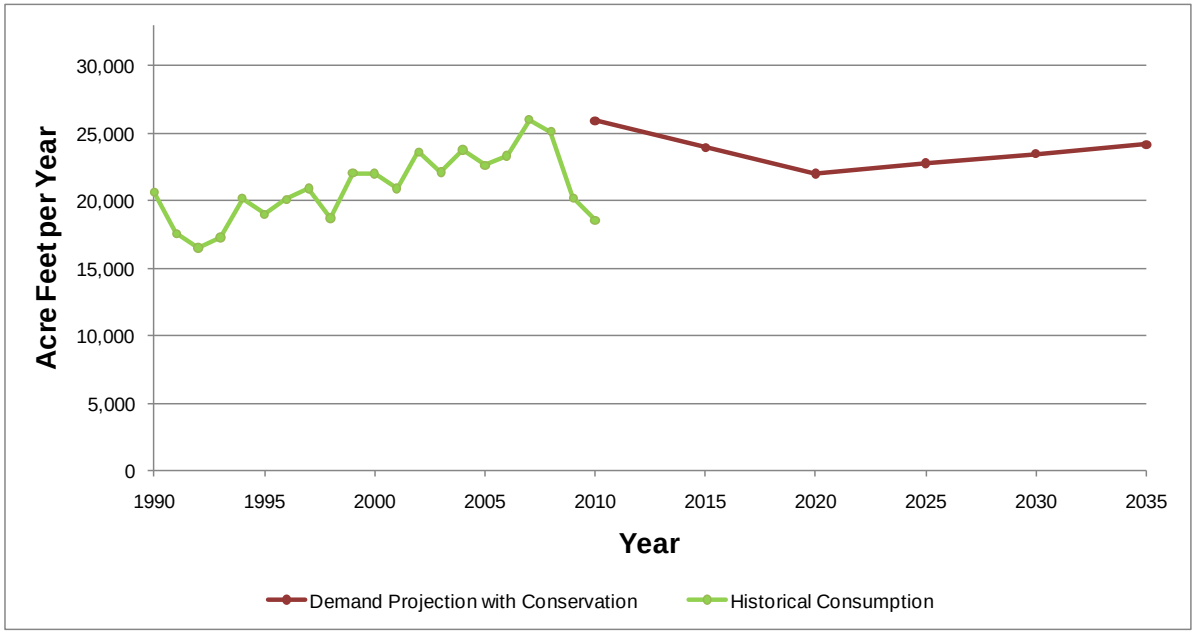

Figure 5.3 – Past, Current, and Projected Water Use

Another key assumption underlying future LVMWD demand values is the 2010 starting point for the projection. The year 2009 saw a dramatic decrease in volume of water consumed by both the region as a whole, as well as in per capita rates. Demand continued to decrease to the 2010 value of 18,591 af, shown in Figure 5.4 as the lower of the two 2010 values. The demand projections were derived from the population projections presented in Chapter 2 and the per-capita consumption targets listed in Table 5.2 and further explained in Chapter 6 under “Method 1”. The historic water demand for 2010 shown in Figure 5.5 is different from the 2010 projection primarily due to water conservation requirements imposed by MWDSC for the year 2010. In response to MWDSC’s stage two water allocation, LVMWD took steps to reduce demand to 18,591 af, 2% below the allocation.

Based on discussions with district staff it was decided to use the maximum 10-year average per-capita water use (307 gpcd) rather than the 2009 water consumption (264 gpcd) as a basis for future demand projections, which were calculated by multiplying the projected populations by the per-capita water use. This is consistent with the water conservation target development as described in detail in Chapter 6. Based on the per capita consumption value of 307 gpcd, the total 2010 consumption was estimated at approximately 26,000 af.

5.3 WATER USAGE BY CLASSIFICATION

The current and projected water deliveries by sector are summarized in Table 5.3 along with those for 2005. As shown, LVWMD does not have any unmetered accounts and is planning to continue installing meters for all future accounts.

The 2007 AWWA Standard Water Balance and Audit study revealed that the district has an overall water loss factor of 4% (WSO, 2007). This is relatively low compared to the 5-10% water loss typically observed in most agencies.

LVWMD does not wholesale water to other agencies.

Table 5.3 Water Demand Projections by Use Type

Use	2005		2010		2015		2020	
	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)
SFR	18,695	17,253	21,421	19,769	21,742	18,241	21,819	16,780
MFR	568	1,327	651	1,521	661	1,403	663	1,291
Comm.	785	2,194	900	2,514	913	2,319	917	2,134
Irrigation	261	873	299	1,000	303	923	304	849
Other	475	101	544	116	552	107	554	99
System Losses(2)		906		1,038		958		881
Total	**20,784**	**22,654**	**23,815**	**25,958**	**21,974**	**23,951**	**20,215**	**22,034**

Notes:

(1) Account numbers are based on total water usage for each projected year. Number of accounts and account type breakdown based on percentage of account types installed since 1990.

(2) Based on 4 percent water loss for all planning years.

Table 5.3 Water Demand Projections by Use Type (Continued)

Use	2025		2030		2035	
	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)	No. of accounts(1)	Demand (afy)
SFR	22,565	17,354	23,276	17,900	23,955	18,422
MFR	686	1,335	708	1,377	728	1,417
Comm.	948	2,207	978	2,276	1,006	2,342
Irrigation	315	878	324	905	334	932
Other	573	102	591	105	608	108
System Losses(2)		911		940		968
Total	**20,906**	**22,787**	**21,564**	**23,504**	**22,193**	**24,190**

Notes: (see above)

5.4 EXPANSION PROJECTS

The UWMPA requires that the UWMP identify the major developments within the agency's service area that would require water supply planning.

UWMPA:

> *10910. (a) Any city or county that determines that a project, as defined in section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.*
>
> *10912. For the purpose of this part, the following terms have the following meanings:*
>
> *10912 (a) "Project" means any of the following:*
> *(1) A proposed residential development of more than 500 dwelling units.*
> *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
> *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
> *(4) A proposed hotel or motel, or both, having more than 500 rooms.*
> *(5) A proposed industrial, manufacturing or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*
> *(6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
> *(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.*

Although there is planned redevelopment within LVMWD including single-family residences, commercial centers, and motels, LVMWD does not currently have any planned expansion projects, as defined in Water Code Section (WCS) 10912 of the UWMPA.

Development anticipated by LVMWD is shown in Figure 5.6. The future development consists of 4 categories: residential (single-family), residential (multi-family), commercial, and mixed use. During discussions with the planning departments of Agoura Hills, Calabasas, Hidden Hills, and Westlake Village, the four cities LVMWD serves, it was indicated that no proposed developments qualified as planned expansion projects as defined in WCS 10912 of the UWMPA.

Although LVMWD has seen significant large tract development in the past, the type of projects planned for the future are anticipated to be relatively small in scale. This is largely in part due to the expansive network of preserved natural open space that runs throughout the LVMWD service area (Figure 2.2). Because this land is not planned for development, many of the projects slated for development within LVMWD's service area are of a small scale.

5.5 LOW INCOME HOUSING

The UWMPA requires that the UWMP identify low income housing developments within the agency's service area and develop demand projections for those units.

> 10631.1(a). The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier

The City of Calabasas and Hidden Hills both provide information on Regional Housing Needs Allocation Progress (RHNA) in their general plans. This element of the update contains plans to construct a total of 236 low income housing units in the future.

Assuming 236 dwelling units maintain the service area average of 3.4 people per dwelling unit, the future projected per capita water usage of 246 gpcd would result in a total of 221 afy of low income housing water consumption.

Table 5.4 Low Income Projected Water Demands

City	Low Income Dwelling Units	Future Demand(1) (afy)
Agoura Hills(2)	-	-
Westlake Village(3)	-	-
Calabasas	232	209
Hidden Hills	4	12
Total	**236**	**221**

Notes:
(1) No timeline for completion is given in either general plan
(2) RHNA housing data was not included in the Agoura Hills General Plan
(3) Westlake Village General Plan was not available

As shown in Table 5.4, water demands for planned low income housing units are 221 afy. The general plans for Hidden Hills and the City of Calabasas do not provide information on single family versus multi-family low income dwelling units, so the total average number of people per dwelling unit (3.4) for all of LVMWD was used. The 236 low income dwelling units also does not include planned projects for Westlake Village or Agoura Hills.

Legend

by Development Land Use Type

- Commerical
- Residential (Multi-Family)
- Mixed Use
- Residential (Single Family)
- Freeway
- Major Roads
- Local Streets
- Las Virgenes Municipal Water District Boundary

N

0 5,000 10,000 20,000 Feet

FIGURE 5.4
Anticipated Future Development
Las Virgenes Municipal Water District
2010 Urban Water Management Plan

LAS VIRGENES MUNICIPAL WATER DISTRICT

carollo Engineers...Working Wonders With Water™

DATE: 2/24/2011 FILENAME: c:\pw_working\projectwise\lwang\d0126074\Figure5.2.mxd

5.6 DEMAND PROJECTION WITH WATER CONSERVATION

The projected water demands with and without the water conservation are listed in Table 5.5 and are graphically depicted in Figure 5.7. As explained above, while actual 2010 usage was 18,591 af, the year 2010 demand projections are simply based on a per-capita consumption of 307 gpcd.

Table 5.5 Demand Projections

Year	SCAG Population[(1)]	Water Demand without Conservation (afy)	Water Demand with Conservation (afy)
2010	75,384	25,958	25,958
2015	77,285	26,613	23,951
2020	79,984	27,542	22,034
2025	82,718	28,483	22,787
2030	85,323	29,380	23,504
2035	87,811	30,237	24,190

Notes:
(2) Population Projections from Table 2.2.

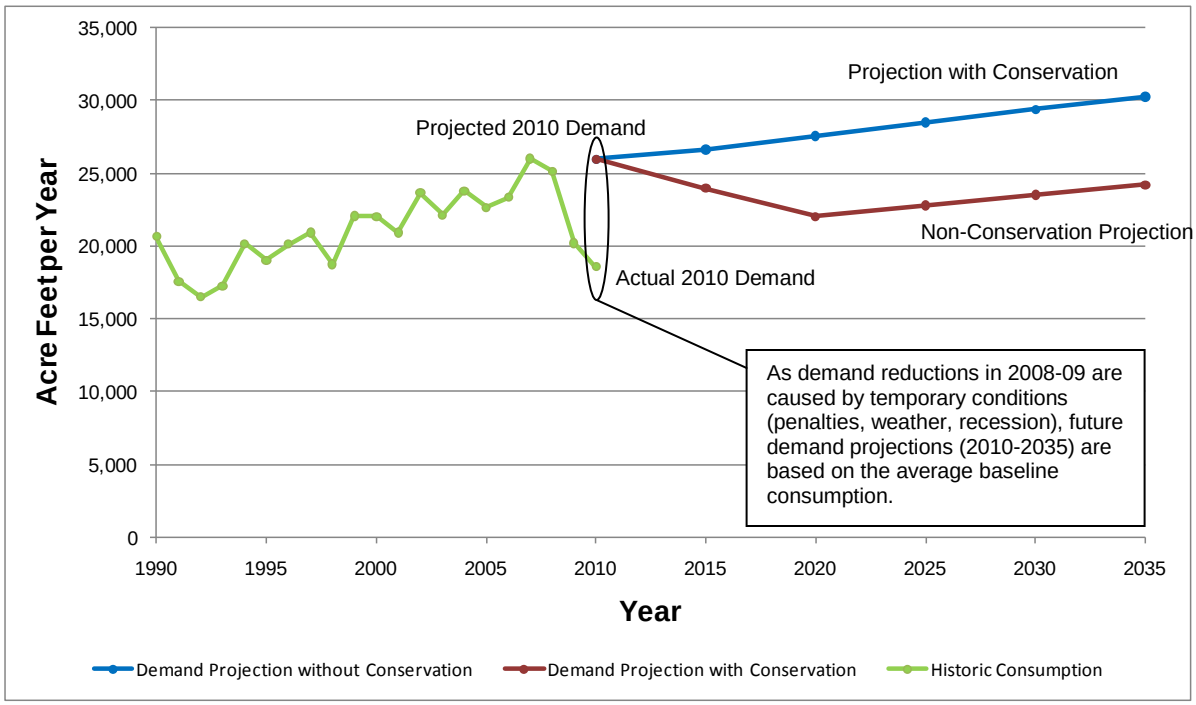

Figure 5.7 Projected Water Demands with and without Conservation

As shown in Figure 5.7, the water conservation requirements of the Water Conservation Act of 2009 reduce the projected water demand for year 2020 from 27,542 afy to 22,034 afy, a decrease of 5,508 af.

Chapter 6

WATER CONSERVATION

6.1 INTRODUCTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) address the requirements of the Water Conservation Act of 2009.

