

Errata Sheet for Minor Corrections to North Marin Water District 2015 Urban Water Management Plan (UWMP)

This errata sheet logs minor content errors that were identified after final adoption of the North Marin Water District 2015 UWMP. DWR has determined that these corrections are minor and do not require the UWMP to be amended.

- ☒ These data errors have been corrected in the Department of Water Resources (DWR) UWMP database at <https://wuedata.water.ca.gov/secure/>
- ☒ This errata sheet has been filed with the UWMP in all locations where it is made publicly available, including the California State Library. Errata may be submitted to State Library via email to cslgps@library.ca.gov

Name and agency of the person filing errata sheet:

Drew McIntyre, North Marin Water District

#	Description of Correction	Location	Rationale	Date Error Corrected
1	Update of Table 2-1 (DWR Table 2-1) Column "Public Water System" changed from " Novato " to " Novato Water System "	Page 2-1	Name clarification	October 17, 2017
2	Update of Table 4-1 (DWR Table 4-1). Edited NOTES: to read "From D. Ladd 3/22/16 attached Water Audit Analysis (Appendix C) . . . "	Page 4-2	Added name of author of form attached	October 17, 2017
3	Update of Table 5-5 (SB X7-7 Table 4) Changed 2015 Gross Water Use and Annual Gross Water Use from 7,237 to 7,829	Page 5-6	Improved accuracy of reported volume	October 17, 2017
4	Update of Table 5-6 (SB X7-7 Table 5) Column "2015 Compliance Year GPCD, Gross Water Use Fm SB X7-7 Table 4" amount changed from 7,237 to 7,829	Page 5-7	Improved accuracy of reported volume	October 17, 2017
5	Update of Table 5-6 (SB X7-7 Table 5) Column "2015 Compliance Year GPCD, Daily Per Capita Water Use" amount changed from 105 to 114	Page 5-7	Calculated value changed from correction of the reported volume	October 17, 2017
6	Update of Table 5-7 (SB X7-7 Table 6) 2015 Compliance Daily Per Capita Water Use " ...water use of 105 114 GPCD . . . "	Page 5-8	Calculated value changed from correction of the reported volume	October 17, 2017
7	5.7 2015 Compliance Daily Per Capita Water Use " ...water use of 105 114 GPCD . . . "	Page 5-10	Calculated value changed from correction of the reported volume	October 17, 2017

8	Update Table 5-11 (SB X7-7 Table 9) Columns "Actual 2015 GPCD", "Adjusted 2015 GPCD" and "2015 GPCD (Adjusted if applicable)" changed from 105 to 114	Page 5-10	Incorrect amount	October 17, 2017
9	Table 6-3 Retail Edited title: "Table 6-3 6-4 (DWR Table 6-3) "	Page 6-13	Incorrect table title	October 17, 2017
10	Table 6-4 (DWR Table 6-3) Column "Recycled Within Service Area" amounts changed from: 4367 1370 , 288 314 , 1,795 1,824	Page 6-13	Improved accuracy of reported volumes	October 17, 2017
11	1 st paragraph, 1 st sentence: "Table's 6-5 A & B (DWR Table's 6-4 A & B shows 2015 recycled water demand coupled with future demands through 2040 in five year increments for Novato Sanitary District and Las Gallinas Valley Sanitary District, respectively. "	Page 6-16	Table 6-5 has been subdivided into Tables 6-5A and 6-5B. Text changed to reflect separate recycled water suppliers	October 17, 2017
12	Table 6-5A Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area from Novato Sanitary District, also added Ag Irrigation to table See attached	Page 6-16	Reported volumes adjusted to reflect volume supplied by Novato Sanitary District	October 17, 2017
13	Table 6-5B Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area from Las Gallinas Valley Sanitary District See attached	Page 6-16A	Second table added to reflect volume supplied by Las Gallinas Valley Sanitary District	October 17, 2017
14	6.5.4.2 Planned Versus Actual Use of Recycled Water, 3 rd sentence: "... recycled water for landscape and golf course irrigation (i.e., 432 454 AFA) is ~75 78% ..."	Page 6-17	Text changed to reflect improved accuracy of reported volumes	October 17, 2017
15	Table 6-5 (DWR Table 6-5) Edited title: Table 6-5 6-6 (DWR Table 6-5)	Page 6-17	Table numbering change	October 17, 2017
16	Table 6-5 (DWR Table 6-5), Column "2015 Actual Use", changed amounts from 229 to 237 and 225 to 217	Page 6-17	Improved accuracy of reported volumes	October 17, 2017
17	Table 6-8 (DWR Table 6-7) Column "Expected Increase in Water Supply to Agency" amount from 248 to 196	Page 6-20	Improved accuracy of reported volumes	October 17, 2017

NORTH MARIN WATER DISTRICT

2015 URBAN WATER MANAGEMENT PLAN

JUNE, 2016



PREPARED BY:

NORTH MARIN WATER DISTRICT

TABLE OF CONTENTS

	PAGE
SECTION 1 INTRODUCTION AND OVERVIEW	
1.1 Introduction	1-1
1.2 Purpose	1-1
1.3 Changes from 2010 UWMP	1-2
1.4 Plan Organization	1-2
SECTION 2 PLAN PREPARATION	
2.1 Basis for Preparing a Plan	2-1
2.2 Regional Planning	2-1
2.3 Individual or Regional Planning and Compliance	2-2
2.4 Calendar Year and Unit of Measure	2-2
2.5 Coordination and Outreach	2-3
SECTION 3 SYSTEM DESCRIPTION	
3.1 General Description of Water System	3-1
3.1.1 Groundwater Facilities	3-4
3.1.2 Distribution System	3-4
3.1.3 Storage	3-4
3.1.4 Pump Stations	3-6
3.1.5 Distribution Pipelines	3-7
3.2 Description of Service Area	3-7
3.3 Climate	3-8
3.4 Employment, Land Use, and Population	3-8
3.4.1 Employment Characteristics	3-8
3.4.2 Land Use Characteristics	3-9
3.4.3 Population Projections	3-9
SECTION 4 SYSTEM WATER USE	
4.1 Recycled versus Potable and Raw Water Demand	4-1
4.2 Water Use by Sector	4-2
4.2.1 Water Use by Customer Type	4-2
4.2.2 Sales to Other Agencies	4-3
4.2.3 Conjunctive Use	4-4
4.2.4 Total Water Demands	4-4
4.3 Distribution Water Losses	4-4
4.4 Estimating Future Water Savings	4-5
4.5 Water Use for Lower Income Households	4-6
SECTION 5 SB X7-7 BASELINES AND TARGETS	
5.1 Updating Calculations from 2010 UWMP	5-1
5.2 Baselines and Targets	5-1
5.3 Service Area Populations	5-3
5.4 Gross Water Use	5-4
5.5 Baseline Daily per Capita Water Use	5-6
5.6 Water Use Targets (2015, 2020)	5-8
5.7 2015 Compliance Daily per Capita Water Use	5-10
5.8 Regional Alliance	5-10

	PAGE
SECTION 6	SYSTEM SUPPLIES
6.1	Purchased Water 6-1
6.1.1	Description 6-1
6.1.2	Physical Constraints 6-2
6.1.3	Legal Constraints 6-2
6.2	Groundwater 6-4
6.2.1	Description 6-5
6.2.2	Physical Constraints 6-6
6.2.3	Legal Constraints 6-8
6.3	Surface Water 6-8
6.4	Stormwater 6-8
6.5	Wastewater and Recycled Water 6-8
6.5.1	Coordination 6-9
6.5.2	Wastewater Collection, Treatment and Disposal 6-9
6.5.2.1	Wastewater Collected Within Service Area 6-10
6.5.2.2	Wastewater Treatment and Discharge within Service Area 6-11
6.5.3	Recycled Water System 6-15
6.5.4	Recycled Water Beneficial Use 6-15
6.5.4.1	Current and Planned Uses of Recycled Water 6-15
6.5.4.2	Planned versus Actual Use of Recycled Water 6-17
6.5.5	Actions to Encourage and Optimize Future Recycled Water Use 6-18
6.6	Desalinated Water Opportunities 6-18
6.7	Exchanges or Transfers 6-19
6.8	Future Water Projects 6-19
6.9	Summary of Existing and Planned Sources of Water 6-22
6.10	Climate Change Impacts to Supply 6-23
SECTION 7	WATER SUPPLY RELIABILITY ASSESSMENT
7.1	Constraints on Water Sources 7-1
7.2	Reliability by Type of Year 7-2
7.3	Supply and Demand Assessment 7-6
7.4	Regional Supply Reliability 7-8
SECTION 8	WATER SHORTAGE CONTINGENCY PLANNING
8.1	Stages of Action (Water Code 10632(a)) 8-1
8.2	Prohibitions on End Uses (Water Code 10632(a) 4-5) 8-2
8.2.1	Landscape Irrigation 8-5
8.2.2	Commercial, Industrial and Institutional (CII) 8-6
8.2.3	Water Features and Swimming Pools 8-6
8.2.4	Defining Water Features 8-6
8.2.5	Other 8-6
8.3	Penalties, Charges and Other Enforcement of Prohibitions (Water Code 10632(a.6)) 8-6
8.4	Consumption Reduction Methods (Water Code 10632(a.5)) 8-7
8.5	Determining Water Shortage Reductions (Water Code 10632(a.9)) 8-8
8.6	Revenue and Expenditure Impacts (Water Code 10632(a.7)) 8-8
8.6.1	Drought Rate Structures and Surcharges 8-8
8.6.2	Use of Financial Reserves 8-8
8.6.3	Other Measures 8-9
8.7	Resolution or Ordinance (Water Code 10632 (a.8)) 8-9
8.8	Catastrophic Supply Interruptions (Water Code 10632(a.3)) 8-9
8.9	Minimum Supply Next Three Years (Water Code 10632(a.2)) 8-10

	PAGE
SECTION 9 DEMAND MANAGEMENT MEASURES	
9.1 CUWCC and BMP Implementation (Water Code 10631(i))	9-1
SECTION 10 PLAN ADOPTION, SUBMITTAL AND IMPLEMENTATION	
10.1 Inclusion of all 2015 Data	10-1
10.2 Notice of Public Hearing	10-1
10.2.1 Notice to Cities and Counties (Water Code 10621(b) and 10642))	10-1
10.2.2 Notice to the Public (Water Code 10642 and Govt' Code 6066))	10-2
10.3 Public Hearing and Adoption (Water Code 10642 and 10608.26)	10-2
10.3.1 Adoption	10-3
10.4 Plan Submittal (Water Code 10621, 10635 and 10644)	10-3
10.5 Public Availability	10-3
10.6 Amending an Adopted UWMP (Water Code 10621 and 10644)	10-3

APPENDICES

Appendix A	Letter to Interested Agencies re Notice of Review and Preparation of 2015 UWMP) (February 4, 2016) Published Notices of Public Hearing in Marin IJ (June 8 and June 15, 2016) Letter to Interested Agencies re Notice of Public Comment Period and Public Hearing (June 8, 2016) Letter Transmission to Novato Public Library (June 8, 2016) Adopted Resolution
Appendix B	R. Grisso Memo – NMWD Calculation for Baseline and Compliance Urban per Capital Water Use for Consistent Implementation of SB 7X-7 for 2015 Urban Water Management Plan (April 27, 2016) C. DeGabriele Memo – 2015 Urban Water Management Plan – NMWD Novato Service Territory – Population and Jobs Projections (March 6, 2015) Regional Alliance Letter (May 18, 2011) 2015 Urban Water Management Plan Water Demand Analysis and Water Conservation Measures Update – Maddaus Report (July 1, 2015)
Appendix C	NMWD Water Shortage Contingency Plan April 2016 NMWD Regulation 15 CUWCC BMP Retail Coverage Report 2014 and 2013 D. Ladd Memo - NMWD Water Loss Audit (March 22, 2016)
Appendix D	Department of Water Resources Checklist
Appendix E	UWMP Standardized Tables and SB X7-7 Tables

LIST OF TABLES

	PAGE
Table 2-1 (DWR Table 2-1) Retail Only: Public Water Systems	2-1
Table 2-2 (DWR Table 2-2) Plan Identification	2-2
Table 2-3 (DWR Table 2-3): Agency Identification	2-3
Table 2-4 (DWR Table 2-4) Retail: Water Supplier Information Exchange	2-3
Table 2-5 Coordination with Appropriate Agencies	2-4
Table 3-1 Water Storage Facilities	3-5
Table 3-2 Hydropneumatic Tank Systems	3-6
Table 3-3 Novato Water System Active Pump Stations	3-7
Table 3-4 Climate	3-8