> *10608.20 (e) An urban retail water supplier shall include in its urban water management plan due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data*

6.2 WATER CONSERVATION TARGET METHODS

Senate Bill x7-7, also known as the Water Conservation Act of 2009 (SBx7-7), is the new law governing water conservation in California that was enacted November 2009. This law requires that all water suppliers increase water use efficiency with the overall goal to decrease per-capita consumption within the state by 20 percent. The bill requires that the Department of Water Resources (DWR) develop certain criteria, methods, and standard reporting forms through a public process that can be used by water suppliers to establish their baseline water use and determine their water conservation goals. The DWR provided four different methods to establish water conservation targets. These four methods can be summarized as follows:

- **Method 1 – Baseline Reduction Method.** The 2020 water conservation target of this method is defined as a 20 percent reduction of average per-capita demand during a 10-year continuous baseline period that should end between 2004 and 2010.
- **Method 2 – Efficiency Standard Method.** The 2020 water conservation target of this method is based on calculating efficiency standards for indoor use separately from outdoor use for residential sectors and an overall reduction of 10 percent for commercial, industrial, and institutional (CII) sectors. The aggregated total of the efficiency standards in each area is then used to create a conservation target.
- **Method 3 – Hydrologic Region Method.** This method uses the ten regional urban water use targets for the state. Based on the water supplier's location within one of these regions, a static water use conservation target for both 2015 and 2020 is assigned.
- **Method 4 – BMP based Method.** This method uses previous Best Management Practices (BMP) of a supplier in order to establish a conservation target for 2020.

Depending on how aggressively the water supplier has pursued water reduction and conservation in the past, a new conservation target for 2020 will be assigned.

The actual water conservation targets derived for the Las Virgenes Municipal Water District (LVMWD) are described for each method in the following paragraphs. This section is concluded with a recommended method that has been used to adjust the projected water demands with the minimum water conservation requirement per SBx7-7. The demand projections with water conservation are used for the water reliability calculations under normal, dry, and multiple dry year conditions are presented in Chapter 7.

6.2.1 Method 1

Method 1 establishes a baseline water per-capita consumption based on historical population and historical demands. Any 10-year consecutive period between 1995 and 2010 can be selected to establish the baseline per-capita demand for the water supplier using the average per-capita consumption from that 10-year period. If an agency uses 10 percent or more recycled water in year 2008, the baseline value can also be determined with a 15-year consecutive period between 1990 and 2010. LVWMD does serve recycled water that accounted for 18 percent of the total deliveries in 2008. As this exceeds the minimum of 10 percent, the baseline period can be extended from 10 to 15 years in length and end between 2004 and 2010.

Table 6.1 Base Period Ranges

Base	Parameter	Value	Units
Water Deliveries	2008 total water deliveries	30,302	af
	2008 total volume of delivered recycled water	5,450	af
	2008 recycled water as a percent of total deliveries	18%	%
10-year Base Period	Number of years in base period	10	years
	Year beginning base period range	1999	
	Year ending base period range	2008	
5-year Base Period	Number of years in base period	5	years
	Year beginning base period range	2004	
	Year ending base period range	2008	

Under Method 1, the baseline value is then reduced by twenty percent to determine the year 2020 conservation target. The intermediate target for year 2015 is the mid-point value between the baseline and year 2010 target values.

In addition to the 10-year baseline period, a 5-year period needs to be selected in any year ending no earlier than 2007 to determine the minimum required reduction in water use. The selected 10-year and 5-year base period ranges are summarized in Table 6.1.

Table 6.1 shows the characteristics of the 10 and 5 year period selected as the baselines for LVMWD in meeting the Water Conservation Act of 2009.

The historical water consumption for the period 1995 through 2010 is shown in Figure 6.1, This figure also depicts the minimum, average, and maximum 10-year baseline values. As shown, the 10-year period with the highest baseline consumption starts in 1999 and ends in 2008.

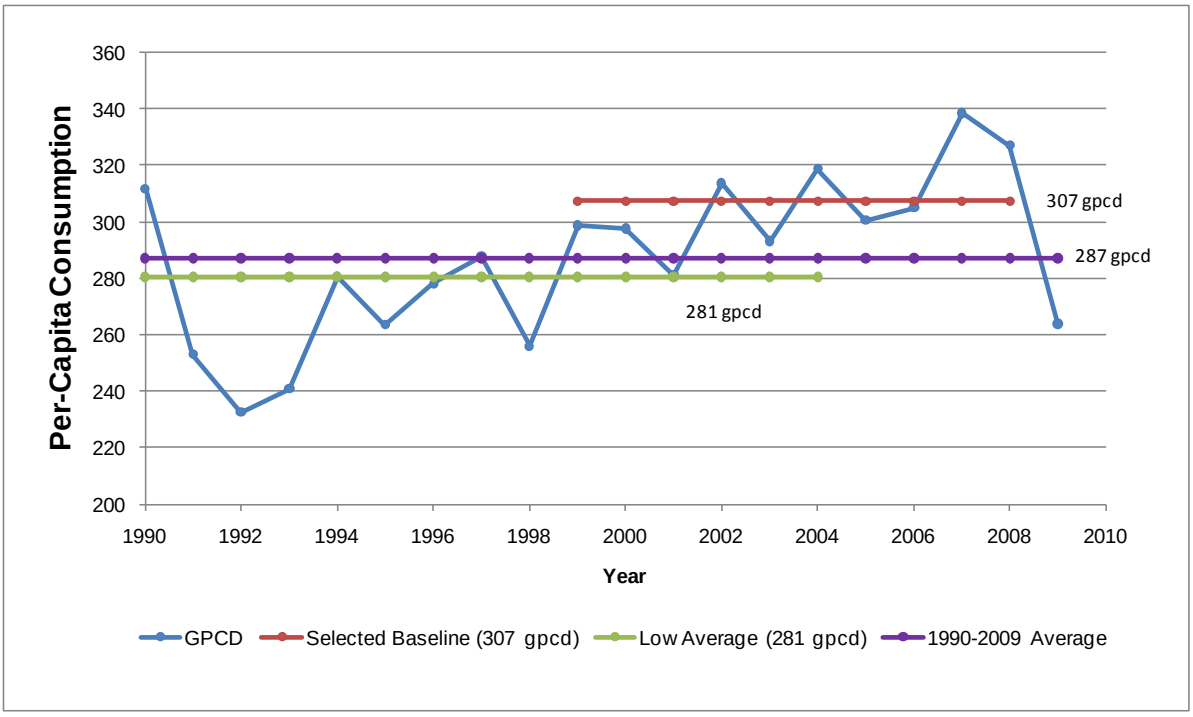

Figure 6.1 Historical Per-Capita Consumption

The population, total consumption, and the per-capita consumption of the 10-year baseline period is shown in Table 6.2. As shown, the average per-capita consumption during this period was 307 gpcd. Based on twenty percent reduction from this baseline period, the LVMWD's 2020 conservation target will be 246 gpcd.

Table 6.2 Base Daily Per Capita Water Use – 10-15 Year Range

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	**Calendar Year**			
Year 1	1999	65,896	19.7	299
Year 2	2000	66,076	19.7	298
Year 3	2001	66,404	18.7	281
Year 4	2002	67,299	21.1	314
Year 5	2003	67,457	19.8	293
Year 6	2004	66,612	21.2	319
Year 7	2005	67,279	20.2	301
Year 8	2006	68,319	20.8	305
Year 9	2007	68,606	23.2	338
Year 10	2008	68,654	22.5	327
Average	**n/a**	**67,260**	**20.7**	**307**

Table 6.3 shows the population, total volume of consumption, and the per-capita consumption of the five year baseline period. The five year baseline value is used to determine the minimum required reduction in water use of 318 gpcd by 2020.

Table 6.3 Base Daily Per Capita Water Use – 5 Year Range

Base Period Year		Distribution System Population	Daily System Gross Water Use (mgd)	Annual Daily Per Capita Water Use (gpcd)
Sequence Year	**Calendar Year**			
Year 1	2004	66,612	21.2	319
Year 2	2005	67,279	20.2	301
Year 3	2006	68,319	20.8	305
Year 4	2007	68,606	23.2	338
Year 5	2008	68,654	22.5	327
Average	**n/a**	**67,894**	**21.6**	**318**

As shown in Table 6.3, the average consumption in the period 2004-2008 was 318 gpcd. The minimum per-capita consumption for year 2020 is defined as 95 percent of this value, reflecting a minimum water conservation of five percent. This equates to a minimum water conservation target of 302 gpcd. As the water conservation target from the 10-year baseline period (246 gpcd) is lower than the minimum water conservation target (302 gpcd), LVMWD's water conservation targets using Method 1 are as follows:

- Year 2015 Target: 277 gpcd (10% reduction)
- Year 2020 Target: 246 gpcd (20% reduction)

6.2.2 Method 2

Method 2 uses performance standards for both indoor and outdoor usage to establish the supplier's 2020 water conservation target. Method 2 consists of a series of four steps and utilizes actual water use data and estimates from the water supplier. First, the method assumes a standard statewide indoor use target of 55 gpcd. Then, the landscaped area for the supplier's entire service area is determined. Commercial, institutional, and industrial water use is accounted for separately using historical billing data. The performance standards for outdoor landscape irrigation, based on acreage, and commercial, institution, and industrial use, based on demands, are then applied to those totals. Finally, the performance standards for all three sectors are added together to determine the Method 3 2020 conservation target.

Although initially investigated during preparation of this report, there is insufficient data to calculate Method 2 for LVMWD. LVMWD's available GIS data showing hardscape and buildings does not account for the natural, un-irrigated landscape which is a significant part of LVMWD's service area. Without this data being accounted for, calculating Method 2 is infeasible. Additional methods of calculating the irrigated landscape were investigated. The most promising of these was using aerial photography. However, the effort associated with field survey calibration requirements for using aerial-photography precluded this as a viable option for LVMWD.

6.2.3 Method 3

The State's 20 by 2020 water conservation plan has identified specific urban water use targets for 2015 and 2020 for each of the ten hydrologic regions shown in Figure 6.2. LVMWD falls in Hydrologic Region 4 (South Coast) which has a target use of 142 gpcd for year 2020.

LVMWD's water conservation targets using Method 3 are as follows:

- Year 2015 Target: 225 gpcd (27% reduction)
- Year 2020 Target: 142 gpcd (54% reduction)

6.2.4 Method 4

Method 4 uses the supplier's BMP reports as a guide to set the 2020 conservation target. The intent behind Method 4 is to use the BMP reports to account for what water conserving measures the supplier has already taken in order to set a more accurate and realistic target for the future and take into consideration the supplier's previous water conservation efforts.

Provisional Method 4

Method 4 is based on LVMWD's BMP efforts and has been released as a provisional method, subject to later revisions during the 2015 UWMP cycle.

The methodology for the provisional method relies on the base daily per capita use in 2000 and reduction in the three urban use sectors:

- Residential indoor;
- Commercial, industrial, and institutional (CII); and

- Landscape use and water loss.

A discussion of each of these components, and the calculated savings in each of these sectors is included below.

Residential Indoor Savings

Since indoor and outdoor water use is delivered through a single meter, an assumption of 70 gpcd has been provided by DWR for standard residential indoor water use.

To determine indoor residential savings, Method 4 outlines two methodologies. First, a (BMP) calculator has been developed to sum the savings for four conservation elements including single and multi-family residential housing toilets, residential washers, and showerheads. Due to insufficient data on the water savings associated with these measures, LVMWD will use what has been termed the “default option” to determine these savings. Based on the draft provisional method, this default value is 15 gpcd.

Commercial, Industrial, and Institutional Savings

Baseline CII water can be easily established for LVMWD since all commercial, industrial, and institutional connections were metered in 2000. The calculated baseline for CII use (over the same 1999 through 2008 period) was 25.8 gpcd.

The provisional method estimates a default value for CII savings of 10 percent of the per capita CII demand. The CII water savings are therefore 2.6 gpcd.

Landscape and Water Loss Savings

The landscape and water loss water use is determined by subtracting the default indoor water use of 70 gpcd and CII water use of 25.8 gpcd from the calculated baseline per capita use of 307. Based on calculated baseline per capita water use, the landscape and water loss use is 212 gpcd.

The draft provisional method estimates a default value for landscape and water loss savings of 21.6 percent. The landscape and water loss savings are therefore 45.7 gpcd.

Metered Savings

Since all connections within LVMWD are currently metered, no water savings are associated with metering unmetered accounts.

Summary

Based on the steps above, the total water savings is estimated at 63 gpcd. When compared with the baseline demand of 307 gpcd, this would result in a water conservation target of 244 gpcd. A summary of baseline water use by sector and individual savings calculated using Method 4 is included in Table 6.5.

Table 6.4 Method 4 Target Determination Summary

Baseline Water Use (gpcd)				Water Savings (gpcd)				
Residential Indoor(1)	CII(2)	Landscape/ Water Loss	Total	Residential /Indoor(3)	CII(4)	Landscape Water	Metered	Total
70	25.8	211.6	307	-15.0	-2.6	-45.7	0.0	244

Notes:
(1) Assumed value based on guidelines in provisional Method 4.
(2) Source: BMP data.
(3) Default savings based on guidelines in provisional Method 4.
(4) CII water savings of 10 percent based on guidelines in provisional Method 4.
(5) Landscape and water loss savings of 21.6 percent based on guidelines in provisional Method 4.

6.2.5 Recommended Method

The water conservation targets per method as developed with data provided by LVMWD are summarized in Table 6.5. As shown, Method 1 results in the most feasible 2015 and 2020 conservation targets and will allow LVMWD the greatest freedom in reaching these goals.

Table 6.5 Conservation Method Overview

	Conservation Target (gpcd)		Reduction by 2020 (%)	
Supply Source	Year 2015	Year 2020	From Baseline(1)	From 2009 Usage(2)
Method 1	277	246	20%	7%
Method 2	n/a	n/a	n/a	n/a
Method 3	225	142	54%	46%
Method 4	276	244	20%	7%

Notes:
1) Baseline consumption is 307 gpcd
2) 2009 consumption is 264 gpcd

Based on an evaluation of each method as described above and discussions with LVMWD staff, it was decided to use Method 1 for the 2010 UWMP. The following section discusses the various best management practices (BMPs) that are available for LVMWD to achieve this reduction in water use.

6.3 BEST MANAGEMENT PRACTICES

In 1991, a Memorandum of Understanding (MOU) regarding urban water conservation in California formed the California Urban Water Conservation Council (CUWCC). Council

members can submit their most recent BMP Report with their UWMP to address the urban water conservation issues in the Urban Water Management Planning Act (UWMPA).

As a member of the CUWCC and signatory of its MOU, LVWMD realizes the importance of the BMPs to ensure a reliable future water supply. LVMWD is committed to implementing water conservation and water recycling programs to maximize sustainability in meeting future water needs for its customers.

LVMWD's previous Urban Water Management Plan (2005) provided information regarding LVMWD's conservation measures already in place and those that would improve the efficiency of water use within LVMWD. This chapter addresses the following requirements of the UWMPA.

> *10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:*
>
> *(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:*
>
> *(A) Water survey programs for single-family residential and multifamily residential customers.*
>
> *(B) Residential plumbing retrofit.*
>
> *(C) System water audits, leak detection, and repair.*
>
> *(D) Metering with commodity rates for all new connections and retrofit of existing connections.*
>
> *(E) Large landscape conservation programs and incentives.*
>
> *(F) High-efficiency washing machine rebate programs.*
>
> *(G) Public information programs.*
>
> *(H) School education programs.*
>
> *(I) Conservation programs for commercial, industrial, and institutional accounts.*
>
> *(J) Wholesale agency programs.*
>
> *(K) Conservation pricing.*
>
> *(L) Water conservation coordinator.*
>
> *(M) Water waste prohibitions.*
>
> *(N) Residential ultra-low-flush toilet replacement programs.*

The current implementation status of the LVMWD's BMPs is summarized in Table 6.6. As shown, LVMWD implements of all of the BMPs. A more detailed description of each BMP is provided in the following paragraphs.

Table 6.6 Demand Management Measures

Demand Management Measure	Implemented	Planned for Implementation	Not Applicable
BMP 1 - Water Survey Programs	✓		
BMP 2 - Residential Plumbing Retrofit	✓		
BMP 3 - Water System Audits	✓		
BMP 4 - Metering with Commodity Rates	✓		
BMP 5 - Landscape Irrigation Programs	✓		
BMP 6 - Washing Machine Rebate Program	✓		
BMP 7 - Public Information Program	✓		
BMP 8 - School Education Program	✓		
BMP 9 - Commercial, Industrial, and Institutional Conservation Programs	✓		
BMP 10 - Wholesale Agency Programs			✓
BMP 11 - Conservation Pricing	✓		
BMP 12 - Water Conservation Coordinator	✓		
BMP 13 - Water Waste Prohibition	✓		
BMP 14 - Ultra Low Flush Toilet Replacement	✓		

6.3.1 BMP 1 - WATER SURVEY PROGRAMS FOR SINGLE-FAMILY RESIDENTIAL AND MULTI-FAMILY RESIDENTIAL CUSTOMERS

LVMWD offers water audits to residential customers. Audits include reviewing water usage history with the customer, identifying leaks inside and outside the home, and recommending improvements. As an incentive LVMWD provides free low-flow showerheads and may consider offering kitchen/bathroom shut-off nozzles in the future.

6.3.2 BMP 2 - RESIDENTIAL PLUMBING RETROFIT

Several studies suggest that water use savings resulting from miscellaneous interior retrofit fixtures can range between 25 and 65 gpd per housing unit. The studies also suggest that installation of retrofit fixtures in older single-family homes tend to produce more savings, while newer multi-family homes tend to produce fewer saving per housing unit.

Using this data, one would estimate current water savings within LVMWD at approximately 515 afy from single family conservation, and 38 afy from multi family conservation, yielding a total of 553 afy for BMP 2. If LVMWD were to increase single family account saturation to 50%, further water conservation could be achieved. Retrofitting an additional 3,600 single

family accounts would likely decrease use by approximately 265 afy, or 5 percent of the 5,508 af reduction in 2020.

6.3.3 BMP 3 - SYSTEM WATER AUDITS

A water audit is a process of accounting for water use throughout a water system to quantify the unaccounted-for water. Unaccounted-for water is the difference between metered production and metered usage on a system-wide basis. LVMWD utilizes visual inspection of distribution routes and aerial surveys of 8 miles of pipeline traversing rugged terrain to detect leaks.

Based on a 2007 AWWA Standard Water Balance and Audit study, the water losses (or unmetered water deliveries) within LVMWD's distribution system were estimated at 4 percent. This quantity is at the low end of the typical water loss spectrum, usually 5-10 percent, therefore this program does not provide opportunities to substantially decrease the per-capita water use.

6.3.4 BMP 4 - METERING WITH COMMODITY RATES

This BMP requires water meters for all new connections and billing by volume of use, as well as establishment of a program for retrofitting any existing unmetered connections.

Currently, all connections within LVMWD's service area are metered and customers are billed according to the amount of water used. As LVMWD continues to install meters at all its new connections, this program will not provide foreseeable water conservation opportunities for the district.

6.3.5 BMP 5 - LARGE LANDSCAPE CONSERVATION PROGRAMS

This BMP calls for agencies to start assigning reference evapotranspiration (ETo) -based water budgets to accounts with dedicated irrigation meters and to provide water-use audits to accounts with mixed-use meters.

Based on 2010 agency data, LVMWD currently has approximately 300 accounts with dedicated irrigation meters served by potable water. These accounts have a combined annual water demand of 1,215 afy, which equates to an average water use of 4 afy per landscape customer. Assuming that these landscape customers could save 25 percent of their water use, or 1 afy, through more efficient watering techniques and ET_o sensors, LVMWD could potentially save 150 afy by implementing landscape conservation programs with 50% of landscaping customers. This would be 3 percent of the 5,508 af reduction needed in 2020.

6.3.6 BMP 6 - HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAM

This program generally provides financial incentives (rebate offers) to qualifying customers who install high-efficiency washing machines in their homes.

LVMWD offers rebates for high-efficiency clothes washing machine (HECW) which are purchased and installed within the region. These machines typically use 15 to 25 gallons less water per load than typical washers, with savings of up to 7,000 gallons per year (assuming 1 load per day).

Assuming that approximately 50 percent of the single-family residential customers in LVMWD do not currently own HECWs, LVMWD could potentially add over 10,000 HECWs. At an average of 1 load per day and 20 gallons of water savings per load, this program could potentially add 7,300 gallons per year of water savings per customer. With 50 percent saturation of the single family sector, this would result in over 225 afy of conservation, or 4 percent of the 5,508 af reduction in 2020.

LVMWD needs to consider if the current rebate amount will be adequate to attract customers given economic conditions.

6.3.7 BMP 7 - PUBLIC INFORMATION PROGRAMS

This program consists of distributing information to the public through a variety of methods including brochures, radio, television, school presentations and videos, and websites.

LVMWD maintains an intensive outreach commitment to customers regarding water conservation benefits and practices. LVMWD engages in numerous public information programs, including ongoing tours of district facilities, specialized tours provided to leadership from local cities and local environmental groups and their volunteers, newsletter ads, portions of the Water Quality Report, web information, presence at events, and presentations to local groups. Further efforts include water awareness month, books and resources provided to local libraries, and presentations scheduled at local council meetings, all of which are carried on public access television. The District continues point of purchase advertising in conjunction with the rebate program for high efficiency washers.

6.3.8 BMP 8 - SCHOOL EDUCATION PROGRAM

This BMP requires water suppliers to implement a school education program that includes providing educational materials and instructional assistance.

In 2008, LVMWD reached over 7,000 students, grades Kindergarten though High School.

6.3.9 BMP 9 - CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL ACCOUNTS

LVMWD should continue programs such as artificial turn replacement, smart irrigation timers, and industrial process water use reductions. Currently, LVMWD has approximately 900 CII accounts. Assuming that LVMWD has the potential to implement 10 new CII programs by year 2020 and that each program would, on average, 5 afy per program, the total savings of the CII program could be around 50 afy, which is about 1 percent of the 5,508 afy water conservation goal for year 2020.

6.3.10 BMP 10 - WHOLESALE AGENCY PROGRAMS

This BMP applies to wholesale agencies and defines a wholesaler's role in terms of financial, technical, and programmatic assistance to its retail agencies implementing BMPs.

LVMWD is not a wholesale agency, so this BMP does not apply.

6.3.11 BMP 11 - CONSERVATION PRICING

LVMWD has an increasing block rate that charges an increasing volumetric rate for increasing consumption. The rate structure consists of the following three separate charges:

- Water Capacity Charge, which is a fixed rate depending on the meter size and is charged whether or not you use any water.
- Commodity Charge, which is the only tiered charge and dependent on your water usage as shown in Table 6.7.
- Elevation Charge, which cover the additional costs of infrastructure and power to pump water to higher locations, billing differs by zone, with customers at higher elevations paying higher costs per unit of water

LVMWD addresses this in the wastewater enterprise as well. For commercial accounts, there is an additional treatment charge for wastewater treatment if water usage is above a certain amount. For single family residential accounts, there is a discount if water usage is below the lifeline allowance of 16 units per billing period.

In July 2009, LVMWD implemented lotsize based water budgets in response to the water shortage. Customers paid a surcharge if they exceeded rates. These surcharges were intended to cover penalties if LVMWD exceeded its allocation from MWDSC.

Table 6.7 Zone 1Tiered Water Rate Structure

Commodity Charge[(1)]	Units of Water Consumed (HCF)	Price per Unit ($/HCF)
Tier I	0-16	$1.66
Tier II	17-67	$2.01
Tier III	68-200	$2.85
Tier IV	200+	$4.13

Notes:
(1) Applies to Residential Customers only
(2) Information available on LVMWD website

6.3.12 BMP 12 - WATER CONSERVATION COORDINATOR

The Water Conservation and Reuse Supervisor is responsible for coordinating LVMWD's water conservation program and providing residents with useful water conservation information. This position is held by Scott W. Harris.

6.3.13 BMP 13 - WATER WASTE PROHIBITION

Ordinance 01-09-254 (see Appendix E) prohibits consumers from wasting or misusing water. LVMWD may discontinue service if repeated violations occur.

Violators of the water conservation prohibitions will be penalized. Further details on prohibitions and penalties are explored in Chapter 8, the Water Shortage Contingency Plan.

6.3.14 BMP 14 - RESIDENTIAL ULTRA-LOW-FLUSH TOILET REPLACEMENT PROGRAMS

State legislation requires the installation of efficient plumbing in new construction and, effective in 1994, requires that only ultra low flow toilets (ULFTs) be sold in California.

There have been over 12,184 ULFTs installed through this program in LVMWD since the program began. Assuming 3 people per household, 5 flushes per person per day, and 1 gallon savings per flush, this has resulted in a water savings of approximately 205 afy.

Over time this program combined with the natural replacement of toilets with ULFTs could increase LVMWD's water savings substantially. Upon reaching a theoretical residential market saturation of 50%, LVMWD would save approximately 185 afy which is about 3 percent of the 5,508 afy water conservation goal for year 2020.

6.4 WATER CONSERVATION IMPLEMENTATION PLAN

The BMP's currently implemented by LVMWD have been effective in reducing water consumption, but further efforts will need to be made to reach the 2020 water conservation target. LVMWD's historic per-capita and future projections are shown in Figure 6.3.