	PAGE
Table 3-5 (DWR Table 3-1) Retail: Population – Current and Projected	3-9
Table 4-1 (DWR Table 4-1) Retail: Demands for Potable and Raw Water – Actual	4-2
Table 4-2 (DWR Table 4-2) Retail: Demands for Potable and Raw Water – Projected	4-3
Table 4-3 (DWR Table 4-3) Retail: Total Water Demands	4-4
Table 4-4 (DWR Table 4-4) Retail: 12 Month Water Loss Audit Reporting	4-4
Table 4-5 (DWR Table 4-5) Retail Only: Inclusion in Water Use Projections	4-5
Table 4-6 Comparison between Active and Passive Savings (AFA)	4-6
Table 4-7 Lower Income Household Water Demands	4-6
Table 5-1 (SB X7-7 Table 1): Baseline Period Ranges	5-2
Table 5-2 (DWR Table 5-1) Baselines and Targets Summary	5-2
Table 5-3 (SB X7-7 Table 2): Method for Population Estimates	5-3
Table 5-4 (SB X7-7 Table 3): Service Area Population	5-3
Table 5-5 (SB X7-7 Table 4): Annual Gross Water Use	5-5
Table 5-6 (SB X7-7 Table 5): Gallons Per Capita Per Day (GPCD)	5-6
Table 5-7 (SB X7-7 Table 6): Gallons per Capita per Day	5-8
Table 5-8 (SB X7-7 Table 7): 2020 Target Method	5-9
Table 5-9 (SB X7-7 Table 7-A): Target Method 1	5-9
Table 5-9 (SB X7-7 Table 7-F): Confirm Minimum Reduction for 2020 Target	5-9
Table 5-10 (SB X7-7 Table 8): 2015 Interim Target GPCD	5-10
Table 5-11 (SB X7-7 Table 9): 2015 Compliance	5-10
Table 5-12 (SB X7-7 RA1 – Weighted Baseline)	5-12
Table 5-13 (SB X7-7 RA1 – Weighted 2020 Target)	5-12
Table 5-14 (SB X7-7 RA1 – 2015 Target)	5-13
Table 5-15 (SB X7-7 RA1 – 2015 GPCD (Actual))	5-13
Table 5-16 (SB X7-7 RA1 – Compliance Verification)	5-14
Table 6-1 Purchased Water Supply (AFA)	6-2
Table 6-2 (DWR Table 6-1) Retail: Groundwater Volume Pumped	6-5
Table 6-3 (DWR Table 6-2) Retail: Wastewater Collected Within Service Area in 2015	6-10
Table 6-4 (DWR Table 6-3) Retail: Wastewater Treatment and Discharge Within Service Area in 2015	6-13
Table 6-5 (DWR Table 6-4) Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area	6-16
Table 6-6 (DWR Table 6-5) Retail: 2010 UWMP Recycled Water use Projection Compacted to 2015 Actual	6-17
Table 6-7 (DWR Table 6-6) Retail: Methods to Expand Future Recycled Water Use	6-18
Table 6-8 (DWR Table 6-7) Retail: Expected Future Water Supply Projects or Programs	6-20
Table 6-9 Water Supply Strategies	6-21
Table 6-10 (DWR Table 6-8) Retail: Water Supplies – Actual	6-22
Table 6-11 (DWR Table 6-9) Retail: Water Supplies – Projected	6-23
Table 7-1 Factors Resulting in Inconsistency of Supply	7-1
Table 7-2 Water Quality – Current and Projected Water Supply Impacts	7-2
Table 7-3 Basis of Water Year Data	7-3
Table 7-4 Projected Wholesale Supplies	7-3
Table 7-5 2040 Water Supply Reliability	7-4
Table 7-6 (DWR Table 7-1) Retail: Basis of Water Year Data	7-5
Table 7-7 (DWR Table 7-2) Retail: Normal Year Supply and Demand Comparison	7-6
Table 7-8 (DWR Table 7-3) Retail: Single Dry Year Supply and Demand Comparison	7-6
Table 7-9 (DWR Table 7-4) Retail: Multiple Dry Years Supply and Demand Comparison	7-7
Table 8-1 (DWR Table 8-1) Retail: Stages of Water Shortage Contingency Plan	8-2
Table 8-2 (DWR Table 8-2) Retail: Restrictions and Prohibitions on End Uses	8-3
Table 8-3 Water Shortage Contingency – Penalties and Charges	8-7
Table 8-4 (DWR Table 8-3) Retail Only: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods	8-7

	PAGE
Table 8-5 Preparation Actions for a Catastrophe	8-9
Table 8-6 (DWR Table 8-4) Retail: Minimum Supply Next Three Years	8-10
Table 9-1 CUWCC BMP/DMM and NMWD Water Conservation Program	9-2
Table 10-1 (DWR Table 10-1) Retail: Notification to Cities and Counties	10-2

LIST OF FIGURES

Figure 3-1.	Agency's Russian River Water Supply Facilities	3-2
Figure 3-2.	District Water Supply Facilities	3-3
Figure 6-1.	Groundwater Basins	6-7
Figure 6-2.	NMWD Recycled Water Service Areas – North-Central	6-12
Figure 6-3.	NMWD Recycled Water Service Area – South	6-14

REFERENCES

1. California Department of Water Resources (DWR) 2015 Guidebook for Urban Suppliers (January 2016)
2. STP Upgrade Design Report, SPH Associates, 2002
3. 2012 Novato Water System Master Plan Update (Final Report dated April 2013).
4. 2012 Novato Water System Master Plan Update (Final Report dated April 2013).
5. City of Novato Housing Element 2007-2014.
6. SCWA 2015 UWMP
7. R. Grisso SBX7-7 Analysis (April 27, 2016) in Appendix B.
8. C. DeGabriele Population and Jobs Projection memo (March 6, 2015) in Appendix B.
9. C. DeGabriele Population and Jobs Projection memo (March 6, 2015) in Appendix B.
10. T:\AC\EXCEL\wtr_use\Production.xlsx
11. US Census Bureau American Fact Finder for City of Novato using 2010-2014 American Community Survey 5 Yr Estimates (adjusted to 2014 inflation dollars). Median income estimate is \$76,609.
12. SWRCB Permits Numbers 12947A, 12949, 12950, and 16596.
13. California Department of Water Resources, 2004.
14. Luhdorff and Scalmanini, 2005, United States Department of Agriculture, 1972.

15. 2012 Novato Water System Master Plan Update (Final Report dated April 2013).
16. Nute Engineering, 2004.
17. NMWD SRF Project Report No. 3 – Recycled Water Expansion – North Service Area.
18. NMWD Engineer's Report for the Distribution and Use of Recycled Water (RMC, August 2011).
19. NMWD and NSD Recycled Water Master Plan (Nute, 2004).
20. NMWD and NSD Recycled Water Implementation Plan (Nute, 2006).
21. 2012 Novato Water System Master Plan Update (Final Report dated April 2013).
22. SCWA 2015 UWMP.
23. Email communication from Agency Engineer Don Seymour dated May 24, 2016.

SECTION 1

INTRODUCTION AND OVERVIEW

1.1 Introduction

This 2015 Urban Water Management Plan (UWMP) addresses the North Marin Water District (District or NMWD) Novato water system and includes a description of the water supply sources, magnitudes of historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years. The District receives the majority (~80%) of its water from Sonoma County Water Agency (Agency), which provides water principally from the Russian River to several retail water contractors, primarily in Sonoma County, California. The remainder of the District's water supply is from its local Stafford Lake water supply and a modest amount of recycled water developed in cooperation with Novato and Las Gallinas Valley Sanitary Districts.

1.2 Purpose

Prior to the state's 1983 Urban Water Management Planning Act (UWMPA), there were no specific requirements that water agencies conduct long-term resource planning. The UWMPA requires a minimum level of resource assessment and planning by water suppliers. The UWMPA has been modified over the years in response to the State's water shortages, droughts and other factors. A significant amendment was made in 2009, after the drought of 2007-2009 and as a result of the governor's call for a statewide 20 percent reduction in urban water use by the year 2020. Passage of the Water Conservation Act of 2009 (aka SBX7-7) required agencies to establish water use targets for 2015 and 2020 that would result in statewide savings by the year 2020.

As stated in the California Department of Water Resources (DWR) 2015 Guidebook for Urban Suppliers (January 2016), *"There is no substitute for water planning at the local water supplier level. Only a local supplier has the knowledge, ability to consider the unique circumstances of the individual agency, can provide for participation by the community, and tailor the planning to local conditions."* Every five years, the District updates its UWMP (or Plan). The District was included in a Regional UWMP prepared by the Agency in 2000. The District's first individual UWMP was prepared in 2005 with a second UWMP prepared in 2010 (revised in 2011). This 2015 UWMP was prepared in compliance with the requirements of the UWMPA and its amendments as they apply to urban water suppliers such as North Marin Water District.

1.3 Changes from 2010 UWMP

Since preparation of the District's 2010 UWMP, a number of changes to the California Water Code (CWC) have been made that impact preparation of UWMPs. They include but are not limited to:

- Demand Management Measures (CWC Section 10631) – Requires water suppliers to provide narratives describing their water demand management measures (DMM).
- Submittal Date (CWC Section 10621) – Requires each urban water supplier to submit its 2015 UWMP to the DWR by July 1, 2016.
- Standardized Forms (CWC Section 10644) – Requires the UWMP to be submitted electronically.
- Water Loss (CWS 10631) – Requires the UWMP to quantify and report on distribution system losses.
- Estimating Future Water Savings (CWC Section 10631) – Provides for water use projections to display and account for the water savings estimated to result from adopted codes, standards or ordinances.
- Defining Water Features (CWC Section 10632) – Requires urban water suppliers to analyze and define water features that are artificially supplied with water separately from swimming pools and spas.

1.4 Plan Organization

Section 1 provides an introduction and overview of the Plan. Section 2 provides a basis for Plan preparation including a discussion on regional planning and overall coordination and outreach. Section 3 provides a general description of the service area, climate, water supply facilities and distribution system and population/demographics. Section 4 provides system water use including current water uses and future water use projections through the year 2040. Section 5 provides baseline and target per capital water use. Section 6 provides a summary of all water supplies including local surface water, recycled water and Agency supplies. Section 7 provides an assessment on the long term water supply reliability. Section 8 provides water shortage contingency planning. Section 9 provides a summary of water conservation and Demand Management Measures. Section 10 provides a discussion on the UWMP public notification, adoption and submittal process and Appendices A through D provide relevant supporting documents.

DWR has provided a checklist of the items that must be addressed in each Plan based upon the UWMPA. This checklist makes it simple to identify exactly where in the plan each item has been addressed. The checklist is completed for this Plan and provided in Appendix D. It references the sections and page numbers where the specific items can be found. The tables that are recommended by DWR are identified in this Plan with their applicable DWR table number¹.

¹ California Department of Water Resources (DWR) 2015 Guidebook for Urban Suppliers (January 2016)

SECTION 2

PLAN PREPARATION

This section provides information on the process for developing the District's 2015 UWMP including an overview of coordination with other agencies, and a description of public outreach.

2.1 Basis for Preparing a Plan

The District's 2015 UWMP has been prepared in accordance with the Urban Water Management Act (UWMPA). The UWMPA is defined by the California Water Code, Division 6, Part 2.6, and Sections 10610 through 10656. The UWMPA requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections or supplying more than 3,000 ac-ft of water annually, to adopt and submit a plan every five years to the California Department of Water Resources (DWR).

Table 2-1 (DWR Table 2-1) provides information on the District's public water system which services the Novato service area.

Table 2-1 (DWR Table 2-1) Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
02-18-09P2110003	Novato	20,498	7,829
TOTAL		20,498	7,829
NOTES: Number of connections from FY15 Annual Report, Pg 22. Water supply volume in AF and from Table 4-1 (see notes at bottom).			

2.2 Regional Planning

The District has the option to prepare an individual or regional UWMP. Although the District's Plans have been based on individual reporting, each five year update includes close coordination on the regional level with the Agency and other Agency Contractors as discussed in Section 2.3.

2.3 Individual or Regional Planning and Compliance

As with the 2005 and 2010 UWMP's, the District's 2015 UWMP has been prepared as an individual, not a regional plan, as shown in Table 2-2 (DWR Table 2-2). However, the 2015 UWMP was developed with close coordination with its wholesaler, the Agency, and other water contractors that receive water from the Agency. Furthermore, a regional alliance was formed in 2011 among these agencies including the cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor, Marin Municipal Water District, Valley of the Moon Water District and North Marin Water District to comply with SBX7-7, the Water Conservation Act of 2009. This Regional Alliance is used within the 2015 UWMP for reporting on regional 2015 and 2020 water use targets. All other elements of the CWC requirements are addressed in the District's Individual Plan.