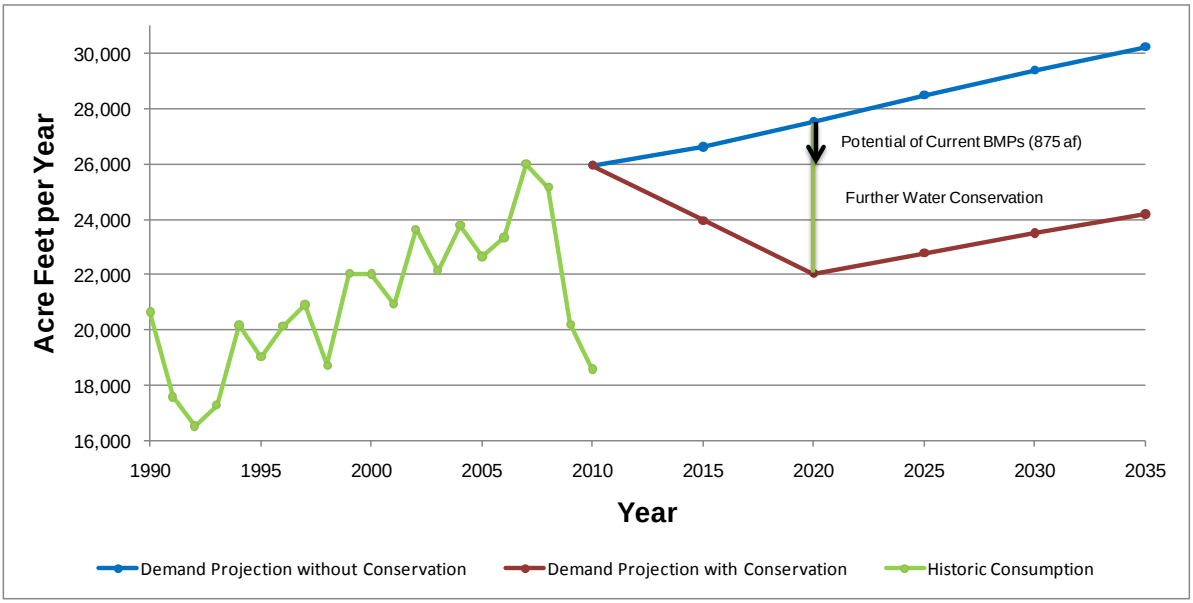

Figure 6.3 Projected Water Demands with and without Conservation

The conservation and non-conservation projections diverge rapidly after 2010, revealing the conservation that LVMWD will need to account for by year 2020. As discussed in Chapter 5, two values are shown for 2010, the lower of which is the historic value while the other was generated using the demand projection methodology.

The potential effect of current BMP programs in 2020 is shown in Figure 6.3. This value, 875 af, is listed as potential because it is based on the assumption that currently implemented BMPs will continue to be practiced and will have an affect on LVMWD water consumption. It also assumes that rebates will attract customers to retrofit water appliances and devices during an economic slump. A breakdown of the potential water conservation amounts by BMP as described in the previous sections is graphically presented in Figure 6.4.

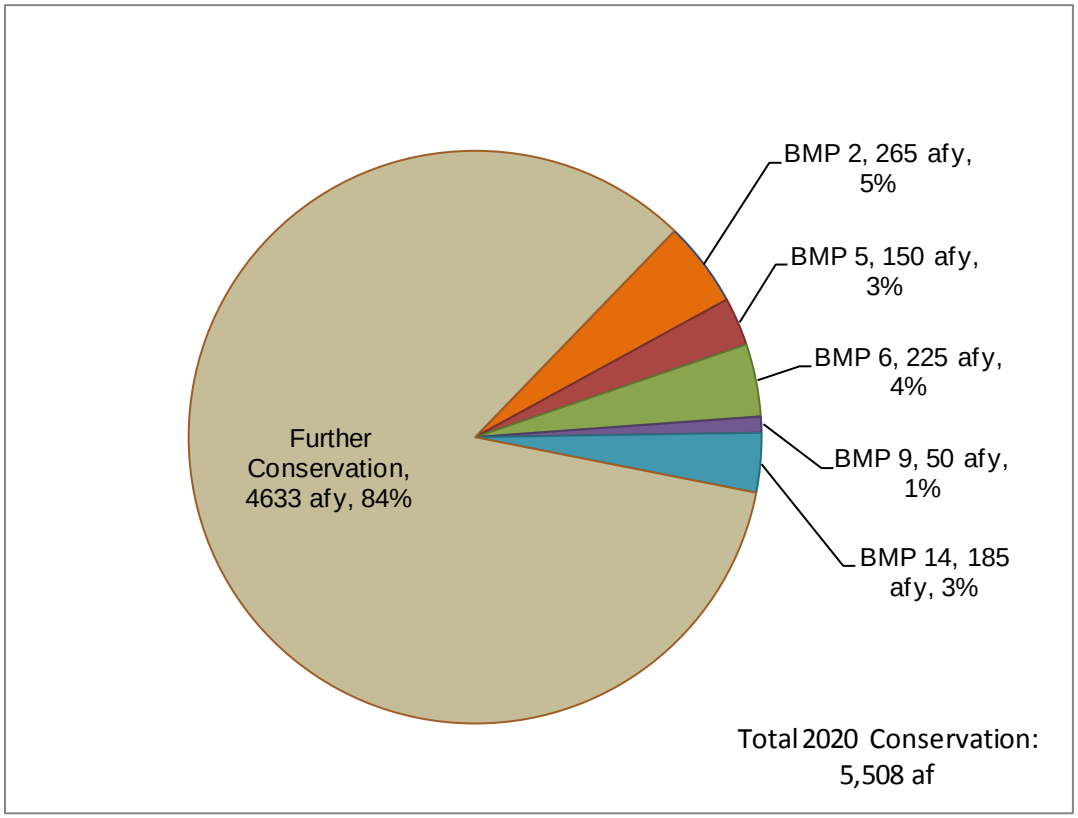

Figure 6.4 Water Conservation Methods

As shown in Figure 6.4, the current BMP programs will only account for 875 af of the 5,508 afy of conservation needed to reach the 22,034 af target in 2020, which equates to about 16 percent of the total water conservation goal. This figure, however, only accounts for 5 of the 13 BMP's (discounting BMP 10) which LVMWD can use to reduce water consumption. BMP's such as school education, water surveying and other such methods remain viable strategies to reduce consumption by an additional 4,633 af.

To achieve the necessary amount of water conservation, LVMWD should prioritize its efforts towards expanding its large scale BMP programs to result in large conservation gains. Continued support of residential retrofits is also essential because of LVMWD's largely residential customer base. Finally, although some BMP's do not result in quantifiable conservation, school and public education programs will provide much needed support as LVMWD strives to meet its 2020 conservation target.

LVMWD should continue its efforts to evaluate program target reductions of outdoor water use such as artificial turf replacement, re-landscaping with drought tolerant plants, and focused water surveys for large lots with landscaping. Finally, LVMWD needs to evaluate its water rates to further encourage conservations. For example, other agencies have adapted different winter versus summer rates or set water budgets that charge for excessive or wasteful use.

Chapter 7

WATER SUPPLY RELIABILITY

7.1 INTRODUCTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) address the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. The UWMPA also requires that the UWMP include information on the quality of water supplies and how this affects management strategies and supply reliability. In addition, an analysis must be included to address supply availability in a single dry year and in multiple dry years. The relevant sections of the UWMPA are presented below.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.*
>
> *10631 (c) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.*
>
> *10631 (c) Provide data for each of the following: (1) An average water year, (2) A single dry water year, (3) Multiple dry water years.*
>
> *10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:*
>
> *10632 (b) An estimate of the minimum water supply available during each of the next three-water years based on the driest three-year historic sequence for the agency's water supply.*
>
> *10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631 and the manner in which water quality affects management strategies and supply reliability.*

This chapter addresses these UWMPA requirements as follows. First, the reliability of the Las Virgenes Municipal Water District's (LVMWD) water supply sources is described. Secondly, planned and potential future supply projects and programs that would impact overall supply availability and reliability are discussed. Subsequently, factors impacting inconsistencies of supply are described. And this chapter is concluded with a comparison of supply and demand under normal, single dry year, and multiple dry years.

7.2 WATER SUPPLY RELIABILITY

LVMWD faces the same ongoing water supply challenges as other water purveyors in Southern California. Increased environmental regulations and demand for water outside the region have resulted in changes in delivery patterns and timing of imported water supply availability.

As described in Chapter 3, LVWMD obtains the vast majority of water from the Metropolitan Water District of Southern California (MWDSC). In addition, some of the non-potable demands are met with recycled water, while a small portion of the demand in an isolated distribution system is supplied from the City of Simi Valley and Ventura County Waterworks District. As the demand of this isolated water system is less than 1 percent of LVMWD's total system demand, this supply source is not addressed in more detailed this chapter.

The following sections will summarize the supply reliability of LVMWD's two main sources of supply, imported water from the SWP and recycled water.

7.2.1 Imported Water Supply Reliability

Because of competing needs and uses associated with these water resources, and because of concerns related to the regional water operations, MWDSC has undertaken a number planning efforts during the past fifteen years. Some of the most recent documents include the 2010 Integrated Water Resources Plan update, the Water Surplus and Drought Management Plan, the Water Supply Allocation Plan, the Long-term Conservation Plan, and most recently the 2010 Regional Urban Water Management Plant. These documents were reviewed for the purpose of preparing the LVMWD 2010 UWMP.

About one third of MWDSC supplies come from local resources, while the remaining is imported from three sources: the Colorado River (via the Colorado River Aqueduct), the Sacramento-San Joaquin River Delta, and the Owens Valley (via the State Water Project), and Mono Basin (via the Los Angeles Aqueducts).

Due to its location, LVMWD has only access to one of these three main imported water supplies, the Sacramento-San Joaquin River Delta which provides water from the Sierras in northern California through the State Water Project (SWP) aqueduct system. The imported water supply reliability for LVWMD is therefore directly tied to the reliability of the SWP supply. As this supply is MWDSC's largest and most variable MWDSC's source of supply, the 2020 Regional UWMP water supply reliability assumptions are all based on this supply source. It was therefore decided that is was appropriate to use this document as a basis for the reliability discussion and assumptions presented in this UWMP.

As noted in the Regional UWMP, the SWP supplies are estimated using the draft SWP Delivery Report distributed by the Department of Water Resources (DWR) in December 2009. This report presents the current estimate of the amount of water deliveries for current (2009) conditions through year 2029. These estimates incorporate the restrictions on the

SWP and Central Valley Project (CVP) operations in accordance with the biological opinions of the U.S. Fish and Wildlife Service and National Marine Fishery Service issued on December 15, 2008 and June 4, 2009, respectively. These biological opinions, also known as the Delta Smelt Protection Rules, have been incorporated in the Table A delivery estimates presented in Table 7.1. It should be noted that due to these biological opinions resulted in a significant reduction compared to the 2005 and 2007 reliability reports.

Table 7.1 Table A Deliveries – Current Conditions

Water Year Type	Percentage of Maximum Delivery(1)	Delivery Amount (acre-feet)
Single-Dry Year	7 %	134,000
Long-term Average Conditions	60%	1,150,000
Multiple-Dry Year	34-36%	650,000-690,000
Multiple-Wet Year	67-71%	1.3-1.4 MAF

Notes:

Source: Final 2009 Reliability Report (DWR, 2010)

1) Maximum annual amount is 4,133 thousand acre-feet (taf) per year.

The Table A delivery estimates presented in Table 7.1 were recently overruled by Federal Judge Oliver Wanger on December 14, 2010. However, these estimates have not been revised at the time of this report preparation and are therefore used in the Regional and LVWMD's UWMPs.

As stated in the Regional UWMP, MWDSC has increased the supplies received from the California Aqueduct by developing flexible Central Valley storage and transfer programs. By working collaboratively with the other water contractors in the Central Valley, MWDSC aims to develop additional dry-year supplies that can be conveyed through the California Aqueduct during dry hydrologic conditions and regulatory restriction periods.

7.2.2 Recycled Water Supply Reliability

As described in Chapter 3, LVMWD obtains recycled water from the Tapia Water Reclamation Plant (WRP) to serve approximately 20 percent of its customer demands. Although the treatment plant capacity is rated for 16 million gallons per day (mgd), the actual wastewater flow varies seasonally. The average daily flow to Tapia WRF is about 9.5 mgd, while the minimum and maximum dry weather flows are 9.0 to 10.3 mgd, respectively. During storm events the daily flows into the Tapia WRP can double due to inflow and infiltration into the sewer mains.

The Tapia WRP treats a combination of wastewater and groundwater that is pumped from two Westlake groundwater wells. These two wells have a combined capacity of 1.15 mgd.

By treating these wells to tertiary Title 22 standards, the amount of potable make-up water is reduced by the same amount. However, the amount of potable water that must be added to the recycled water system to satisfy the demands is not eliminated in totality during maximum day demand conditions. The use of these two wells is therefore important for the overall recycled water supply reliability. To avoid double counting of supply capacities, the groundwater production amount is stated as zero in subsequent tables, as the total recycled water supply capacity includes the use of these two wells.

As the groundwater wells are only used to supplement the system during peak demand conditions, it is assumed that under average day demand conditions, the available wastewater flows are sufficient to meet the recycled water demands. With the ability to provide additional supply from reservoir storage, groundwater wells, and potable supplements, it can be stated that the recycled water system has a supply reliability of close to 100 percent.

7.3 FUTURE SUPPLY PROJECTS AND PROGRAMS

Since LVMWD purchases most of its water from MWDSC, the projects implemented by MWDSC to secure their water supplies have a direct impact on LVMWD. In addition, the Triunfo Sanitation District (TSD) planned projects and programs for recycled water that impact the need for potable make-up water for the recycled water system.

7.3.1 Projects Planned by MWDSC

As described in its Regional UWMP, MWDSC plans to meet its supply reliability goal through:

- Surface water storage programs related to the SWP and Colorado River
- Colorado River Water Management Programs
- SWP Management Programs
- Central Valley/SWP Storage and Transfer Programs
- Water Conservation
- Development of Local Supplies
- Water Recycling Projects
- Ocean Desalination programs
- Groundwater banking programs in Southern California Region

The implementation approach and the achievements to-date for each of these programs are discussed in detail in Chapter 3 of the Regional UWMP. The projected increase in supply availability due to these programs under average year conditions is summarized in Table 7.2.

Table 7.2 MWDSC's Current and Planned Supply Programs

Program Description	2015 (afy)	2020 (afy)	2025 (afy)	2030 (afy)	2035 (afy)
Current Programs					
In-Region Storage and Programs	685,000	931,000	1,076,000	964,000	830,000
California Aqueduct	1,550,000	1,629,000	1,763,000	1,733,000	1,734,000
Colorado River Aqueduct	1,250,000	1,250,000	1,250,000	1,250,000	1,250,000
Capability of Current Programs	**3,485,000**	**3,810,000**	**4,089,000**	**3,947,000**	**3,814,000**
Under Development					
In-Region Storage and Programs	206,000	306,000	336,000	336,000	336,000
California Aqueduct	382,000	383,000	715,000	715,000	715,000
Colorado River Aqueduct	187,000	187,000	187,000	182,000	182,000
Capability of Planned Programs	**588,000**	**689,000**	**1,051,000**	**1,051,000**	**1,051,000**
Supply Increase					
Total (afy)	4,073,000	4,499,000	5,140,000	4,998,000	4,865,000
Total (%)	+17%	+18%	+26%	+27%	+28%

Notes:
Source: Table 2-11 from MWDSC RUWMP (MWDSC, 2010).

As shown in Table 7.2, the planned programs are estimated to increase MWDSC's supply in 2035 from 3.8 MAF to 4.9 MAF, which equates to a 28 percent increase in supply capacity.

As the majority of the new supplies are related to surface water or groundwater storage programs, these planned programs greatly enhance MWDSC's ability to capture excess supplies during wet years and thereby increasing the supply reliability during single and multiple dry year periods. These programs combined with water conservation are estimated the increase MWDSC's potential supply surplus in 2035 during average year conditions from 1.71 MAF to 2.76 MAF, which equates to a 61 percent increase in surplus supplies.

7.3.2 Projects planned by LVMWD

Since the preparation of the 2005 UWMP, LVMWD has developed an Integrated Water System Master Plan Update in 2007. The following projects were identified in this study to enhance the operations and reliability of the potable water system:

- 5 MG Finished water tank and Filter Plant Expansion at Las Virgenes Reservoir
- 1235-foot System East-West Transmission Improvements
- Calleguas MWD Intertie
- Jed Smith/Mountain Gate System Improvement Program
- Warner Pump Station Expansion
- Mulwood Pump Station Expansion
- Twin Lakes Expansion and Emergency Supply Pipeline
- Woolsey Canyon Project
- Three Springs Tank and Pumping Improvements
- Seminole Zone Pumping, Pipeline and Storage
- New Zone Development
- Emergency Generator at LV-2 Pump Station
- Connect LV-1 Turnout to West Valley Feeder
- 1235 Zone Tank Rehabilitation

In addition, LVWMD has developed a Recycled Water Master Plan Update in 2007. The following projects were identified in this study to expand the recycled water system:

- Decker Canyon Project
- Alternative Decker Canyon Project
- Thousand Oaks Boulevard Extension
- Calabasas City Center
- Woodland Hills Golf Course Extension
- Agoura Road Gap
- RWPS – East Expansion
- Morrison Air Gap Upgrades
- Water Quality Concerns and Open Reservoirs
- Reservoir 2 Replacement

With the implementation of these projects, LVMWD will expand its water and recycled water infrastructure to meet the projected demands. Although these projects are important to continue to provide reliable water and recycled water services, these projects do not increase or change the reliability of the available water supplies.

The recycled water supply availability and reliability depend on the actual wastewater flow generation within the Tapia WRP tributary area, which covers both portions of LVMWD's service area and the Triunfo Sanitation District (TSD). Currently, the recycled water demand during winter months is less than the available supply and excess recycled water is

discharged. However, during summer months, the recycled water demand exceeds the available flows and the system needs to be supplemented with the Westlake wells and occasionally potable water. New development within the Tapia WRP service area would increase wastewater flows and therefore recycled water supply. This would offset the need for potable demand, thus increasing LVMWD's overall supply reliability.

7.4 FACTORS IMPACTING SUPPLY RELIABILTY

There are a variety of factors that can impact water supply reliability. These factors impacting LVWMD's supply sources are indicated with an "X" in Table 7.3. A brief discussion on each of these factors is provided below.

Table 7.3 Factors Resulting in Inconsistency of Supply

Water Supply Sources	Specific Source Name	Legal	Environmental	Water Quality	Climatic	Additional Information
Imported	MWDSC	-	X	-	X	-
Groundwater	Westlake Wells	-	-	X	-	-
Recycled Water	Tapia WRP	-	-	X	-	-

7.4.1 Environmental

MWDSC's primary purpose is to provide a supplemental supply of water for domestic and municipal uses at wholesale rates to its member public agencies. MWDSC's principal sources of water are the SWP and the Colorado River. The Colorado River was MWDSC's original source of water after the organization's establishment in 1928 and MWDSC has a legal entitlement to receive water from the Colorado River under a permanent service. MWDSC also imports significant amounts of water from the State Water Project (SWP), which is owned and operated by the State of California. In 1960, MWDSC signed a contract with DWR. MWDSC is one of 29 agencies that have long-term contracts for water service from DWR, and is the largest agency in terms of the number of people it serves (19.1 million), the share of SWP water that it has contracted to receive (approximately 46 percent), and the percentage of total annual payments made to DWR by agencies with State water contracts (approximately 60 percent in 2008). The longevity and importance of these legal arrangements with MWDSC's largest suppliers indicate that, while water importation is frequently litigious, MWDSC has shown a continuous ability to procure water from these supplies, and will continue to do so in the future.

Further environmental concerns stem from the fragile state of many of California's water ecosystems. Because of this, environmental concerns inevitably arise during the water planning process. The delicacy of these systems can, in turn, cause a lack of supply due to the enforcement of environmental legislation. The recent legal action involving the endangered species act in the Sacramento-San Joaquin River Delta is an example of the clash between environmental concerns and water supply. In June 2007, MWDSC's Board approved a Delta Action Plan that provides a framework for staff to pursue actions with other agencies and stakeholders to build a sustainable Delta and reduce conflicts between water supply conveyance and the environment. MWDSC continues to develop principles to help achieve its mission to provide adequate and reliable supplies of high-quality water in an environmentally and economically responsible way.

7.4.2 Water Quality

Local groundwater is relatively high in sodium bicarbonate or calcium bicarbonate, iron, manganese and possibly calcium-magnesium sulfate. The total dissolved solids (TDS) content typically ranges from 800 to 1,200 mg/l, although extends as high as 2,800 mg/l in some areas. The concentrations of TDS make the water too poor in quality to be used as a potable source. High iron and manganese concentrations also cause sidewalk stains when put directly into irrigation systems. To circumvent this issue, the groundwater is used only to augment supplies for the recycled water system.

Recycled water comprises nearly 20 percent of LVMWD's total water use on an annual basis. Although the recycled water is stored in an open reservoir, LVMWD has had success with using non-clogging sprinklers and valve controllers where problems with particulate matter have been experienced. Another alternative to improve the overall water quality in the distribution system would be to install filters, but such filters would require frequent cleaning and might not provide an efficient solution.

7.4.3 Climate

MWDSC's service area encompasses three major climate zones. Climate change will add its own new uncertainties to the challenges of planning, and irrespective of the debate associated with the sources and cause of increasing concentrations of greenhouse gasses, changes in weather will significantly affect water supply planning. MWDSC intends to explore opportunities to continually increase efficiency, join the California Climate Action Registry, support environmental practices, develop solar power at some of their water treatment facilities, and pursue renewable water and energy programs that promote sustainability. Given that climatic pressures will unarguably affect supply reliability, continual attention to this issue will be necessary on the part of MWDSC.

7.5 SUPPLY AND DEMAND COMPARISON

10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

There are two aspects of supply reliability that can be considered. The first relates to immediate service needs and is primarily a function of the availability and adequacy of the supply facilities. The second aspect is climate-related, and involves the availability of water during mild or severe drought periods. This section compares water supplies and demands during three water scenarios: normal water year, single dry water year, and multiple dry water years. These scenarios are defined as follows:

- **Normal Year**:
  The normal year is a year in the historical sequence that most closely represents median runoff levels and patterns. The supply quantities for this condition are derived from historical average yields.
- **Single Dry Year**:
  This is defined as the year with the minimum useable supply. The supply quantities for this condition are derived from the minimum historical annual yield.
- **Multiple Dry Years**:
  This is defined as the three consecutive years with the minimum useable supply. Water systems are more vulnerable to these droughts of long duration, because they deplete water storage reserves in local and state reservoirs and in groundwater basins. The supply quantities for this condition are derived from the minimum historical three consecutive years' annual average yields.

As LVMWD's is nearly 100 percent reliant on imported water from MWDSC, the years chosen these scenarios are consistent with the Regional UWMP. As summarized in Table 7.4, MWDSC has identified 1977 as the single driest year since 1922 and the years 1990-1992 as the multiple driest years over that same period. These years represent the timing of the least amount of available water resources from the SWP, which is not only the largest source of supply from MWDSC but also the only imported water source that LVMWD has access to through its imported water connections.

Table 7.4 Basis of Water Year Data

Water Year Type	Base Year(s)
Average Water Year	1997
Single-Dry Water Year	1977
Multiple-Dry Water Years	1990-1992

Sources:

Regional UWMP (MWDSC, 2009) and historical consumption and population data provided by LVMWD.

The regional UWMP does not identify a particular year that would represent average demand conditions. To determine the average demand year, LVMWD's historical per-capita water usage evaluated. By normalizing water consumption with population and thus expressing consumption in gallons per capita per day (gpcd), the increase of demands due to growth is eliminated. The historical per capita consumption in the period 1990-2010 is shown below in Figure 7.1. As shown, the average consumption in the period was 287 gpcd. As the per-capita consumption in 1997 was 288 gpcd and the closest to the 20-year average of 287 gpcd, this year was selected to represent average year conditions.

The supply reliability for these historic conditions is presented in Table 7.5. As shown, there was no LVMWD consumption data available for 1977. Based on the data in Figure 7.1, it can be concluded that the per-capita consumption in the multiple dry year period 1990-1991 was actually substantially lower (up to 17 percent) than the average usage of 1990-2009. This is also shown in Table 7.5, as the total amount of imported water in these years is less than during average year conditions. As dry year demand almost always demonstrates an increase compared to normal year conditions, this renders the comparison ineffective for planning purposes. Even with the slight increase in recycled water use and the growth that occurred between 1992 and 1997, the total demand in 1992 (third dry year) is only 80 percent of the average year 1997.

Table 7.5 Supply Reliability – Historic Conditions

Water Supply Source	Average Year (1997)	Single Dry Year (1977)	Multiple Dry Years 1990	1991	1992
Imported (afy)	20,919	n/a	20,653	17,580	16,518
% of Normal	100.0%	n/a	98.7%	84.0%	78.9%
Recycled	4,445	n/a	4,721	3,929	3,962
% of Normal	100.0%	n/a	104.7%	87.1%	87.9%
Total (afy)	25,364	n/a	25,374	21,509	20,480
% of Normal	100.0%	n/a	99.8%	84.6%	80.5%

Notes:
Source: Historical production records provided by LVMWD.

Due to the decrease in demand in this 3-year period, it was considered unrealistic for use as the basis for future multiple dry year planning. Instead the year with the maximum per-capita usage was selected to project future demands during single and multiple dry years. As shown in Figure 7.1, the maximum per-capita use in the 20-year period was 338 gpcd, which is 18 percent higher than the average consumption of 287 gpcd.