Table 2-2 (DWR Table 2-2): Plan Identification		
Select Only One	Type of Plan	Name of RUWMP or Regional Alliance <i>if applicable</i> <i>drop down list</i>
<input checked="" type="checkbox"/>	Individual UWMP	
	<input type="checkbox"/> Water Supplier is also a member of a RUWMP	
	<input checked="" type="checkbox"/> Water Supplier is also a member of a Regional Alliance	North Marin-Sonoma Alliance
<input type="checkbox"/>	Regional Urban Water Management Plan (RUWMP)	
NOTES:		

2.4 Calendar Year and Unit of Measure

As shown in Table 2-3 (DWR Table 2-3), this 2015 UWMP reports on a Fiscal Year basis. All water volumes are reported in acre-feet, unless otherwise indicated.

Table 2-3 (DWR Table 2-3): Agency Identification	
Type of Agency (select one or both)	
<input type="checkbox"/>	Agency is a wholesaler
<input checked="" type="checkbox"/>	Agency is a retailer
Fiscal or Calendar Year (select one)	
<input type="checkbox"/>	UWMP Tables Are in Calendar Years
<input checked="" type="checkbox"/>	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
07/01	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES:	

2.5 Coordination and Outreach

The UWMPA requires the District to 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. The District coordinated the preparation of its Plan with its wholesale water supplier, the Agency, other water contractors that receive water from the Agency, the City of Novato, the Novato Sanitary District, the Las Gallinas Valley Sanitary District, the County of Marin and County of Sonoma. On February 4, 2016, a letter was sent to each of these entities advising that NMWD was reviewing and updated the UWMP. In addition, the District reviewed the ABAG Projections 2013 including the most recent 2010 census data in development of the water demand projections in this Plan. Per CWC Section 10631, Table 2-4 (DWR Table 2-4) confirms the District provided the Agency with water use projections for Agency supply in five year increments through 2040 (see Table 6-11 (DWR Table 6-9)).

Table 2-4 (DWR Table 2-4) Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name <i>(Add additional rows as needed)</i>
Sonoma County Water Agency
NOTES:

Table 2-5 provides a summary of the District's coordination with the appropriate agencies. The District encouraged community and public interest involvement in the Plan update through public hearing and inspection of the draft document. Public hearing notifications were published in the Marin Independent Journal on June 8 and June 15, 2016. A copy of the published Notice of Public Hearing is included in Appendix A. The hearing provides an opportunity for all residents and employees within the Novato service area to learn and ask questions about their water supply in addition to the District's plans for providing a reliable, safe, high-quality water supply. Copies of the draft Plan are available for public inspection on the District's website, the District's Administration Building and at the local Novato public library. Copies of the notices, advertisements and outreach lists are provided in Appendix A.

Table 2-5
Coordination with appropriate agencies

Coordinating Agencies ^{1,2}	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 / No information
Sonoma County Water Agency	x			x		x	
Novato Sanitary District				x		x	
Las Gallinas Valley Sanitary District				x			
Marin County LAFCO		x		x		x	
Marin Municipal Water District	x			x			
County of Marin				x		x	
City of Novato				x		x	
City of Sonoma	x			x			
City of Santa Rosa	x			x			
City of Rohnert Park	x			x			
City of Cotati	x			x			
City of Petaluma	x			x			
Town of Windsor	x			x			
Valley of the Moon Water District	x			x			
County of Sonoma PRMD				x		x	
General public			x				
Other							

¹ Indicate the specific name of the agency with which coordination or outreach occurred.

² Check at least one box in each row.

SECTION 3

SYSTEM DESCRIPTION

This section describes the District's water system, including a description of the service area and its climate, water system facilities (including surface water supply facilities and the distribution system) and populations/demographics.

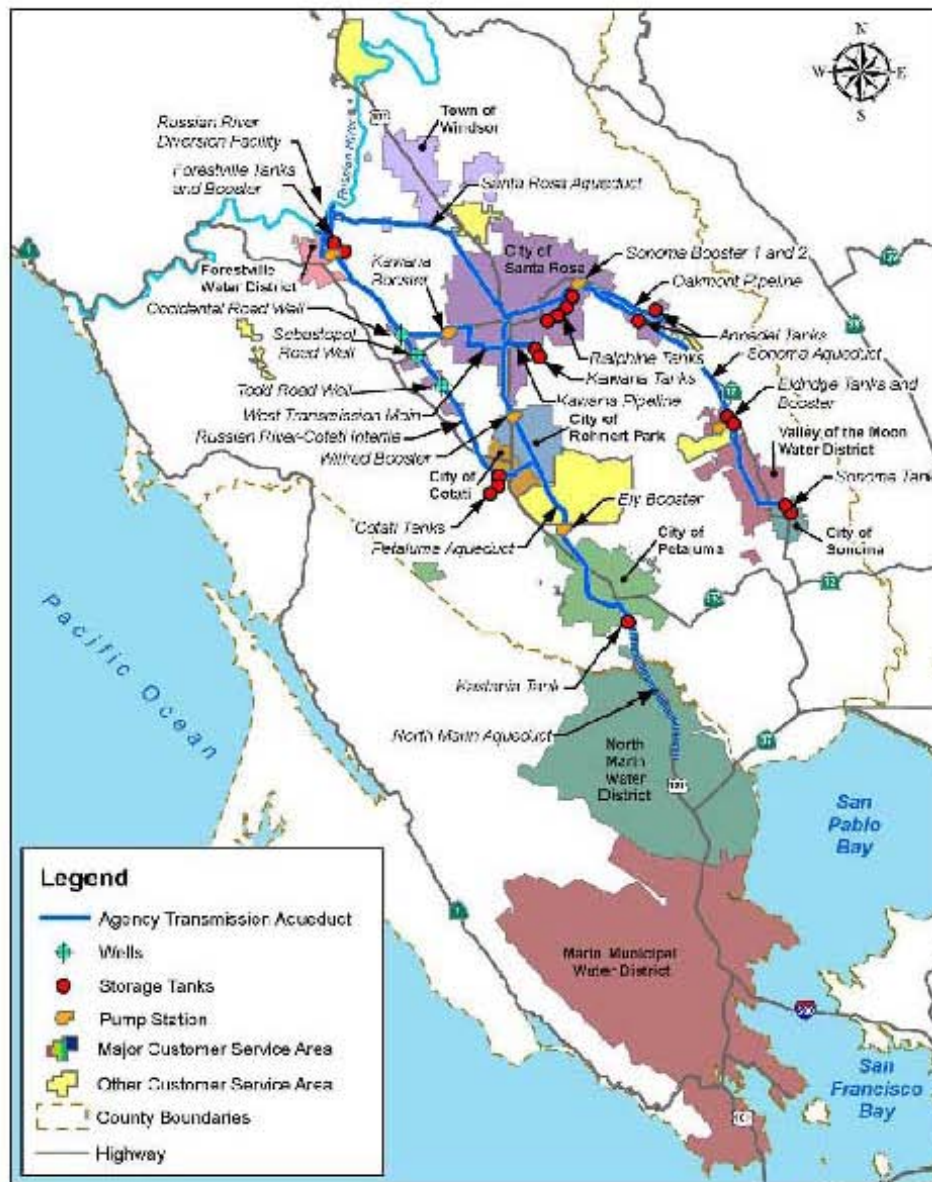
3.1 General Description of Water System

The District receives the majority of its water supply from the Agency's Russian River Project. Additional details regarding sources of water supply including Recycled Water are included in Section 6. The Santa Rosa Aqueduct and the Russian River-Cotati Intertie carry primarily Russian River water from the Agency diversion facilities located in the Wohler and Mirabel areas to the District via the Petaluma and North Marin Aqueducts. In addition, the Agency operates three groundwater wells in the Santa Rosa Plain that supplement the water supply from the Russian River. A map of the Agency's Aqueduct system is provided in Figure 3-1.

The District's Novato Water System maintains a local source of supply, Stafford Lake, in addition to the water purchased from the Agency. The District operates its Stafford Lake source seasonally to reduce peak demand on the Agency's Aqueduct system. A map of the District's Novato water system is presented in Figure 3-2. The District's water supply from Stafford Lake is treated at the Stafford Treatment Plant (STP). Water from Stafford Lake is drawn through an intake tower and, depending on the water surface elevation, is either gravity-fed or pumped to the STP. The STP, which was constructed in 1951, was upgraded in 1973 and completely rehabilitated in 2006. The rehabilitated STP uses chlorine dioxide as a pre-oxidant followed by Actifloc™ ballasted sand clarification with conventional filtration, chlorination and pH adjustment (sodium hydroxide addition)² and has a design capacity of 6 million gallons per day (mgd).

² STP Upgrade Design Report, SPH Associates, 2002
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Figure 3-1. Agency's Russian River Water Supply Facilities



3.1.1 Groundwater Facilities

The District's Novato Water System has no developed groundwater supply source.

3.1.2 Distribution System

The District receives treated (potable) water from the Stafford Lake Water Treatment Plant and the Agency's Petaluma Aqueduct. The District owns and operates a 30, 36 and 42-inch diameter North Marin Aqueduct that transports water from the Agency's Petaluma Aqueduct near Kastania Tank in south Petaluma to Novato. The District has four separate pressure zones, using 31 storage tanks, 26 booster pump stations, and seven hydropneumatic systems that have combined storage and pump stations. More detailed information is available in the District's 2012 Master Plan³

3.1.3 Storage

The District maintains extensive treated water storage facilities due to its distance from Agency storage facilities. The District's four pressure zones each have gravity storage in one or more storage tanks. A total of 29 storage facilities are located throughout the Novato Water System with a total capacity of 37 million gallons. Approximately 48 percent of the total system demand is in Zone 1 and 43 percent in Zone 2. Tank locations and specifications are summarized in Tables 3-1 and 3-2.

³ 2012 Novato Water System Master Plan Update (Final Report dated April 2013)
T:\GM\UWMP 2015\FINAL North Marin UWMP Master 2015.doc

Table 3-1 Water Storage Facilities

Zone	Storage Tanks	Capacity (gallons)	Type of construction	Year built
1	Lynwood 1	500,000	Welded Steel	1958
1	Lynwood 2	850,000	Welded Steel	1963
1	Atherton	5,000,000	Welded Steel	1973
1	Amaroli	4,500,000	Concrete	2002
1	Palmer Dr	3,000,000	Welded Steel	2008
	Total Zone 1	13,850,000		
2	Sunset	5,000,000	Welded Steel	1963
2	Trumbull	1,500,000	Welded Steel	1963
2	San Mateo	5,000,000	Welded Steel	1966
2	Crest 1	500,000	Welded Steel	1966
2	Crest 2	500,000	Welded Steel	2011
2	Pacheco (a)	5,000,000	Concrete	1975
2	Black Point	324,000	Welded Steel	2000
2	Hancock	2,100	Fiberglas	1974
2	Air Base	1,000,000	Welded Steel	1957
	Total Zone 2	18,826,100		
3	Ponti	500,000	Welded Steel	1976
3	Cherry Hill 2	200,000	Welded Steel	1997
3	Cherry Hill 1	250,000	Welded Steel	1979
3	Garner	100,000	Welded Steel	1986
3	Half Moon	100,000	Welded Steel	1969
3	Wild Horse Valley	500,000	Welded Steel	1966
3	Center Road	500,000	Welded Steel	2008
3	Winged Foot	600,000	Welded Steel	1964
3	San Andreas	250,000	Welded Steel	1985
3	World College West	200,000	Welded Steel	1982
3	Dickson	250,000	Welded Steel	1988
3	Nunes	120,000	Welded Steel	1994
3	Old Ranch Road	50,000	Redwood	1963
3	Windhaven	8,000	Concrete	1991
	Total Zone 3	3,628,000		
4	Upper Wild Horse	44,000	Bolted Steel	1987
4	Buck	500,000	Welded Steel	1997
4	Cabro Court	5,500	Concrete	2001
	Total Zone 4	549,500		
Other-Kastania (SCWA)		12,000,000		

Table 3-2 Hydropneumatic Tank Systems

Hydropneumatic System	Tank Size (Gallons)	Year Built
Hayden	3,500 ^a	1963
Eagle Drive	4,000 ^a	1959
Bahia	3,000	1970
San Marin East	3,000	1980
Indian Hills	6,000	1982
Diablo	1,500	1985
Garner	4,200	1985
Total	17,700	

Note:

^aTwo tanks at these sites.

3.1.4 Pump Stations

The District's water distribution system, serving the greater Novato area, is divided into four pressure zones. Zone 1, at the lowest elevation, is supplied by water delivered from the Agency via the Petaluma Aqueduct and the North Marin Aqueduct, as well as water pumped from Stafford Lake Water Treatment Plant. Water to supply the other zones is pumped from Zone 1. Transmission mains vary in size from 16 to 24 inches in diameter. Table 3-3 summarizes the characteristics of the District's pump stations.