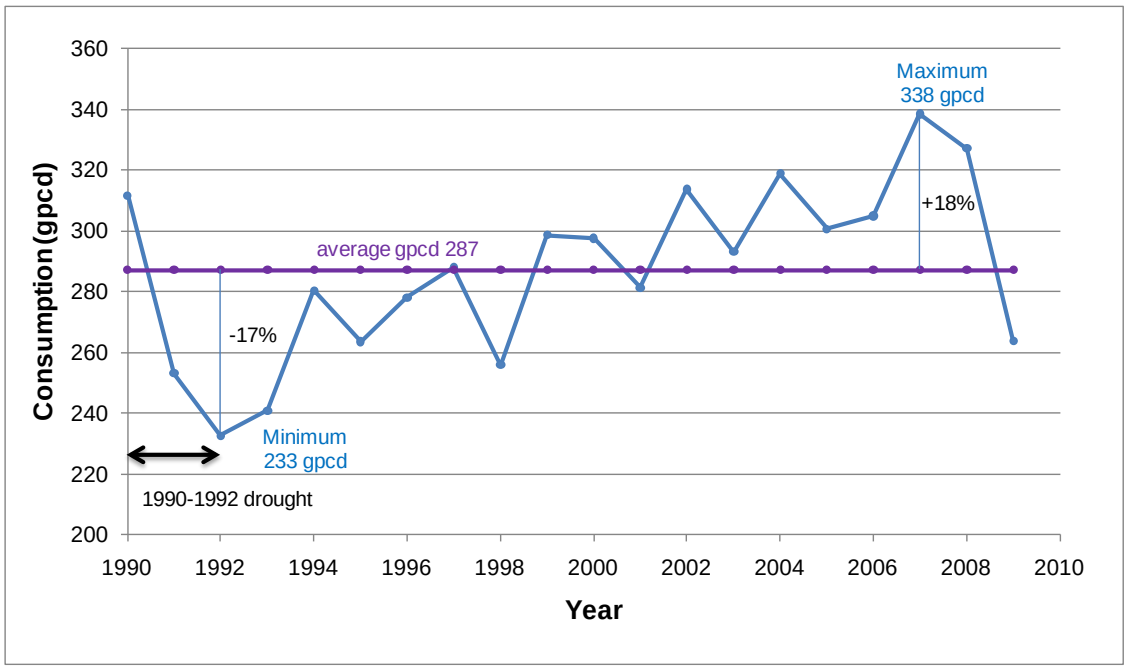

Figure 7.1 Historical Per-Capita Consumption Variation

This method differs from the single and multiple dry year demand projections presented in MWDSC's 2010 Regional UWMP, but provides a more conservative planning basis. The

demand projections shown in Table 7.6 are obtained from the MWD-MAIN Water Use Forecasting System (MWD-Main), which is based on forecasts taken from the SCAG 2007 Regional Transportation Plan and the San Diego Association of Governments Series 12: 2050 Regional Growth Forecast.

Table 7.6 MWDSC Retail Demands for Average, Single, and Multiple Dry Years

Retail Municipal and Industrial Demand	2015 (afy)	2020 (afy)	2025 (afy)	2030 (afy)	2035 (afy)
Average Year (afy)	4,978,000	5,170,000	5,330,000	5,491,000	5,627,000
Single Dry Year (afy)	5,000,000	5,194,000	5,354,000	5,515,000	5,653,000
Multiple Dry Year (afy)	5,004,000	5,232,000	5,409,000	5,572,000	5,715,000
Single Dry Year Increase(1)	0.4%	0.5%	0.5%	0.4%	0.5%
Multiple Dry Year Increase(1)	0.5%	1.2%	1.5%	1.5%	1.6%

Notes:
(1) As percentage of Average Year Conditions
(2) Source: Tables 2-6, 2-7, and 2-8 of Regional UWMP (MWDSC, 2010)

As shown in Table 7.6, the Regional UWMP shows that the single and multiple dry year retail municipal and industrial demands only increase between 0.4 and 1.6 percent. This is substantially less than assumed in LVMWD's 2005 UWMP, which assumed a 10 percent increase in single dry years, and other 2010 UWMPs are currently being prepared for other member agencies. Demand variations due to dry year conditions are anticipated to be less noticeable in the much larger service area of MWDSC than in LVWMD's service area because:

- MWDSC's customers may experience different levels of extreme dry weather within different portions of its large service area
- MWDSC's service area includes many urban regions with very limited outdoor demands, making those areas less sensitive to weather variations
- MWDSC's service area includes more industrial and other non-residential demands that are not sensitive to weather

In other words, LVMWD's demands are expected to increase relatively more during hydrological dry years than MWDSC's demand as the entire area would experience dry extreme dry weather conditions at the same time and because the primarily residential character with plentiful outdoor usage makes demands more weather dependent. It was

therefore decided to use LVWMD's historical demands normalized for population (per-capita consumption) as shown in Figure 7.1 as a basis for projecting the demand increase during single and multiple dry years. This means that 2007 was chosen as the base year for both single and multiple dry year projections and that the average demands for these years were increased by 18 percent.

7.6 SUPPLY AND DEMAND COMPARISON

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) demonstrate that sufficient water supplies will be available to meet the next 25 years of projected water demands.

> 10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.

7.6.1 Average Year

The projected average year demands and supplies are compared in 5-year increments in Table 7.10 through Table 7.10. This comparison consists of a number of steps that are described below.

First, the projected average year demands for 2015 through 2020 are compared with the year 2010 demands. As shown, the projected demands for the entire planning period are projected to remain below the year 2010 demand. This decrease reflects the SB-7x7 water conservation targets combined with limited growth potential within LVMWD's service. This trend is shown in Table 7.10.

Table 7.7 LVWMD Projected Average Year Water Demands

Description	2015	2020	2025	2030	2035
Projected Average Year Demand (afy)	23,951	22,034	22,787	23,504	24,190
Increase Compared to 2010[1] (afy)	(2,007)	(3,924)	(3,171)	(2,454)	(1,768)
Increase Compared to 2010	-8%	-15%	-12%	-9%	-7%
Demand as % of 2010 Demand	92%	85%	88%	91%	93%

Notes:
1) Based on an 2010 Average Year Demand of 25,958 afy.

Secondly, the average year supplies from MWDSC for 2015 through 2020 are compared with the year 2010 supplies. This comparison only includes the current supply programs operated by MWDSC, such as the existing in-region storage programs, the SWP via the California Aqueduct, and the Colorado River Aqueduct. For conservative planning purposes, the capacities of the new programs that are under development are not included in the summary presented in Table 7.8. It should be noted that the average year supply for 2010 was obtained from the 2005 Regional UWMP as this information was not presented in the 2010 Plan. As shown, there has been a significant increase in the estimated supply capacity between year 2010 (2.7 MAF) and 2015 (3.5 MAF).

Table 7.8 MWDSC Projected Average Year Supplies

Description	2015	2020	2025	2030	2035
Average Year Supply(1) (afy)	3,485,000	3,810,000	4,089,000	3,947,000	3,814,000
Increase Compared to 2010(2) (afy)	817,000	1,142,000	1,421,000	1,279,000	1,146,000
Increase Compared to 2010	31%	43%	53%	48%	43%
Supply as % of 2010 Supply	131%	143%	153%	148%	143%

Notes:
1) Based on the current supply programs as listed in Table 2-11 from the 2010 Regional UWMP.
2) Based on the projected supply capacity of 2,668,000 afy obtained from 2005 Regional UWMP.

Subsequently, the projected supplies and demand of MWDSC are compared under average year conditions. As shown in Table 7.9, the projected supplies are substantially greater (174-181%) than the projected demands through the planning horizon of 2035. This reflects a combination of increased water conservation efforts by the member agencies as well an increase in local supplies.

Table 7.9 MWDSC Projected Average Year Supply as Percentage of Demand

Description	2015	2020	2025	2030	2035
Average Year Supply(1) (afy)	3,485,000	3,810,000	4,089,000	3,947,000	3,814,000
Average Year Demand(2) (afy)	2,006,000	1,933,000	1,985,000	2,049,000	2,106,000
MWDSC Supply as % of Demand	174%	197%	206%	193%	181%

Notes:
1) Based on the current supply programs as listed in Table 2-11 from the 2010 Regional UWMP.
2) Based on total demands on Metropolitan as listed in Table 2-11 from the 2010 Regional UWMP.

The last step involves the comparison of the relative increase in LVMWD demand with the relative increase in MWDSC supplies. This comparison is presented in Table 7.10. As shown, the imported water supplies are projected to increase substantially more (81-118%) than LVMWD's demands. This difference indicates that it is reasonable to expect that MWDSC would have sufficient supplies available to accommodate LVMWD's projected demands under average year conditions as LVMWD would get its proportional share of the

increased supplies as one of MWDSC's 26 member agencies.

Table 7.10 Comparison of Supply and Demands under a Normal Year

Row	Description	2015	2020	2025	2030	2035
1	LVMWD Demand Increase as % of 2010 Demand (from Table 7.7)	92%	85%	88%	91%	93%
2	MWDSC Supply Increase as % of 2010 Supply (from Table 7.8)	131%	143%	153%	148%	143%
3	MWDSC Supply as % of Demand (from Table 7.9)	174%	197%	206%	193%	181%
4	**Difference MWD Supply Increase and LVMWD Demand Increase (Row 3 – Row 1)**	**81%**	**112%**	**118%**	**102%**	**88%**

The ratios presented in Table 7.10 are used to project the imported water supply availability for each planning year. By combining the imported water supplies with the other supply sources, the total available supply capacity is calculated. The available supplies are then compared with the projected demands to determine if LVMWD has sufficient water supplies available to meet future demand under average year conditions. This summary is presented in Table 7.11.

Table 7.11 Supply and Demand Comparison – Normal Year

Water Sources	2015	2020	2025	2030	2035
Supply					
Projected Supply as a % of Demand During a Normal Year(1)	174%	197%	206%	193%	181%
Imported Water Supply(2)	41,675	43,406	46,941	45,363	43,783
Groundwater Supply(3)	0	0	0	0	0
Recycled Water Supply(4)	4,878	6,185	7,493	8,800	9,062
Total Supply	**46,553**	**49,591**	**54,434**	**54,163**	**52,845**
% of Normal Year	100%	100%	100%	100%	100%
Demands					
Imported Water	23,951	22,034	22,787	23,504	24,190
Groundwater(3)	0	0	0	0	0
Recycled Water	4,878	6,185	7,493	8,800	9,062
Total Demand	**28,829**	**28,219**	**30,280**	**32,304**	**33,252**
% of Year 2010(5)	111%	109%	117%	124%	128%
Difference Supply - Demand	**17,724**	**21,372**	**24,154**	**21,859**	**19,593**
Difference as % of Supply	**38%**	**43%**	**44%**	**40%**	**37%**
Difference as % of Demand	**61%**	**76%**	**80%**	**68%**	**59%**

Notes:
1) From Table 7.9.
2) Calculated by multiplying the imported water demand with the imported water supply (%) from Row 1.
3) Groundwater is set to 0 to avoid double counting as all pumped groundwater is used to supplement the recycled water system. This is therefore not included as a demand source either.
4) Recycled water production is assumed to be equal to the recycled water demand, but would need to be supplemented by groundwater and/or potable water on a seasonal basis.
5) Year 2010 deliveries is 25,958 afy.

As shown in Table 7.11, it is projected that LVMWD has sufficient supplies available to meet both potable and recycled water demands through 2035 under average year condition with a supply surplus ranging from 61 to 80 percent of the projected demands.

7.6.2 Single Dry Year

As described in the previous section, the projected average year potable and recycled water demands are increased by 18 percent to estimate the water demands during both single dry years, while the projected imported water supplies are obtained from MWDSC's Regional 2010 UWMP. The projected single dry year demands and supplies are compared

in 5-year increments in Table 7.12 and Table 7.13. The data presented in Table 7.12 and Table 7.13 is similar to the data presented in Table 7.10 but based on single dry year conditions versus average year conditions. Details on the calculations of the values presented in this table are included in Appendix I.

Table 7.12 Comparison of Supply and Demands under a Single Dry Year

Row	Description	2015	2020	2025	2030	2035
1	LVMWD Demand Increase as % of 2010 Demand	91%	84%	87%	89%	92%
2	MWDSC Supply Increase as % of 2010 Supply	86%	98%	105%	99%	95%
3	MWDSC Supply as % of Demand	113%	129%	135%	125%	116%
4	**Difference MWD Supply Increase and LVMWD Demand Increase (Row 3 – Row 1)**	**21%**	**44%**	**47%**	**35%**	**23%**

Notes:
Details on the calculations in each row are included in Appendix I.

As shown in Table 7.12, the imported water supplies are projected to increase more (21-47%) than LVMWD's demands. This difference indicates that, similar to average year conditions, it is reasonable to expect that MWDSC would have sufficient supplies available to accommodate LVMWD's projected demands under single dry year conditions as LVMWD would get its proportional share of the increased supplies.

The ratios presented in Table 7.12 are used to project the imported water supply availability for each planning year. By combining the imported water supplies with the other supply sources, the total available supply capacity is calculated. The available supplies are then compared with the projected demands to determine if LVMWD has sufficient water supplies available to meet future demand under single dry year conditions. This summary is presented in Table 7.13.

Table 7.13 Supply and Demand Comparison – Single Dry Year

Water Sources	2015	2020	2025	2030	2035
Supply					
Projected Supply as a % of Demand During a Single Dry Year(1)	113%	129%	135%	125%	116%
Imported Water Supply(2)	31,950	33,418	36,328	34,698	33,074
Groundwater Supply(3)	0	0	0	0	0
Recycled Water Supply(4)	5,750	7,290	8,832	10,372	10,681
Total Supply	**37,700**	**40,709**	**45,160**	**45,070**	**43,755**
% of Normal Year	81%	82%	83%	83%	83%
Demands					
Imported Water	28,231	25,971	26,858	27,704	28,512
Groundwater(3)	0	0	0	0	0
Recycled Water	5,750	7,290	8,832	10,372	10,681
Total Demand	**33,981**	**33,261**	**35,690**	**38,077**	**39,193**
% of Year 2010(5)	111%	128%	137%	147%	151%
Difference Supply - Demand	**3,719**	**7,448**	**9,469**	**6,994**	**4,561**
Difference as % of Supply	**10%**	**18%**	**21%**	**16%**	**10%**
Difference as % of Demand	**11%**	**22%**	**27%**	**18%**	**12%**

Notes:
1) From Table 7.12.
2) Calculated by multiplying the imported water demand with the imported water supply (%) from Row 1.
3) Groundwater is set to 0 to avoid double counting as all pumped groundwater is used to supplement the recycled water system. This is therefore not included as a demand source either.
4) Recycled water production is assumed to be equal to the recycled water demand, but would need to be supplemented by groundwater and/or potable water on a seasonal basis.
5) Year 2010 deliveries is 30,596 afy.

As shown in Table 7.13, it is projected that LVMWD has sufficient supplies available to meet both potable and recycled water demands through 2035 under single dry year condition with a supply surplus ranging from 11 to 27 percent of the projected demands.

7.6.3 Multiple Dry Year

As described in the previous section, the projected average year potable and recycled water demands are increased by 18 percent to estimate the water demands during both single and multiple dry years, while the projected imported water supplies are obtained from

MWDSC's Regional 2010 UWMP. The projected multiple dry year demands and supplies are compared in 5-year increments in Table 7.14 through Table 7.17. The data presented in Table 7.14 is similar to the data presented in Table 7.10 but based on multiple dry year conditions versus average year conditions. Supply and demand data for years 2010 through 2012 are not presented, as MWDSC did not provide supply information for these years in their 2010 RUWMP. Due to recent demand reduction actions by MWDSC however, it is assumed that supply will be sufficient for this period of time. Details on the calculations of the values presented in this table are included in Appendix I.

Table 7.14 Comparison of Supply and Demands under Multiple Dry Years

Row	Description	2015	2020	2025	2030	2035
1	LVMWD Demand Increase as % of 2010 Demand	92%	85%	88%	91%	93%
2	MWDSC Supply Increase as % of 2010 Supply	86%	92%	96%	94%	92%
3	MWDSC Supply as % of Demand	101%	110%	110%	105%	101%
4	**Difference MWD Supply Increase and LVMWD Demand Increase (Row 3 – Row 1)**	**8%**	**26%**	**23%**	**15%**	**7%**

Notes:
Details on the calculations in each row are included in Appendix I.

As shown in Table 7.14, the imported water supplies are projected to increase more (7-26%) than LVMWD's demands. This difference indicates that, similar to average year conditions, it is reasonable to expect that MWDSC would have sufficient supplies available to accommodate LVMWD's projected demands under single dry year conditions as LVMWD would get its proportional share of the increased supplies.

The ratios presented in Table 7.14 are used to project the imported water supply availability for each planning year. By combining the imported water supplies with the other supply sources, the total available supply capacity is calculated. The available supplies are then compared with the projected demands to determine if LVMWD has sufficient water supplies available to meet future demand under multiple dry year conditions. This summary is presented in Table 7.15 (Dry Year 1), Table 7.16 (Dry Year 2), and Table 7.17 (Dry Year 3).

Table 7.15 Supply and Demand Comparison – Multiple Dry Year No. 1

Water Sources	2015	2020	2025	2030	2035
Supply					
Projected Supply as a % of Demand During Multiple Dry Years[1]	101%	110%	110%	105%	101%
Imported Water Supply[2]	28,383	28,689	29,647	29,126	28,702
Groundwater Supply[3]	0	0	0	0	0
Recycled Water Supply[4]	5,750	7,290	8,832	10,372	10,681
Total Supply	**34,132**	**35,979**	**38,479**	**39,498**	**39,384**
% of Normal Year	73%	73%	71%	73%	75%
Demands					
Imported Water	28,231	25,971	26,858	27,704	28,512
Groundwater[3]	0	0	0	0	0
Recycled Water	5,750	7,290	8,832	10,372	10,681
Total Demand	**33,981**	**33,261**	**35,690**	**38,077**	**39,193**
% of Year 2010[5]	111%	109%	137%	147%	151%
Difference Supply - Demand	**152**	**2,718**	**2,788**	**1,421**	**190**
Difference as % of Supply	**0.4%**	**8%**	**7%**	**4%**	**0.5%**
Difference as % of Demand	**0.4%**	**8%**	**8%**	**4%**	**0.5%**

Notes:
1) From Table 7.14.
2) Calculated by multiplying the imported water demand with the imported water supply (%) from Row 1.
3) Groundwater is set to 0 to avoid double counting as all pumped groundwater is used to supplement the recycled water system. This is therefore not included as a demand source either.
4) Recycled water production is assumed to be equal to the recycled water demand, but would need to be supplemented by groundwater and/or potable water on a seasonal basis.
5) Year 2010 deliveries is 30,596 afy.

Table 7.16 Supply and Demand Comparison – Multiple Dry Year No. 2

Water Sources	2016	2021	2026	2031	2036
Supply					
Projected Supply as a % of Demand During Multiple Dry Years[1]	101%	110%	110%	105%	101%
Imported Water Supply[2]	27,928	28,885	29,833	29,295	28,870
Groundwater Supply[3]	0	0	0	0	0
Recycled Water Supply[4]	6,058	7,599	9,140	10,434	10,745
Total Supply	**33,986**	**36,484**	**38,973**	**39,730**	**39,615**
% of Normal Year	73%	74%	72%	73%	75%
Demands					
Imported Water	27,779	26,148	27,028	27,866	28,678
Groundwater[3]	0	0	0	0	0
Recycled Water	6,058	7,599	9,140	10,434	10,745
Total Demand	**33,837**	**33,747**	**36,168**	**38,300**	**39,423**
% of Year 2010[5]	111%	130%	139%	148%	152%
Difference Supply - Demand	**149**	**2,737**	**2,806**	**1,430**	**191**
Difference as % of Supply	**0.4%**	**8%**	**7%**	**4%**	**0.5%**
Difference as % of Demand	**0.4%**	**8%**	**8%**	**4%**	**0.5%**

Notes:
See footnotes listed in Table 7.15.

Table 7.17 Supply and Demand Comparison – Multiple Dry Year No. 3

Water Sources	2017	2022	2027	2032	2037
Supply					
Projected Supply as a % of Demand During Multiple Dry Years[1]	101%	110%	110%	105%	101%
Imported Water Supply[2]	27,474	29,081	30,020	29,465	29,037
Groundwater Supply[3]	0	0	0	0	0
Recycled Water Supply[4]	6,366	7,907	9,448	10,496	10,808
Total Supply	**33,839**	**36,988**	**39,468**	**39,961**	**39,846**
% of Normal Year	73%	75%	73%	74%	75%
Demands					
Imported Water	27,327	26,326	27,197	28,027	28,845
Groundwater[3]	0	0	0	0	0
Recycled Water	6,366	7,907	9,448	10,496	10,808
Total Demand	**33,693**	**34,233**	**36,645**	**38,523**	**39,653**
% of Year 2010[5]	110%	132%	141%	148%	153%
Difference Supply - Demand	**147**	**2,755**	**2,823**	**1,438**	**192**
Difference as % of Supply	**0.4%**	**7%**	**7%**	**4%**	**0.5%**
Difference as % of Demand	**0.4%**	**8%**	**8%**	**4%**	**0.5%**

Notes:
1) See footnotes listed in Table 7.15.

As shown in Table 7.15 through Table 7.17, the projected demands are just below the projected supply in each year of a 3-year multiple dry year period. Although supply surplus only ranges from 0.4 to 8 percent, it should be noted that these summaries include two key conservative planning assumptions as discussed in the methodology. These are:

- The projected available supply from MWDSC only includes the existing supply programs and does not include the programs that are currently under development which are estimated to increase the imported water supplies by 17 to 39 percent, depending on the planning year and hydrologic conditions (see Table 7.2). It should be noted that these planned programs increase the total available imported water supply relatively more during single and multiple dry years than during average years.

- Both potable water and recycled water demands during single and multiple dry are assumed to increase by 18%, which represents the maximum per-capita demand

increase in the period 1990-2009. This is a 35 percent net difference with the 17 percent per-capita demand decrease for the years 1990-1993, which represent the multiple dry year period per DWR's hydrologic method as shown in Table 7.4.

Based on the positive supply surplus shown in this section and the two conservative planning assumptions listed above, it can be concluded that LVMWD has sufficient supplies available to meet both potable and recycled water demands through 2035 under average, single dry year, and multiple dry year conditions.

7.7 TRANSFER AND EXCHANGE OPPORTUNITIES

As mentioned in Chapter 3, LVWMD purchases about 150 afy from the City of Simi Valley and Ventura County Waterworks District to serve a small isolated distribution system within the District's service area. This water transfer will be discontinued when the Woosley Canyon Pump Station, still in the implementation process, has been constructed.

Currently, LVMWD is in discussion with Calleguas Municipal Water District (CMWD) to complete an intertie project. This project would potentially bring 20 cubic feet per second (cfs) or 12.5 mgd of additional capacity to LVMWD to refill the Las Virgenes reservoir. This additional water would serve as an alternative to purchasing water from MWDSC during summer months. This transfer opportunity is summarized in Table 7.18.

Table 7.18 Water Transfer and Exchange Opportunities

Source Water Transfer	Transfer or Exchange	Short Term	Proposed Quantities	Long Term	Proposed Quantities
Calleguas MWD	Transfer	n/a	n/a	X	Up to 20 cfs or 12.5 mgd

7.8 OPPORTUNITIES FOR DESALINATED WATER

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

10631 (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long term supply.

The UWMPA requires that the UWMP address the opportunities for development of desalinated water, including ocean water, brackish water and groundwater. The opportunities for LVMWD and MWDSC are described separately below.

7.8.1 LVMWD Desalination Opportunities

As summarized in Table 7.19, there are no opportunities identified for use of desalinated water by LVMWD.

Table 7.19 Desalination Opportunities for LVMWD

Sources of Water	Opportunities for Desalinated Water
Ocean Water	None
Brackish Ocean Water	None
Brackish Groundwater	None
Other	None

Groundwater Desalination

As discussed in Chapter 3, water from the underlying groundwater basins extend as high as 2,800 mg/l in TDS content in some areas. While this could be considered brackish groundwater, additional water quality problems, as discussed in Chapter 3, and limited production from existing wells suggest desalination of groundwater would not be efficient. It is therefore concluded that there are no opportunities for desalinating the groundwater underlying LVMWD's service area.

Seawater Desalination

It is not practical nor economically feasible to implement a seawater desalination program at this time. While located near the ocean relative to many other water purveyors, the topology of LVMWD's service area would not be conducive to pumping desalinated water from near the ocean.

West Basin Municipal Water District (WBMWD), whose service area borders LVMWD's service area to the south, is currently developing seawater desalination technology through its Temporary Ocean-Water Desalination Demonstration Facility. The location of WBMWD's seawater desalination efforts would preclude involvement with LVMWD.

LVMWD could provide financial assistance to other purveyors in exchange for water supplies. Should the need arise; LVMWD may consider this option.

7.8.2 MWDSC's Desalination Program

Although, LVMWD has not identified any specific project opportunities for desalination of seawater or impaired groundwater at this time, other desalination projects developed by MWDSC within the region indirectly benefit LVMWD. The recent efforts to develop and implement desalination by MWDSC as described in its regional 2010 UWMP are summarized below.

MWDSC's Seawater Desalination Program (SDP) was created in 2001 to encourage the

development of seawater desalination by local agencies and was modeled after the Local Resources Program (LRP). Like the LRP, it offers sliding-scale incentives to member and local agencies that proceed up to $250/acre-foot of produced supplies. The incentive is designed to accelerate the development of expensive local supply projects by member agencies by lowering their cost. MWDSC has entered into four (4) SDP agreements, while a fifth potential agreement with the Los Angeles Department of Water and Lower (LADWP) that could potentially produce up to 28,000 afy, is currently on hold. In addition, there are currently three other desalination projects under development by local agencies within MWDSC's service area outside the SDP. The desalination projects are summarized in Table 7.20. The potential capacity of all these combined project ranges from 270,000 to 422,000 afy.

Table 7.20 MWDSC Desalination Project Opportunities

Project Name	Member Agency	Capacity (afy)	Status n/a
Long Beach Seawater Desalination Project(1)	LBWD	10,000	Pilot Study
South Orange Coastal Ocean Desalination Project(1)	MWDOC	16,000-28,000	Pilot Study
Carlsbad Seawater Desalination Project(1)	SDCWA	56,000	Permitting
West Basin Seawater Desalination Project(1)	WBMWD	20,000	Pilot Study
LADWP Seawater Desalination Project	LADWP	28,000	Unknown
Huntington Beach Seawater Desalination Project	MWDOC	56,000	Permitting
Camp Pendleton Seawater Desalination Project	SDCWA	56,000-168,000	Planning
Rosarito Beach Seawater Desalination Feasibility Study	SDCWA	28,000-56,000	Feasibility Study

Notes:
1) These SDPs have executed incentive agreements with MWDSC.