Table 3-3 Novato Water System Active Pump Stations

<i>From Zone</i>	<i>To Zone</i>	<i>Location</i>	<i>No. of Pumps</i>	<i>HP</i>	<i>Pump Capacity (gpm)</i>
1	2	San Marin	3	100-100-100	1,800
1	2	Lynwood	3	100-100-100	1,800
1	2	School Road	2	30-30	400
1	2	Hayden ^a	2	5.0-5.0	75
1	2	Hancock	1	1.0	35
1	3	Cherry Hill	2	15-15	140
1	2	Diablo Hills ^a	2	3.0-5.0	50
2	3	Davies	2	5.0-5.0	50
2	3	Ridge Road	2	5.0-5.0	80
2	3	Truman	2	7.5-7.5	75
2	3	Winged Foot	2	15-15	150
2	3	Ponti	2	15-15	250
2	3	Trumbull	3	15-15-15	200
2	3	San Andreas	2	10.0-10.0	110
2	3	Eagle Drive ^a	2	10.0-10.0	245
2	3	Bahia ^a	2	7.5-7.5	125
2	3	San Marin East ^a	2	5.0-5.0	80
2	3	Indian Hills ^a	2	7.5-7.5	125
2	3	Nunes	2	5.0-5.0	110
2	3	Woodland Hts	2	7.5-7.5	110
3	4	Garner ^a	2	5.0-5.0	50
3	4	Cabro Ct	1	1.5	25
3	4	Wild Horse Dr	2	3.0-3.0	50
3	4	Buck	2	5.0-5.0	100
Aqueduct	3	Wind Haven	2	1.5-1.5	25
Aqueduct	3	World College West	2	10.0-10.0	100

^aHydropneumatic systems

3.1.5 Distribution Pipelines

Most of the District's distribution pipelines range from 6 to 12 inches in diameter, principally constructed of asbestos cement or polyvinyl chloride, and are up to 65 years old.

3.2 Description of Service Area

The District provides potable water to a total population of approximately 61,381 people (developed from the SBX7-7 analysis in Appendix B) in the Novato service territory in Marin County, just south of the Sonoma County border. The Novato Water System serves primarily the City of Novato and the adjacent surrounding unincorporated areas⁴. Figure's 3-1 and 3-2 identifies the Agency's transmission system and District's Novato Water System service area. This Plan solely addresses the Novato Water System. The District's West Marin Water System has a separate source of supply and there is no physical interconnection of water facilities

⁴ 2012 Novato Water System Master Plan Update (Final Report dated April 2013)
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between the Novato and West Marin Water System. The West Marin Water System has only 770 connections, serving ~1800 people, and is not subject to the UWMPA.

3.3 Climate

The District's climate is tempered by its proximity to the Pacific Ocean. In common with much of the California coastal area, the year is divided into wet and dry seasons. Approximately 93 percent of the annual precipitation normally falls during the wet season, October to May, with a large percentage of the rainfall typically occurring during three or four major winter storms. Winters are cool, and below-freezing temperatures seldom occur. Summers are warm and the frost-free season is fairly long. Annual precipitation averages 27.3 inches. Table 3-4 summarizes average monthly evapotranspiration rates (ET_o), rainfall, and temperatures from July 1986 to January 2002.

Table 3-4 - Climate

	Standard average ET _o ^a , in	Average rainfall ^b , in	Average temperature ^b , °F
January	1.09	6.44	47.23
February	1.66	5.26	51.27
March	2.95	3.89	53.56
April	4.17	1.83	56.56
May	5.17	0.69	61.48
June	6.15	0.25	67.07
July	6.64	0.03	70.10
August	5.83	0.11	69.80
September	4.34	0.31	68.06
October	2.81	1.58	62.23
November	1.26	4.03	53.14
December	0.93	5.20	47.33
Annual	43.00	29.63	58.95

Notes:

^a Data represents the monthly average from July 1986 to January 2002 and was recorded from Novato CIMIS station 63.

ET_o, or evapotranspiration, is the loss of water from evaporation and transpiration from plants.

^b 1952-2005 data recorded at Sonoma station from NOAA website www.wrcc.dri.edu

3.4 Employment, Land Use, and Population

This section describes the District's employment and land use characteristics and current and projected future population.

3.4.1 Employment Characteristics

The District's employment is a variety of industries, with the majority working in education, health services, professional/scientific occupations, management, finance and retail⁵.

⁵ City of Novato Housing Element 2007-2014
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Regionally, employment in the agricultural industry is related to vineyards, livestock, orchards, silage crops, and timber. The primary industrial activities in the region include: biochemical production and other high technology, limited wine production, other agricultural product processing, and miscellaneous manufacturing. Recreation and tourism are small but growing industries in the region⁶.

3.4.2 Land Use Characteristics

Land use within the District is primarily residential, but also includes agricultural, industrial, commercial, and recreational land uses.

3.4.3 Population Projections

Table 3-5 (DWR Table 3-1) provides the current and projected population for the District's Novato service area through the year 2040. The 2015 population was derived from the SBX7-7 analysis⁷ with future population projections developed separately⁸ and utilized in Maddaus Report (also included in Appendix B).

Table 3-5 (DWR Table 3-1) Retail: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040(opt)
	61,381	62,656	63,929	65,099	66,139	67,482
NOTES: 2015 from SBX7-7 Table 3 in Appendix B, all other projections from Table 3-1, Pg 20 of July 1 2015 Maddaus Report (Appendix B)						

⁶ SCWA 2015 UWMP

⁷ R. Grisso SBX7-7 Analysis (April 27, 2016) in Appendix B

⁸ C. DeGabriele Population and Jobs Projection memo (March 6, 2015) in Appendix B

SECTION 4

SYSTEM WATER USE

This section describes and quantifies past and current water use and future water use projections through the year 2040 to the extent that records are available. Note that future water use projections are subject to review and revision every 5 years as part of the UWMP update process. The 2015 UWMP demand projections are lower than the 2010 UWMP projections due to a multitude of factors. Both population and employment projections have been reduced based on recent ABAG data⁹. For example, in the year 2035, the 2015 UWMP predicts a population of 66,139 (versus 67,808 in the 2010 UWMP) and employment projection of 32,959 (versus 37,025 in the 2010 UWMP). Another primary driver in reduced water use projections is the effectiveness of the District's comprehensive water conservation programs. Note that there is inherent uncertainty with future water use demand projections due to future changes in economic conditions, regulations, behavior, etc. Again, due to this uncertainty, the District will capture changing conditions during the next UWMP update in 2020.

4.1 Recycled versus Potable and Raw Water Demand

Raw water demand within the District represents a small fraction (i.e., ~2%) of total demand. The District provides raw (untreated) water demand for landscape irrigation to two customers (Marin County – Stafford Lake Park and Indian Valley Golf Course). Raw water demand is projected to remain constant throughout the planning period.

Annual recycled water demand currently represents 5% of total demand and is projected to increase due to expansion of recycled water into the Central Service Area. It should be noted that recycled water demands are essentially related to outdoor irrigation and therefore occur primarily between the months of April to October. As such, actual maximum day supply of recycled water represents up to 14% of the Districts total demand during summer months. For additional demand information refer to Section 4.2 and to Section 6 for more recycled water discussion.

⁹ C. DeGabriele Population and Jobs Projection Memo (March 6, 2015)
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4.2 Water Uses by Sector

4.2.1 Water Use by Customer Type

Water uses in the District include single-family, multi-family (apartments and condominiums), commercial, institutional/government, landscape and others (pools, mobile homes and miscellaneous). Actual 2015 water use by category is shown in Table 4-1 (DWR Table 4-1) and future water use by category is shown in Table 4-2 (DWR Table 4-2). Future water use demands, developed by Maddaus Water Management (MWM) using the Decision Support System (DSS) Model, are detailed in Appendix B.

Table 4-1 (DWR Table 4-1) Retail: Demands for Potable and Raw Water - Actual			
Use Type (Add additional rows as needed)	2015 Actual		
<i>Drop down list</i> <i>May select each use multiple times</i> <i>These are the only Use Types that will be</i> <i>recognized by the WUEdata online submittal tool</i>	Additional Description (as needed)	Level of Treatment When Delivered <i>Drop down list</i>	Volume (AF)
Single Family	61% of total demand (see note)	Drinking Water	4,631
Multi-Family	Apt/Condos, 14% total	Drinking Water	1,063
Commercial	10% of total	Drinking Water	759
Institutional/Governmental	3% of total	Drinking Water	228
Landscape	8% of total	Drinking Water	607
Other	Pools, mobile homes, misc at 4%	Drinking Water	303
Losses	From Appendix L, Water Audit	Drinking Water	238
Other	IVGC and MC Stafford Park	Raw Water	178
TOTAL			8,007
NOTES: From attached Water Audit Analysis, total Novato FY15 Potable (Drinking Water) Water is 7,591 AF (7,829 AF supply - 238 AF (or 77.6 MG) losses. Percentages shown in Additional Description above are based on of the total demand number (7,591 AF). Raw water use is from T:\AC\EXCEL\wtr use\raw water use.xls			

Table 4-2 (DWR Table 4-2) Retail: Demands for Potable and Raw Water - Projected						
Use Type <i>(Add additional rows as needed)</i>	Additional Description <i>(as needed)</i>	Projected Water Use <i>Report To the Extent that Records are Available</i>				
<u>Drop down list</u> <i>May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool</i>		2020	2025	2030	2035	2040-opt
Single Family		5,551	5,538	5,491	5,512	5,567
Multi-Family	Apts/Condos	1,279	1,261	1,233	1,213	1,206
Commercial		990	1,023	1,057	1,100	1,131
Institutional/Governmental		258	262	267	271	275
Landscape		749	778	815	853	881
Other	Pools, mobile homes, misc	369	372	372	373	378
Losses		598	606	610	615	624
Other	Raw water IVGC&MC Park	218	218	218	218	218
TOTAL		10,012	10,058	10,063	10,155	10,280
NOTES: see R. Grisso 4-12-16 email saved under 2015 UWMP regarding Customer Demand Projections including Program B. The above demands differ from Table 3-6 (Pg 27) of Maddaus July 1 2015 Demand Forecast Report to reflect Program B. Any rounding errors are adjusted in the "other" category to have totals match Table ES-2 (Pg 8) for Program B.						

4.2.2 Sales to Other Agencies

The District does not currently sell water to other agencies. Currently, when surplus transmission system capacity is available, MMWD receives Russian River water from the Agency through the District's North Marin aqueduct under the MMWD Supplemental Water Supply Agreement with the Agency. A provision of the Interconnection Agreement between the District and MMWD allows for delivery ("wheeling") of MMWD's Russian River water through the District's aqueduct. Because MMWD has a direct agreement with the Agency, Russian River water delivered to MMWD does not affect the District's allocation. Over the past 10 fiscal years, deliveries of Russian River water wheeled to MMWD have averaged 6,450 acre feet per year¹⁰ (vs 7,830 reported in the 2010 UWMP). The Interconnection Agreement also enables the District to backfeed MMWD's Russian River water into Stafford Lake during drought periods for later treatment and conveyance to MMWD. This provision was last used in 2014 when 359 AF was backfed.

¹⁰ T:\AC\EXCEL\wtr use\Production.xlsx
T:\GM\UWMP 2015\FINAL North Marin UWMP Master 2015.doc

4.2.3 Conjunctive Use

There is no viable groundwater aquifer within the District. Therefore, the District does not currently have a management strategy where surface water is managed in conjunction with groundwater.

4.2.4 Total Water Demands

Table 4-3 (DWR Table 4-3) is a tabulation of showing both actual and projected total system water demands (i.e., potable, raw and recycled water) through the year 2040.

Table 4-3 (DWR Table 4-3) Retail: Total Water Demands						
	2015	2020	2025	2030	2035	2040 (opt)
Potable and Raw Water <i>From Tables 4-1 and 4-2</i>	8,007	10,012	10,058	10,063	10,155	10,280
Recycled Water Demand* <i>From Table 6-4</i>	454	650	650	650	650	650
TOTAL WATER DEMAND	8,461	10,662	10,708	10,713	10,805	10,930
<i>*Recycled water demand fields will be blank until Table 6-4 is complete.</i>						
NOTES:						

4.3 Distribution Water Losses

Table 4-4 (DWR Table 4-4) summarizes distribution system losses for 2015. Water losses are the difference between supplied water and authorized consumption. Water losses include unauthorized consumption, customer meter inaccuracies and systematic data handling errors. The reported total water loss, calculated using the AWWA Water Audit methodology specified in Appendix L of DWR's 2015 UWMP Guidebook, results in a 3% overall system water loss (see Appendix C), or 238 AF.