To promote the development of local seawater desalination projects, MWDSC provides regional facilitation by supporting member agency projects during permit hearings and other proceedings, coordinating responses to potential legislation and regulations, and working with the member agencies to resolve related issues, such as greenhouse gas emission standards and seawater intake regulations, that could impact the projects. MWDSC has also formed a special committee to find additional ways to promote potential projects and explore opportunities for developing regional seawater desalination supplies.

7.9 CLIMATE CHANGE IMPACTS ON SUPPLY RELIABILITY

Because LVMWD is 100 percent reliant on MWDSC for its potable water supply, the effects of climate change on LVMWD are best summarized by considering the effects of climate change on MWDSC as a whole, described in MWDSC's 2010 regional UWMP (MWDSC, 2010). While the exact timing and magnitude of the effects of climate change are still under debate, researchers have identified some specific areas of concern for California water users, these concerns are listed as follows:

- Reduction in Sierra Nevada snowpack, which is a significant source of water as it melts and feeds water systems on both east and west sides of the state;
- Increase in intensity and frequency of extreme weather events;
- Rising sea levels, resulting in increased storm damage and cutbacks on the SWP and Central Valley Project;
- Effects on groundwater;
- Changes to demand levels and patterns;
- Water borne pathogens and water quality degradation;
- General decline in ecosystem health and function;
- Alterations to power generation and pumping regimes;

As scientific understanding of climate change continues to advance, the nature of these impacts will be more thoroughly understood and better addressed.

Chapter 8

WATER SHORTAGE CONTINGENCY PLAN

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a draft water shortage contingency resolution or ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction.

8.1 STAGES OF ACTIONS

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses specified issues.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.*

8.1.1 Water Shortage Stages and Reduction Objectives

LVMWD relies almost entirely on Metropolitan Water District of Southern California (MWDSC) for their supply of potable water. Diversions from the Sacramento-San Joaquin River Delta for the State Water Project (SWP) and Central Valley Project (CVP) are being greatly restricted due to a variety of factors, resulting in anticipated SWP deliveries of only 35 percent and CVP deliveries of 40 percent to local agencies. In response to a conservation directive by the Governor of the State of California in June 2008, MWDSC issued a regional Condition 2 Water Supply Alert. MWDSC's Water Supply Alert calls for local agencies such as LVMWD to enforce drought ordinances.

Eight principles guide LVMWD's implementation of its conservation measures.

- Incentives and appropriate water use practices shall be utilized as needed to accomplish goals, limiting financial impacts and/or shut-offs to those customers who fail to meet conservation targets.
- Customers who meet goals should not pay more for their water.
- Conservation goals should relate to the MWDSC's Water Supply Allocation Plan and wholesale rate structures.

- Development that complies with conservation codes and standards should not be restricted.
- An appeal process shall be available to all customers.
- The Las Virgenes Reservoir shall be used appropriately to support water supply.
- Policies and procedures shall be clear and logical, make sense to customers, and relate clearly and directly to conservation targets.
- Water allocations shall be based on needs that are basic to all, and customers' demonstrated level of efficiency.

LVMWD has developed a Water Shortage Response Plan (WSRP) to be invoked during declared water shortages (included in Appendix F), and an important document that explains how LVMWD will reduce demands during periods of reduced supply.

In response to the urgent statewide and regional water supply shortage, LVMWD will:

- Communicate timely water supply situation, conservation, and compliance messages to all customers, residential homeowners associations, business chambers, inter-governmental bodies, essential facilities (schools, hospitals, fire), and other stakeholders.
- Implement water conservation measures in accordance with LVMWD rules and regulations.
- Develop further ordinances and policies as necessary to ensure conservation.
- Develop and implement individual customer water budgets to ensure proper allocation of water supplies.

Each of the above measures will be implemented as appropriate to ensure conservation levels of commensurate with the severity of the water supply situation.

After a water shortage is declared, the board of directors may adjust tiers and rates to provide customers with a financial incentive to conserve water. The volume of water available within each tier under normal weather shall be reduced, and billing rates increased, in proportion to the above conservation goals. The tiers referenced in the water shortage stages are the same as found in Chapter 5, under BMP 11 Table 6.6.

Further regional water supply allocation issues are covered in MWDSC's 2009 Water Supply Allocation Plan. LVMWD will refer to MWDSC in the event that specific conservation targets must be addressed.

8.1.2 Water Reduction Stage Triggering Mechanisms

The General Manager will recommend activation of one or more elements of the WSRP whenever water supplies of the district have a reasonable prospect for being inadequate to meet the needs of customers. The recommendation shall be presented to the board in the form of a written report, which includes the reasons for the recommendation. The board shall consider the report at a duly noticed public hearing.

8.1.3 Administration of Water Shortage Program

Through the use of the following channels and media, LVMWD staff will realize timely and appropriate communications with the LVMWD Board of Directors, customers, residential homeowners associations, business chambers, inter-governmental bodies, essential facilities (schools, hospitals, fire), and other stakeholders.

- Public water conservation forums hosted at LVMWD headquarters and off-site locations.
- Attendance and agenda presentation at local city council meetings.
- Attendance and agenda presentations at home-owners association and business chamber meetings.
- Direct mailings and bill inserts to customers and account holders.
- Press releases.
- LVMWD publications, e.g., the *Current Flow*.
- Updated posting of issues and information on LVMWD website.
- Advertisements in local publications and cable channels.
- Cards, table tents, door hangers and other leave-behind reminders.

8.2 WATER SHORTAGE CONTINGENCY ORDINANCE/ RESOLUTION

According to the UWMPA, the UWMP is required to include an urban water shortage contingency analysis that includes a draft water shortage contingency resolution or ordinance.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (h) A draft water shortage contingency resolution or ordinance.*

In addition to programmatic, voluntary conservation measures, it may become necessary to implement further compliance measures to realize the targeted conservation goals. The Board of Directors of LVMWD may amend existing drought ordinances, or adopt more stringent ordinances as necessary to ensure.

LVMWD adopted its Water Shortage Response Plan on June 24, 2008. Copies of the relevant ordinances are included in Appendix F. Table 8.1 provides a summary of other ordinances and resolutions related to water conservation.

Table 8.1 LVMWD Ordinances and Resolutions for Water Shortage Measures

Ordinance or Resolution Number	Date	Thrust of Legislation
Ordinance 04-03-241	April 2003	Amends section 3-4 of the Las Virgenes Code to establish a comprehensive program the board can implement when a water shortage occurs.
Ordinance 01-09-254	January 2009	Amends section 3-4 of the Las Virgenes Code to introduce further mandatory water conservation, pursuant to Water Code Section (WCS) 71610.5
Ordinance 03-09-256	March 2009	Amends section 3-4 of the Las Virgenes Code to establish further water conservation regulations as a result of a decrease in water delivered by MWDSC.
Resolution 04-09-2388	April 2009	Implement changes to achieve water conservation in order to meet the Regional Water Shortage Level 2 allocations as called by MWDSC.
Ordinance 07-09-257	July 2009	Amends section 3-4 of the Las Virgenes Code with conservation incentives. The District may, by resolution, offer incentives to customers who replace high volume water equipment with low volume water equipment.
Ordinance 05-10-262	May 2010	Amends section 3-4 of the Las Virgenes Code by superseding Ordinance 03-09-256 to establish further water conservation regulations as a result of a decrease in water delivered by MWDSC.
Resolution 03-10-2399 and 2400	May 2010	Authorize changes to the water shortage response framework.
Resolution 05-10-2401	May 2010	Permits customers using less than their allocated amount to obtain an allocation credit for future usage. Resolution also permits refunds.
Resolution 05-10-2404	May 2010	Implements changes to LVMWD practices to achieve water conservation to meet Regional Water shortage Level 2 allocations by MWDSC.

Notes:
(1) Copies of each ordinance and resolution can be found in Appendix F.

As shown in Table 8.1, LVMWD has enacted eight ordinances and resolutions related to water conservation since the last UWMP. Copies of each ordinance and resolution can be found in Appendix F.

8.3 PROHIBITIONS, CONSUMPTION REDUCTION METHODS, AND PENALTIES

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses methods to reduce consumption.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.*
>
> *10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.*
>
> 10632 (f) Penalties or charges for excessive use, where applicable.

8.3.1 Mandatory Prohibitions on Water Wasting

According to Ordinance 04-03-241, the LVMWD board may prohibit wasteful practices and implement conservation measures during a water shortage, including restrictions on the following:

- Irrigation
- Exterior Washing
- Ornamental or Recreational Uses
- Serving Water at Restaurants Without Request
- Restrict exterior washing, and ornamental or recreational uses of water.
- Require restaurants to serve water only upon request.
- Require hotels to give guests the option of laundering linens and towels during multiple day stays.

8.3.2 Excessive Use Penalties

Excessive use penalties provide punitive incentives for customers violating water conservation restrictions. The following excessive use penalties are described in LVMWD's relevant ordinances:

- Customers shall be notified in writing when the first violation of this article is discovered by LVMWD. The notice shall include a warning that further violations could result in stricter penalties as set forth below.
- Customers who violate this article for a second time within a twelve-month period have committed an infraction publishable by a fine of up to $50
- Customers who violate this article for a third time within a twelve-month period have committed an infraction punishable by a fine of up to $100
- Customers who violate this article for a forth time within a twelve-month period have committed an infraction punishable by a fine of up to $250
- LVMWD may install flow restrictors or terminate service to customers who have violated provisions of this article fine times within a twelve-month period.
- Customers shall be encouraged to report violations of this article through LVMWD's water conservation "hot line".
- Fines collected pursuant to this section shall be deposited in a special fund and spent to provide assistance for water reduction appliances and processes.

8.3.3 Review Process

As with any system for allocating community resources, exceptional individual circumstances or needs may warrant review and specific accommodations. In considering such circumstances, LVMWD will strive to balance individual needs with the community's need for adequate water and a practical system for allocation.

A customer may request relief from mandatory conservation practices by filing a written appeal with LVMWD staff. The water district may grant relief in case of hardship if all feasible means of conserving water have been exercised, including but not limited to, retrofitting non-Ultra Low Flush (ULF) toilets with ULF-toilets, installing low-flow showerheads, implementing recommended conservation measures pursuant to a district water audit, and verifying no observable runoff from the customer's premise.

Staff will review the petition for appeal and make a finding to approve or deny the appeal. Findings and recommended exceptions, if any, will be forwarded to the General Manager for approval.

The decision of the General Manager may be appealed to a water shortage committee appointed by LVMWD's Board of Directors. The committee shall review the General Manager's decision and approve or deny the petition based on the circumstances of each case. Decisions of the committee shall be final.

8.4 REVENUE AND EXPENDITURE IMPACTS/MEASURES TO OVERCOME IMPACTS

According to the UWMPA, the UWMP is required to include an urban water shortage contingency analysis that addresses the financial impacts from reduced water sales.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*
>
> *10632 (g) An analysis of the impacts of each of the proposed measures to overcome those revenue and expenditure impacts, such as the development of reserves and rate adjustments.*

The majority of operating costs for most water agencies are fixed rather than a function of the amount of water sold. As a result, when significant conservation programs are undertaken, it is frequently necessary to raise water rates because the revenue generated is based on lower total consumption while the revenue required is basically fixed.

- A water budget shall be assigned to each potable water customer based on the customer's classification. Water budget shall reflect water supply allocation levels to the LVMWD by MWDSC. The General Manager shall provide each customer with thirty days' notice of the customer's water budget.
- Customers who consume no more water than their budget will pay normal rates and charges. Customers who consume more than their water budget will be assessed a surcharge for usage above the budget. Proceeds collected as a result of a surcharge will be used to pay penalties assessed by MWDSC, and at the discretion of the Board of Directors, may be refunded to customers, and/or stabilize rates, and/or support water conservation programs.
- LVMWD staff shall process water budget adjustments and appeals pursuant to an appeals process approved by the board of directors.
- The water allocation levels for each classification and surcharge rates shall be established by the board from time to time by resolution.

8.5 ACTIONS DURING A CATASTROPHIC INTERRUPTION

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses a catastrophic interruption of water supplies.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.*

During declared shortages, or when a shortage declaration appears imminent, LVMWD will activate water shortage response measures.

8.6 REDUCTION MEASURING MECHANISM

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses a catastrophic interruption of water supplies.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

LVMWD's water system currently has water meters on all connections. These meters record the amount of water consumed at each location. LVMWD will use these meters in concert with the budgeted water allocations for each customer to monitor district-wide actual reductions in water use.

When allocations were initially set, they were based on lot size. After reductions to allocations, however, some small lot customers were allocated more than their historical usage, and large lot customers had to reduce consumption by 70%.