Table 4-4 (DWR Table 4-4) Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
07/2014	238
<i>* Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.</i>	
NOTES:	

4.4 Estimating Future Water Savings

As indicated in Table 4-5 (DWR Table 4-5), future water use savings associated with passive conservation and water use for lower income households are included in the water use projections shown in Table's 4-2 and 4-3. A more detailed discussion of passive savings is included herein and Section 4.5 discusses water demand associated with Lower Income Households.

Table 4-5 (DWR Table 4-5) Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) <i>Drop down list (y/n)</i>	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc... utilized in demand projections are found.	Refer to App B, Maddaus Water Demand Analysis Rpt (July 1 2015). See "Notes" below.
Are Lower Income Residential Demands Included In Projections? <i>Drop down list (y/n)</i>	Yes
NOTES: Within Maddaus Rpt refer to Program B, Fig 5-1 (Pg 40) and Table 5-1 (Pg 41) for both Passive and Active conservation measures.	

Future water savings are comprised of both active and passive savings. Active savings are attributed to continuation of the District's existing water conservation program with enhancements to include implementation of automatic meter reading (aka AMI). This "Optimized Program" is referred to as Program B in the Maddaus report included in Appendix B and includes 21 separate conservation measures. Key drivers for Program B selection included (1) cost effectiveness, (2) compliance with CUWCC's BMPs and, (3) SB X7-7 reduction targets by 2020. Passive savings due to plumbing code changes are also developed within the Maddaus Report and are attributed to various state and federal standards including CALGreen, SB 407 and AB 715.

The District's service area has a relatively high percentage of residential water use and a significant amount of outdoor water use. Consequently, residential and irrigation conservation programs produce the most savings. Projected active and passive savings through 2040 are included in water use projections summarized in Table's 4-2 and 4-3 and are listed separately in Table 4-6 below (refer to Table 5-2 in Maddaus Report in Appendix B), Active water savings reduce water needs in 2040 by another 5.8% when compared to 2040 potable water demand with passive savings (i.e., plumbing code). Furthermore, in 2040, approximately 86% of the active savings potential is reducing outdoor use.

Table 4-6
Comparison between Active and Passive Savings (AFA)

<i>Savings Type</i>	<i>2020</i>	<i>2025</i>	<i>2030</i>	<i>2035</i>	<i>2040</i>
Active	405	496	568	591	616
Passive	95	212	376	508	620
Total ⁽¹⁾	500	707	944	1098	1237

⁽¹⁾ Rounding errors occur in some tabulations

4.5 Water Use for Lower Income Households

By state statute, a Lower Income Household is defined under the California Health and Safety Code (Section 50079.5) as 80% of the median income. Based on Census data for the Novato service area, the 80% of median income figure is approximately \$61,300¹¹ (vs. \$64,700 in 2010) and the lower income households are estimated to comprise approximately 40% of the total households. Table 4-7 shows the projected water demands for lower income households and is based on 40% of the total single-family and multi-family residential projected water use.

Table 4-7
Lower Income Household Water Demands

<i>Lower Income Water Demands</i>	<i>2020</i>	<i>2025</i>	<i>2030</i>	<i>2035</i>	<i>2040</i>
Single-family Residential (AFA)	2220	2215	2196	2205	2227
Multi-family Residential (AFA)	512	504	493	485	482

¹¹ US Census Bureau American Fact Finder for City of Novato using 2010-2014 American Community Survey 5 Yr Estimates (adjusted to 2014 inflation dollars). Median income estimate is \$76,609.

SECTION 5

SB X7-7 BASELINES AND TARGETS

With adoption of Water Conservation Act of 2009 (Senate Bill X7-7, (SBX7-7), the state is required to set a goal of reducing urban water use by 20% by the year 2020. Each urban water supplier is required to develop a baseline daily per capita water use, establish a per capita water use target for 2020, and an interim water use target for 2015.

5.1 Updating Calculations from 2010 UWMP

In the 2010 UWMP, the District calculated a 2020 Urban Water Use Target using pre-2010 Census data. For the 2015 Plan, DWR required that the District recalculate the baseline populations using both the 2000 and 2010 Census data and submit the updated baseline and targets using standardized tables in the SB X7-7 Verification Form (submitted in Appendix B)

5.2 Baselines and Targets

The base daily per capita water use is the water supplier's average gross daily water use per capita measured in gallons. The baseline includes all water entering the potable water delivery system, including water losses, excluding raw water and recycled water delivered within the supplier's service area, water placed into long-term storage, or water conveyed to other urban water suppliers.

The purpose of developing a base daily per capita water use figure is to have a baseline from which to derive the 2015 and 2020 water use targets for SBX7-7 compliance. The baseline water use is developed for each water supplier based on a 10-year average beginning no earlier than 2005 and ending no later than 2010. In some circumstances, water suppliers may use a 15-year baseline if their recycled water delivery in 2008 was 10% or greater (which was not the case for NMWD).

For development of the District's base daily per capita water use, a 10-year average was used which is based on data from 1995 to 2004 and a 5-year average from 2003 to 2007. These baseline periods are shown in Table 5-1 (SBX7-7 Table1). As summarized Table 5-2 (DWR Table 5-1), the base daily per capita water use is 173 gallons per capita per day (GPCD) (vs 178 in the 2010 UWMP). The 5-year base daily per capita water use remains unchanged since the 2010 UWMP at 162 GPCD.

Table 5-1 (SB X7-7 Table-1): Baseline Period Ranges			
Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	10,583	Acre Feet
	2008 total volume of delivered recycled water	144	Acre Feet
	2008 recycled water as a percent of total deliveries	1.36%	Percent
	Number of years in baseline period ^{1, 2}	10	Years
	Year beginning baseline period range	1995	
	Year ending baseline period range ³	2004	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range ⁴	2007	
¹ If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. ² The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.			
³ The ending year must be between December 31, 2004 and December 31, 2010.			
⁴ The ending year must be between December 31, 2007 and December 31, 2010.			
NOTES:			

Table 5-2 (DWR Table 5-1) Baselines and Targets Summary Retail Agency or Regional Alliance Only					
Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	1995	2004	173	156	139
5 Year	2003	2007	162		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES: Refer to R Grisso memo and separate SBX 7-7 analysis in Appendix B					

The base daily per capita water use was developed using the total service area population. The gross water use includes all water entering the water delivery system, including water losses.

5.3 Service Area Populations

As stated previously herein, the District's service territory includes not only the city of Novato but also the adjacent surrounding unincorporated area and includes a limited number of customers served outside of the NMWD service territory in south Sonoma County. In previous UWMPs, the District developed baseline population estimates using Census Block Group data to develop service area populations. As reported in Table 5-3 (SBX7-7 Table 2), for the 2015 UWMP it was determined that a more simplified yet equally precise methodology could be applied using the District's Dwelling Unit (DU) database. For more detailed information refer to the SBX7-7 Calculation Memo provided in Appendix B.

Table 5-3 (SB X7-7 Table 2): Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
<input type="checkbox"/>	1. Department of Finance (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
<input type="checkbox"/>	2. Persons-per-Connection Method
<input type="checkbox"/>	3. DWR Population Tool
<input checked="" type="checkbox"/>	4. Other DWR recommends pre-review
NOTES: 1. Persons-per-dwelling unit multiplier method using 2000 and 2010 Census data was used to determine the baseline population number back to 1995.	

Table 5-4 (SBX7-7 Table 3) indicates the population for each year within the 10-year and 5-year baselines (including the 2015 compliance year).

Table 5-4 (SB X7-7 Table 3): Service Area Population		
Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	52,762

Year 2	1996	51,809
Year 3	1997	51,950
Year 4	1998	52,073
Year 5	1999	53,119
Year 6	2000	54,099
Year 7	2001	54,712
Year 8	2002	56,196
Year 9	2003	56,358
Year 10	2004	57,527
<i>Year 11</i>	<i>2005</i>	
<i>Year 12</i>	<i>2006</i>	
<i>Year 13</i>	<i>2007</i>	
<i>Year 14</i>	<i>2008</i>	
<i>Year 15</i>	<i>2009</i>	
5 Year Baseline Population		
Year 1	2003	56,358
Year 2	2004	57,527
Year 3	2005	59,146
Year 4	2006	60,357
Year 5	2007	60,474
2015 Compliance Year Population		
2015		61,381
NOTES:		

5.4 Gross Water Use

Gross water use is a measure of all the water that enters into NMWD's potable water distribution system. Gross water does not include raw water, recycled water delivered within the District's service area nor water wheeled to Marin Municipal. A tabulation of all water entering into the District's distribution system from both Stafford Lake Water Treatment Plant and SCWA for each of the years included in the 10-year and 5-year baseline periods is shown in Table 5-5 (SBX7-7 Table 4).

Table 5-5 (SB X7-7 Table 4): Annual Gross Water Use *

Baseline Year <i>Fm SB X7-7 Table 3</i>		Volume Into Distribution System <i>This column will remain blank until SB X7-7 Table 4-A is completed.</i>	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water <i>This column will remain blank until SB X7-7 Table 4-B is completed.</i>	Water Delivered for Agricultural Use	Process Water <i>This column will remain blank until SB X7-7 Table 4-D is completed.</i>	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1995	9,779			-		-	9,779
Year 2	1996	10,328			-		-	10,328
Year 3	1997	10,537			-		-	10,537
Year 4	1998	9,215			-		-	9,215
Year 5	1999	10,188			-		-	10,188
Year 6	2000	10,784			-		-	10,784
Year 7	2001	10,969			-		-	10,969
Year 8	2002	11,042			-		-	11,042
Year 9	2003	10,651			-		-	10,651
Year 10	2004	11,505			-		-	11,505
<i>Year 11</i>	2005	-			-		-	-
<i>Year 12</i>	2006	-			-		-	-
<i>Year 13</i>	2007	-			-		-	-
<i>Year 14</i>	2008	-			-		-	-
<i>Year 15</i>	2009	-			-		-	-
10 - 15 year baseline average gross water use								10,500

5 Year Baseline - Gross Water Use								
Year 1	2003	10,651			-		-	10,651
Year 2	2004	11,505			-		-	11,505
Year 3	2005	10,060			-		-	10,060
Year 4	2006	10,735			-		-	10,735
Year 5	2007	10,326			-		-	10,326
5 year baseline average gross water use								10,655
2015 Compliance Year - Gross Water Use								
2015		7,237	-		-		-	7,237
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3								
NOTES:								

5.5 Baseline Daily per Capita Water Use

All agencies must determine the daily per capita water use in each of the baseline years by dividing the yearly annual gross water use by the service area population. This data is tabulated in Table 5-6 (SBX7-7 Table 5) for both the 10-year and 5-year baseline periods as well as for 2015.

Table 5-6 (SB X7-7 Table 5): Gallons Per Capita Per Day (GPCD)				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Annual Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	52,762	9,779	165
Year 2	1996	51,809	10,328	178
Year 3	1997	51,950	10,537	181
Year 4	1998	52,073	9,215	158
Year 5	1999	53,119	10,188	171

Year 6	2000	54,099	10,784	178
Year 7	2001	54,712	10,969	179
Year 8	2002	56,196	11,042	175
Year 9	2003	56,358	10,651	169
Year 10	2004	57,527	11,505	179
Year 11	2005	-	-	
Year 12	2006	-	-	
Year 13	2007	-	-	
Year 14	2008	-	-	
Year 15	2009	-	-	
10-15 Year Average Baseline GPCD				173
5 Year Baseline GPCD				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use
Year 1	2003	56,358	10,651	169
Year 2	2004	57,527	11,505	179
Year 3	2005	59,146	10,060	152
Year 4	2006	60,357	10,735	159
Year 5	2007	60,474	10,326	152
5 Year Average Baseline GPCD				162
2015 Compliance Year GPCD				
2015		61,381	7,237	105
NOTES:				

A summary of the 10-year and 5-year baseline GPCD and the 2015 compliance GPCD is provided in Table 5-7 (SBX7-7 Table 6).

Table 5-7 (SB X7-7 Table 6): Gallons per Capita per Day Summary From Table SB X7-7 Table 5	
10-15 Year Baseline GPCD	173
5 Year Baseline GPCD	162
2015 Compliance Year GPCD	105
NOTES:	

5.6 Water Use Targets (2015, 2020)

The purpose of SBX7-7 is to establish requirements for the State of California to reduce its statewide urban per capita water use by 20 percent by the year 2020. Compliance of the 2015 and 2020 water use targets is a requirement for eligibility for State Water grants and loans.

Under SBX7-7, each individual urban water supplier (i.e., the District) must develop a water use target for the year 2020 using one of four allowable methods. There are four methods established by the California Department of Water Resources (DWR) which an urban water supplier may use to develop its 2015 and 2020 water use targets. The four methods are generally described below. A more complete description can be found in DWR's *Guidebook for Urban Water Suppliers* for the 2015 Urban Water Management Plan dated January 2016.

- Method 1: 80 percent of Base Daily Per Capita Use;
- Method 2: Performance standards based on actual water use data for indoor residential water use, landscaped area, and commercial, industrial, and institutional (CII) water use;
- Method 3: 95 percent of the San Francisco Bay hydrologic region; and
- Method 4: Savings by water sector DWR Method 4 (this method identifies water savings obtained through identified practices and subtracts them from the District's baseline GPCD).

As with the 2010 UWMP, the District has elected to use Method 1 for the development of its individual water use target as shown in Table 5-8 (SBX7-7 Table 7).

Table 5-8 (SB X7-7 Table 7): 2020 Target Method <i>Select Only One</i>		
Target Method		Supporting Documentation
<input checked="" type="checkbox"/>	Method 1	SB X7-7 Table 7A
<input type="checkbox"/>	Method 2	SB X7-7 Tables 7B, 7C, and 7D <i>Contact DWR for these tables</i>
<input type="checkbox"/>	Method 3	SB X7-7 Table 7-E
<input type="checkbox"/>	Method 4	Method 4 Calculator
NOTES:		

As shown in Table 5-9 (SBX7-7 Table 7-A), the 2020 target under Method 1 is 139 GPCD (vs 143 in the 2010 UWMP).

Table 5-9 (SB X7-7 Table 7-A): Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	2020 Target GPCD
173	139
NOTES:	

Table 5-9 (SBX7-7 Table 7-F) confirms that the calculated 2020 target of 139 GPCD is below the maximum allowable 2020 target of 154 GPCD.

Table 5-9 (SB X7-7 Table 7-F): Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD <i>From SB X7-7 Table 5</i>	Maximum 2020 Target ¹	Calculated 2020 Target ²	Confirmed 2020 Target
162	154	139	139
¹ Maximum 2020 Target is 95% of the 5 Year Baseline GPCD ² 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.			
NOTES:			

The 2015 interim target of 156 GPCD represents the value halfway between the 10-year baseline of 173 GPCD and the confirmed 2020 target of 139 GPCD as shown in Table 5-10 (SBX7-7 Table 8).

Table 5-10 (SB X7-7 Table 8): 2015 Interim Target GPCD		
Confirmed 2020 Target <i>Fm SB X7-7 Table 7-F</i>	10-15 year Baseline GPCD <i>Fm SB X7-7 Table 5</i>	2015 Interim Target GPCD
139	173	156
NOTES:		

5.7 2015 Compliance Daily Per Capita Water Use

Table 5-11 (SBX7-7 Table 9) confirms that the actual 2015 water use of 105 GPCD is well below the 2015 interim target of 156 GPCD.

Table 5-11 (SB X7-7 Table 9): 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments <i>(in GPCD)</i>					2015 GPCD <i>(Adjusted if applicable)</i>	Did Supplier Achieve Targeted Reduction for 2015?
		Enter "0" if Adjustment Not Used			TOTAL Adjustments	Adjusted 2015 GPCD		
		Extraordinary Events	Weather Normalization	Economic Adjustment				
105	156	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	-	105	105	YES
NOTES:								

5.8 Regional Alliance

SBX7-7 provides that urban water retail suppliers may plan, comply and report on the 2020 water use target on a regional basis, an individual basis, or both. The District is one of eight Water Contractors plus MMWD that purchase Russian River water supply from the Sonoma County

Water Agency (Agency). The Water Contractors and MMWD are eligible to form a regional alliance, under the provisions of SBX7-7 because the Water Contractors are recipients of water from a common wholesale water supplier. A water conservation regional alliance among the eight Water Contractors and MMWD is already in existence and comprises the Sonoma-Marín Saving Water Partnership, thereby effectively combining the regional water conservation efforts with a regional alliance for the purpose of meeting SBX7-7 regional water use targets. The members of the alliance include: Valley of the Moon Water District, City of Sonoma, City of Santa Rosa, Town of Windsor, City of Rohnert Park, City of Cotati, City of Petaluma, Marin Municipal Water District, and North Marin Water District.

The DWR established three options for calculating a regional alliance target. The District, along with the other Water Contractors in the regional alliance, selected Option 1 for establishing the regional alliance target. Option 1 consists of each member of the regional alliance calculating their individual targets and then weighting the individual targets by each member's population. The weighted targets are then averaged to determine the regional alliance target. Detailed calculations under the regional alliance can be found in Appendix B. The regional alliance per capita water use targets in comparison to the projected per capita water use are shown in Table's 5-12 (SBX7-7 RA1 Weighted Baseline), 5-13 (SBX7-7 Weighted 2020 Target), 5-14 (SBX7-7 RA1 2015 Target), Table 5-15 (SBX7-7 RA1 2015 GPCD, Actual) and Table 5-16 (SBX7-7 RA1 Compliance Verification).

Table 5-12 (SB X7-7 RA1 - Weighted Baseline)

Participating Member Agency Name	10-15 year Baseline GPCD*	Average Population During 10-15 Year Baseline Period	(Baseline GPCD) X (Population)	Regional Alliance Weighted Average 10-15 Year Baseline GPCD
City of Cotati	159	6,559	1,043,146	
Marin Municipal Water District	149	178,670	26,690,318	
North Marin Water District	173	54,061	9,370,435	
City of Petaluma	180	52,622	9,491,997	
City of Rohnert Park	161	40,811	6,582,847	
City of Santa Rosa	145	143,109	20,806,963	
City of Sonoma	225	9,679	2,173,212	
Valley of the Moon Water District	146	20,969	3,058,648	
Town of Windsor	156	24,572	3,834,809	
Regional Alliance Total	1,495	531,051	83,052,375	156

**All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6, Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

NOTES

Table 5-13 (SB X7-7 RA1 - Weighted 2020 Target)

Participating Member Agency Name	2020 Target GPCD*	2015 Population	(Target) X (Population)	Regional Alliance Weighted Average 2020 Target
City of Cotati	130	7,288	947,440	
Marin Municipal Water District	124	189,000	23,436,000	
North Marin Water District	139	61,381	8,531,959	
City of Petaluma	141	61,798	8,713,518	
City of Rohnert Park	119	41,675	4,959,325	
City of Santa Rosa	126	173,071	21,806,946	
City of Sonoma	180	11,147	2,006,460	
Valley of the Moon Water District	124	23,478	2,911,272	
Town of Windsor	130	27,486	3,573,180	
Regional Alliance Total	1,213	596,324	76,886,100	129

**All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

NOTES

Table 5-14 (SB X7-7 RA1 - 2015 Target)		
Weighted Average 10-15 year Baseline GPCD	Weighted Average 2020 Target	Regional Alliance 2015 Interim Target
156	129	143
NOTES		

Table 5-15 (SB X7-7 RA1 - 2015 GPCD (Actual))				
Participating Member Agency Name	2015 Actual GPCD ¹	2015 Population	(2015 GPCD) X (2015 Population)	Regional Alliance 2015 GPCD (Actual)
City of Cotati	93	7,288	679,016	
Marin Municipal Water District	110	189,000	20,716,982	
North Marin Water District	105	61,381	6,461,073	
City of Petaluma	110	61,798	6,823,500	
City of Rohnert Park	89	41,675	3,693,396	
City of Santa Rosa	85	173,071	14,765,037	
City of Sonoma	141	11,147	1,573,338	
Valley of the Moon Water District	90	23,478	2,117,236	
Town of Windsor	99	27,486	2,720,608	
Regional Alliance Totals	923	596,324	59,550,186	100
<i>* All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6, Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.</i>				
NOTES				

Table 5-16 (SB X7-7 RA1 - Compliance Verification)				
2015 GPCD (Actual)	2015 Interim Target GPCD	Economic Adjustment ¹ Enter "0" if no adjustment	Adjusted 2015 GPCD (if economic adjustment used)	Did Alliance Achieve Targeted Reduction for 2015?
100	143	0	100	YES
¹ Adjustments for economic growth can be applied to either the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods.				
NOTES				

The District Board of Directors approved the regional alliance membership and using regional targets at its Board meeting on April 19, 2011. A copy of the letter approving the District's membership in the regional alliance is included in Appendix B.

Becoming a member of the regional alliance helps the Water Contractors focus efforts on regional water conservation programs that the District actively engages in through the Sonoma-Marín Saving Water Partnership. This regional effort provides for an "economies of scale" cost benefit for implementing regional programs and also provides for a consistent water conservation message throughout the region.

SECTION 6

SYSTEM SUPPLIES

The District uses both imported (purchased) water from the Russian River and local Stafford Lake surface water as its supply sources for the Novato Water System. Recycled water as an additional source of supply began in 2007. The Russian River water supplied by the Agency is supplemented by three Agency owned groundwater wells. This section describes the sources of water available to the District including quantities, supply constraints, and the reliability of the water supply sources.

6.1 Purchased Water

This section describes the District's water supply that is purchased from the Agency, as well as the physical and legal constraints to this supply. The surface water supply facilities are described in Section 3.

6.1.1 Description

The District receives its primary water supply from the Agency's transmission system. The Agency is supplied by the federal Russian River Project, which it operates along with the Agency's appurtenant water transmission system. The Coyote Valley Dam, which creates Lake Mendocino on the East Fork Russian River, and Warm Springs Dam, which creates Lake Sonoma on Dry Creek (a tributary to the Russian River), are the key elements of the Russian River Project. The Agency manages releases at both reservoirs for water supply and to maintain required minimum flows in the Russian River and Dry Creek principally for fishery protection, recreation and to satisfy direct diversions by other Russian River users. Flood control releases from each of the reservoirs are controlled by the United States Army Corps of Engineers (USACE). Flows in the Russian River are augmented by Pacific Gas & Electric Company's (PG&E) Potter Valley Project, which diverts a portion of the Eel River flows to the East Fork of the Russian River.

Water from the Russian River is diverted by the Agency near Forestville and conveyed via its transmission system (including diversion facilities, treatment facilities, pipelines, water storage tanks, booster pump stations, and groundwater wells) to its wholesale customers, including the District. Releases from storage for redirection by the Agency's water transmission system are generally made from Lake Sonoma. Further detail on the District's water supply facilities and distribution system is included in Section 3.

A tabulation of the District's actual and projected purchased (wholesale) water supplies from the Agency in five year increments through 2040 is provided in Table 6-1

Table 6-1
Purchased Water Supply (AFA)

Water Supplier	Contracted Vol.	2015	2020	2025	2030	2035	2040
Sonoma County Water Agency	14,100	6,034	8,699	8,835	8,913	9,028	9,178

Hydrologic and hydraulic modeling studies prepared by the Agency and reported in the Agency's 2015 UWMP indicate that adequate water supplies are available in Lakes Mendocino and Sonoma to meet in-stream flows, system losses and demands for average and multiply dry year scenarios through 2030. The Agency model results also show that demand curtailments will be triggered during portions of the year in a single dry year scenario. Further detail on the Agency's efforts to increase supply to meet a projected shortfall in 2035 is included below.

6.1.2 Physical Constraints

The capacity of the Agency's transmission system is a physical constraint that currently limits the District's water supply from the Agency. The District receives water through the 7.6 mile long North Marin Aqueduct, which is a 30, 36 and 42-inch diameter cement-lined and tapped wrapped (circa 2015) or coal tar-coated (circa 1961) steel transmission main that runs from the Agency's Petaluma Aqueduct near Kastania Tank in south Petaluma to a connection with the District's distribution system north of San Marin Drive in Novato.

6.1.3 Legal Constraints

This section of the plan describes the water rights held by the Agency and the various agreements and issues that influence the available water supply. The District's share of the Agency's water supply, and the District's separate water rights, are also described.

Agency Water Rights. Four State Water Resources Control Board (SWRCB) permits¹² currently authorize the Agency to store water in Lake Mendocino (122,500 ac-ft/yr) and Lake Sonoma

¹²SWRCB Permits Numbers 12947A, 12949, 12950, and 16596.

(245,000 ac-ft/yr) and to divert and redivert 180 cubic feet per second (cfs) of water from the Russian River, up to 75,000 ac-ft/yr. The Agency estimates the existing annual diversion and rediversion limit of 75,000 ac-ft will be exceeded by 2035. Consequently, it will be necessary for the Agency to file an application with the SWRCB by around 2030 to increase its annual diversion and rediversion limit (see Section 6.9). The permits also establish minimum instream flow requirements for fish and wildlife protection and Russian River recreational considerations. These minimum instream flow requirements vary according to the hydrologic cycle (i.e., dry water years versus normal water years) defined by the SWRCB's Decision 1610. The Agency meets the various instream Decision 1610 flow requirements by making releases from Coyote Valley Dam and Warm Springs Dam.

Restructured Agreement. The Restructured Agreement for Water Supply (Restructured Agreement), executed in 2006 between the Agency and its eight prime Water Contractors including the District, provides for the finance, construction, and operation of existing and new Russian River diversion facilities, transmission lines, storage tanks, booster pumps, conventional wells and appurtenant facilities. The Restructured Agreement includes specific maximum amounts of water that the Agency is obligated to supply to its Water Contractors including the District. Additionally, the Restructured Agreement provides for development of (1) additional alternative water supply investments (conservation, local supply and water recycling), and (2) Russian River watershed ecosystem restoration activities.

Delivery entitlements established in the Restructured Agreement and allocated to the District are 19.9 mgd during the average day of the peak month and 14,100 acre feet per year.

Russian River Biological Opinion. In September 2008, a final Biological Opinion (BO) was released by the National Marine Fisheries Service (NMFS) and issued to the Agency, the U.S. Army Corps of Engineers, the California Department of Fish and Game, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District. The BO is a federal mandate on Russian River operations of the receiving agencies listed above that affect salmonids on state and federal endangered species lists (steelhead, coho and Chinook) which affects the Agency's water supply operations and subsequent delivery to its water contractors, including the District.

The BO calls for the elimination or reduction of impacts to salmonids due to water supply and flood control activities in the Russian River watershed through measures deemed “reasonable and prudent alternatives,” including:

- Extensive monitoring of both habitat and fish in Dry Creek, the estuary and the Russian River;
- Eliminating impediments to fish migration and improving habitat on several streams;
- Restoring up to six miles of habitat in Dry Creek and studying a bypass project;
- Requesting the State Water Resources Control Board to reduce summertime flows in the Russian River;
- Creating a freshwater lagoon in the estuary at the mouth of the Russian River during the summer months.

NMFS concluded that lower flows in Dry Creek and Russian River create a better environment for juvenile salmon and steelhead and the BO identified habitat restoration projects in Dry Creek to reduce water velocities in the stream. Current minimum summer flows are based on weather conditions, and range from 125 cfs (during a normal year, as measured at Hacienda Bridge in Guerneville) to 85 cfs (as measured during a dry year). Under the terms of the BO, minimum flows would be dropped to 70 cfs with an additional 15 cfs to maintain system flexibility for a total flow of 85 cfs. For a more complete and comprehensive discussion of minimum flow requirements, refer to the Agency’s 2015 UWMP. The BO acknowledged a need for balance and flexibility and noted that the Agency may find alternative minimum flow requirements that meet the goals of restoring functional salmonid-rearing habitat while promoting water conservation and limited adverse effects on other in-stream resources.

6.2 Groundwater

The District does not currently own or operate any groundwater wells, although private wells exist within the District’s service area. The District does not pump groundwater, as the potential for salt water intrusion restricts the feasibility of utilizing groundwater. The groundwater basin that supplements the Agency’s supply is described in the Agency’s 2015 UWMP. Marin County Environmental Health Services (EHS) is the lead agency for carrying out the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. For the District’s Novato Service

Territory, the state recognized underlying groundwater basin is the so called “Novato Valley Basin” which has a CASGEM priority ranking of Very Low.

6.2.1 Description

The Novato Valley Basin is located in the San Francisco Bay Hydrologic Region as shown in Figure 6-1. According to California’s Groundwater Resources Bulletin 118-Update 2003, the Novato Valley Basin Number is 2-30. The basin occupies a structural depression in the eastern Coast Range west of San Pablo Bay. The basin drains to San Pablo Bay and the areas close to the bay are tidally influenced.¹³ The water-bearing deposits underlying the District are primarily the alluvial deposits of Pleistocene and Holocene age. These alluvium deposits overlie the non-water-bearing Franciscan Formation. The alluvium is composed of silt, clay, and sand with some lenses of gravel. Groundwater wells screened in sand and gravels yield approximately 50 gpm.

Most of the natural recharge occurs along stream beds and on the basin floor from direct percolation. Soils beneath the District are predominantly Reyes silty clays with low permeability¹⁴.

The District historically has pumped no groundwater as shown in Table 6-2.

Table 6-2 (DWR Table 6-1) Retail: Groundwater Volume Pumped						
<input checked="" type="checkbox"/>	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type <i>Drop Down List</i> <i>May use each category multiple times</i>	Location or Basin Name	2011	2012	2013	2014	2015
<i>Add additional rows as needed</i>						
TOTAL		0	0	0	0	0
NOTES:						

¹³ California Department of Water Resources, 2004

¹⁴ Luhdorff and Scalmanini, 2005; United States Department of Agriculture, 1972

6.2.2 Physical Constraints

The groundwater quality is considered poor due to high salinity, and well yields are too low for municipal supply.

Figure 6-1

**Alluvial Groundwater Basins and Subbasins within the
San Francisco Bay Hydrologic Region**



6.2.3 Legal Constraints

There are no legal constraints on the District's use of its groundwater supply; however, the District has no groundwater wells.

6.3 Surface Water

The District supplements the water supply received from the Agency with a local surface water supply from Stafford Lake. Stafford Lake, which captures runoff from an area of 8.3 square miles, is located four miles west of downtown Novato. Runoff contributing flow to the lake is provided from land near the upper reaches of Novato Creek. The capacity of Lake Stafford is 4,450 ac-ft at a water surface elevation of 196 feet MSL.¹⁵

District Water Rights. The District holds two water rights on Novato Creek with the SWRCB: (1) License 9831 issued in 1970, and (2) Water Right Permit 18800 issued in 1983. License 9831 allows the District to directly divert up to 2.9 cubic feet per second (cfs) and to divert 4,000 ac-ft to storage in Stafford Lake between October 1 and April 30. The total amount of direct diversion and diversion to storage authorized during a water year (between October 1 and September 30 of the subsequent year) under License 9831 is 4,490 ac-ft.

Water Right Permit 18800 allows the District to directly divert up to 9.75 cfs from Novato Creek between October 1 and April 30 and to divert up to 4,400 ac-ft to storage between November 1 and April 1. Although Water Right Permit 18800 limits the total storage between both Water Right Permit 18800 and License 9831 to 4,400 ac-ft, it allows for a maximum of 8,454 ac-ft to be diverted from the Novato Creek during any water year.

6.4 Stormwater

The District does not currently own or operate any stormwater diversion or capture projects. The District does, however, offer rebates to customers who install rainwater catchment system within the District's service area.

6.5 Wastewater and Recycled Water

Water recycling is the treatment and management of municipal, industrial, or agricultural wastewater to produce water that can be reused for beneficial uses, and offset potable water supply demands. Water recycling provides an additional source of water that can be used for

¹⁵ 2012 Novato Water System Master Plan Update (Final Report dated April 2013)

purposes such as irrigation, groundwater recharge, industrial uses, and environmental restoration. “Recycled water” is defined in the California Water Code as “water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur.” The SWRCB Division of Drinking Water (DDW) sets the water quality criteria for specific uses of recycled water in Title 22 of the California Code of Regulations.

This section provides information on the amount of generated wastewater and existing disposal of wastewater to determine the potential for recycled water use by the District. The amount of recycled water currently used, potentially available, and future potential uses for recycled water for the District are also described.

6.5.1 Coordination

The District worked in coordination with the Novato Sanitary District (NSD) to update the Recycled Water Master Plan and evaluate the economic feasibility of implementing a recycled water system to serve landscape irrigation users in the Novato area.¹⁶ The Deer Island Recycled Water Facility (RWF) was completed in 2007 and delivery of recycled water to StoneTree Golf Course began. In 2009, recycled water was extended to Novato Fire Protection District Station 62.

Since 2005, the District has been working as a member of the North Bay Water Reuse Authority (NBWRA) to expand use of recycled water on a regional basis in the North San Pablo Bay region. As a result, the District now has an agreement with NSD to expand the treatment and delivery of recycled water in the North (completed 2012) and Central area (underway) of Novato and under a separate agreement with Las Gallinas Valley Sanitary District (LGVSD) expanded the treatment and delivery of recycled water in the South area of Novato, principally the Hamilton Field area in 2013. NBWRA was authorized to receive a 25% federal grant from the US Bureau of Reclamation, up to \$25M toward expansion of recycled water. \$18.2M has been appropriated to date and District’s recycled water expansion project for the Central Novato Service area is scheduled to begin construction in late summer of 2016.

6.5.2 Wastewater Collection, Treatment and Disposal

This section summarizes collection, treatment and disposal of wastewater generated within the District’s Novato Service Area.

¹⁶ Nute Engineering, 2004

6.5.2.1 Wastewater Collected Within Service Area

Table 6-3 (DWR Table 6-2) identifies the volume of wastewater collected within the District's service area by the Novato Sanitary District (NSD). A small number of residential dwellings within NMWD's service area utilize on-site septic treatment systems and are not connected to NSD's sewer collection system.

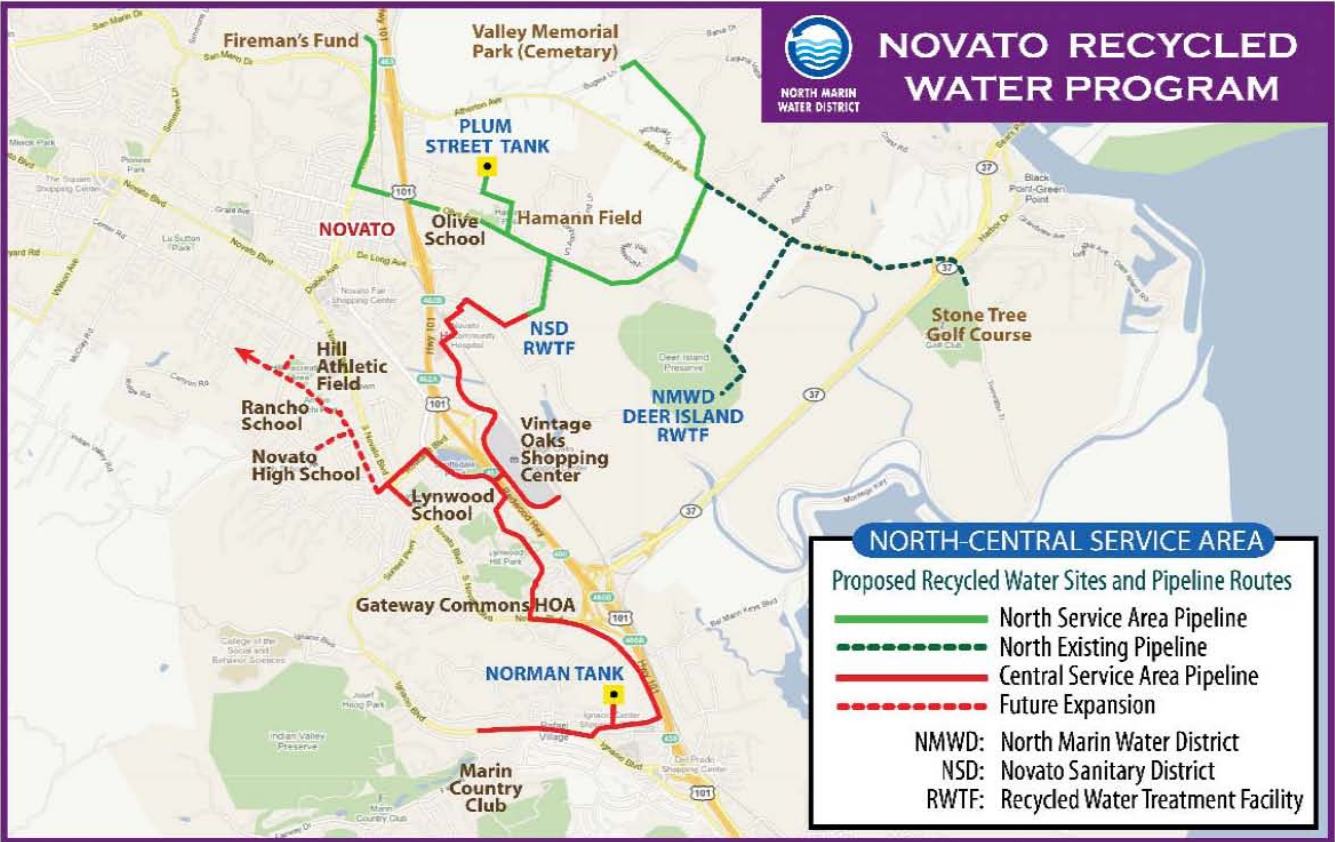
Table 6-3 (DWR Table 6-2) Retail: Wastewater Collected Within Service Area in 2015

	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2015 service area covered by wastewater collection system <i>(optional)</i>					
	Percentage of 2015 service area population covered by wastewater collection system <i>(optional)</i>					
Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? <i>Drop Down List</i>	Volume of Wastewater Collected from UWMP Service Area 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? <i>Drop Down List</i>	Is WWTP Operation Contracted to a Third Party? <i>(optional)</i> <i>Drop Down List</i>
Add additional rows as needed						
Novato Sanitary District	Metered	4,287	Novato Sanitary District	Davidson St.	Yes	Yes
Total Wastewater Collected from Service Area in 2015:		4,287				
NOTES: Total wastewater flow was 1397.6 MG or 4287 AF per John Bailey (Veolia Water) email dated March 17 2016.						

6.5.2.2 Wastewater Treatment and Discharge Within Service Area

Table 6-4 (DWR Table 6-3) identifies the volume of treated wastewater either recycled or disposed of within the District's service area. NSD owns the Novato Treatment Plant (aka Davidson St. Treatment Plant) which serves all Novato and provides advanced wastewater treatment at both the secondary and tertiary treatment level. Operation of the facility is contracted to a private third party (Velolia Water). During winter months secondary treated water flows to San Pablo Bay via an outfall pipe. The San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) regulates discharges to the San Pablo Bay from the Novato Treatment Plant. During the summer months secondary treated water is recycled and used to irrigate pastures and the Deer Island wildlife pond adjacent to Highway 37. Disinfected Tertiary treated water from NSD's Novato Treatment Plant provides recycled water at standards meeting Title 22 requirements for the District's North and Central Service Areas. NMWD also owns and operates the Deer Island Water Recycling Plant (WRP) to serve as standby facility should operational problems develop at the NSD Novato Treatment Plant. For the sake of simplicity, the Deer Island WRP operation is not quantified herein due to its limited production volumes (i.e., typically less than 5% of total recycled water production). As described herein and shown in Figure 6-2, NSD is the producer of recycled water and the District is the distributor of recycled water.

Figure 6-2



The Las Gallinas Valley Sanitary District (LGVSD) owns and operates the LGVSD Treatment Plant and has a service area just south of the District's Novato service area. Although LGVSD's wastewater is generated from outside of the District's service area, LGVSD supplies NMWD with Disinfected Tertiary recycled water in conformance with Title 22 requirements to serve the District's South Service Area in the quantities shown in Table 6-4 (DWR Table 6-3). As described herein and shown in Figure 6-3, LGVSD is the producer of recycled water and the District is the distributor of recycled water.

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015										
<input type="checkbox"/>	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.									
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number (optional)	Method of Disposal <i>Drop down list</i>	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level <i>Drop down list</i>	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
NSD, Davidson St	San Pablo Bay			Bay or estuary outfall	No	Secondary, Disinfected - 23	2,632	2,632		
	Reclaim Ponds	Ag Irrigation		Other	No	Secondary, Disinfected - 23	1,367		1,367	
	Property Fenceline	Recycled Water Supplied to NMWD		Other	No	Tertiary	288		288	
LGVSD, Las Gallinas Valley TP	Property Fenceline	Recycled Water Supplied to NMWD		Other	Yes	Tertiary			140	
Total							4,287	2,632	1,795	0
NOTES:										

6.5.3 Recycled Water System

The District's recycled water distribution system is divided into two distinct and separate areas based on the sources of the recycled water as shown in Figures 6-2 and 6-3. The separate distribution systems are not interconnected. Specifically, the North and Central Service Areas are provided recycled water from NSD and the South Service Area is provided recycled water from LGVSD. Currently, the North Service Area contains ~ 5 miles of pipelines, 0.5 MG of storage and services 17 customers¹⁷. The South Service Area contains ~ 5.5 miles of pipelines, 0.5 MG of storage and services 26 customers. A more detailed description of the recycled water storage, transmission and distribution system is provided in the District's 2011 Title 22 Engineer's Report.¹⁸

6.5.4 Recycled Water Beneficial Uses

6.5.4.1 Current and Planned Uses of Recycled Water

This section discusses current and planned recycled water uses within the District's service area.

The "Recycled Water Master Plan" completed in February 2004¹⁹ produced a focused study of potential recycled water uses and estimated the cost to build a recycled water system. In the 2004 Master Plan, the StoneTree Golf Course at Black Point was identified as an ideal "anchor" customer and recycled water use began in 2007 using NMWD's newly constructed Deer Island Water Reclamation Plant. The 2004 Master Plan was supplemented in 2006 by the "Recycled Water Implementation Plan"²⁰ to provide guidance and phasing in the larger Novato master-planned recycled water system. Based on the 2006 Implementation Plan recommendations, NMWD entered into aforementioned agreements with both NSD and LGVSD (refer to Section 6.5.2.2). Under the terms of both agreements, the sanitary districts are the producers and NMWD is the distributor of recycled water.

A major factor that determines the use of recycled water and implementation of recycled water projects is the financial feasibility of connecting users to the system. Recycled water distribution systems require additional pipelines, storage tanks, and pumps. Proximity to the production of the recycled water and the distribution system is a major factor in considering use of recycled water. Through a combination of funds from new development and state/federal grants/loans, NMWD's

¹⁷ NMWD SRF Project Report No. 3 – Recycled Water Expansion – North Service Area

¹⁸ NMWD Engineer's Report for the Distribution and Use of Recycled Water (RMC, August 2011)

¹⁹ NMWD and NSD Recycled Water Master Plan (NUTE, 2004)

²⁰ NMWD and NSD Recycled Water Implementation Plan (NUTE, 2006)

implementation of the Central Service Area Expansion project (construction scheduled to start in summer 2016) will result in completion of all major expansion elements (i.e., North, Central and South) recommended in the 2006 Implementation Plan.

Table 6-5 (DWR Table 6-4) shows 2015 recycled water demand coupled with future demands through 2040 in five year increments. All of the recycled water use is currently for landscape irrigation. The District is looking at expanding recycled water use for both commercial and industrial applications.

Table 6-5 (DWR Table 6-4) Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area								
<input type="checkbox"/> Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.								
Name of Agency Producing (Treating) the Recycled Water:			Novato Sanitary District and Las Gallinas Valley Sanitary District					
Name of Agency Operating the Recycled Water Distribution System:			North Marin Water District					
Supplemental Water Added in 2015			19.2					
Source of 2015 Supplemental Water			NMWD Potable Water Supply					
Beneficial Use Type	General Description of 2015 Uses	Level of Treatment <i>Drop down list</i>	2015	2020	2025	2030	2035	2040 (opt)
Agricultural irrigation								
Landscape irrigation (excludes golf courses)	NMWD N&S (now), Central (future)	Tertiary	229	400	400	400	400	400
Golf course irrigation	StoneTree GC (now), MCC (future)	Tertiary	225	250	250	250	250	250
Commercial use								
Industrial use								
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge (IPR)*								
Surface water augmentation (IPR)*								
Direct potable reuse								
Other (Provide General Description)								
Total:			454	650	650	650	650	650
<i>*IPR - Indirect Potable Reuse</i>								
NOTES: 2015 Ag Irr Use from NSD for Ag. Irr. 2015 North and South use estimated from SRF Progress Reports at ~50.5% of total use. StoneTree use estimated from SRF Progress Reports at ~49.5% of total use.								

6.5.4.2 Planned Versus Actual Use of Recycled Water

In the District's 2010 UWMP, agricultural irrigation water applied by both the Novato Sanitary District and Las Gallinas Valley Sanitary District was listed. In the 2015 UWMP, the District is only listing agricultural irrigation supply produced and distributed by NSD since LGVSD's production and distribution of agricultural irrigation water is outside of the District's service area. Table 6-6 (DWR Table 6-5) shows that District's actual 2015 distribution of recycled water for landscape and golf course irrigation (i.e., 432 AFA) is ~75% of the estimated 2015 amount (i.e., 580 AFA) shown in the 2010 UWMP. The primary reasons for this decrease are: (1) implementation of improved irrigation efficiency at many sites, (2) reduced water application rates based on budgetary pressures and (3) reduced water use practices that are carried over from potable water irrigation cut backs due to the drought.

Table 6-5 (DWR Table 6-5) Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual			
<input type="checkbox"/>		Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.	
Use Type		2010 Projection for 2015	2015 Actual Use
Agricultural irrigation		2,500	1,370
Landscape irrigation (excludes golf courses)		400	229
Golf course irrigation		180	225
Commercial use			
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	Type of Use		
Total		3,080	1,824
NOTES: 2010 UWMP projected 580 AF in 2015 for total RW use and did not list the existing StoneTree GC use separately (~180 AF in 2010). Ag Irrigation is lower because it doesn't include LGVSD Ag Irr which is outside of NMWD's Service Territory.			

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

District Regulation 18 has a mandatory use requirement for recycled water service when connection is deemed to be feasible. District Regulation No. 18 applies to both existing customers and new development within the District's recycled water service areas. Retrofit costs for existing customers are paid by the District to help encourage the development of recycled water sites in a fair and equitable manner. Table 6-7 (DWR Table 6-6) shows the planned 2018 operation year for the District's Central Service Area recycled water expansion project that will result in the retrofit of over 39 existing customers from potable to recycled water use.

Table 6-6 (DWR Table 6-6) Retail: Methods to Expand Future Recycled Water Use			
□ TBD	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
<i>Add additional rows as needed</i>			
Central Expansion	Install ~ 5.8 miles of 8"-16" pipelines and rehab a 0.5 MG storage tank	2018	196
Conditional Service	New and existing customers are required to use recycled water where available.	Ongoing	
Total			196
NOTES:			

6.6 Desalinated Water Opportunities

Although the District has not investigated the feasibility of constructing a desalination plant, the neighboring Marin Municipal Water District (MMWD) conducted a pilot-scale desalination study (the MMWD Seawater Desalination Pilot Plant Study). If a full-scale desalination plant were constructed, it is possible that the District could supplement its water supply with desalinated water under a future agreement with MMWD. However, because the determination of potential full-scale MMWD desalination plant is yet uncertain, it is not included in this Plan as a future water supply source.

6.7 Exchanges or Transfers

Currently, when surplus transmission system capacity is available, MMWD receives Russian River water from the Agency through the District's North Marin Aqueduct under the MMWD Supplemental Water Supply Agreement with the Agency. A provision of the Intertie Agreement between the District and MMWD allows for delivery ("wheeling") of MMWD's Russian River water through the District's aqueduct²¹. Because MMWD has a direct agreement with the Agency, Russian River water delivered to MMWD does not affect the District's allocation. As reported in Section 4.2.2, deliveries of Russian River water wheeled to MMWD have averaged 6,450 AFA (vs 7,830 in the 2010 UWMP) over the last ten years.

Although the District does not currently transfer or exchange water with other entities, water transfers between the Agency's water contractors are authorized under the Restructured Agreement. Such transfers and exchanges between Agency water contractors have been necessary in the past and may be necessary in the future to improve water supply reliability.

6.8 Future Water Projects

This section provides projections of the future water supply quantities available to the District. Future projects that may contribute to the District's water supply from the Agency and the quantity are summarized in Table 6-8 (DWR Table 6-7). The District has already summarized the development of future recycled water supplies herein. Future water supplies from the Agency are projected to be needed by the year 2035. Accordingly, the Agency expects to file an application with the SWRCB by around 2030 to increase its annual diversion and rediversion limit on the Russian River.²²

²¹ 2012 Novato Water System Master Plan Update (Final Report dated April 2013)

²² SCWA 2015 UWMP

Table 6-8 (DWR Table 6-7) Retail: Expected Future Water Supply Projects or Programs						
<input type="checkbox"/> <input type="checkbox"/> Section 6.8	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type <i>Drop Down List</i>	Expected Increase in Water Supply to Agency <i>This may be a range</i>
	<i>Drop Down List (y/n)</i>	<i>If Yes, Agency Name</i>				
<i>Add additional rows as needed</i>						
Recycled Water Central Expansion	Yes	Novato Sanitary District	Install ~5.8 miles of 8"-16" pipelines and rehab a 0.5 MG storage Tank	2018	All Year Types	218
Agency Modify/Acquire Additional Water Rights	Yes	Sonoma County Water Agency	Agency estimates that existing rights will be exceeded by 2035	2035	All Year Types	5,000
NOTES: Recycled Water Central Expansion quantity also reported in DWR Table 6-6						

The Water Agency's commitment to providing a reliable water supply to its customers in future years has prompted development of new water supply strategies.

The Agency staff initially developed 12 strategies that the Water Agency's Board of Directors reviewed and generally approved in April 2009. The strategies were revised and a draft Water Supply Strategies Action Plan was developed with input from the water contractors and the community following a 17-month outreach program. In September 2010, the Agency's Board of Directors approved the Water Supply Strategies Action. The Action Plan included a revised set of nine strategies, as presented in Table 6-9.

The strategies and Action Plan are based on the following considerations:

- No entity can do it alone: Coordination and partnerships are essential to achieving reliable, efficient, and sustainable water resource management.
- None of the strategies stand alone: The strategies are interconnected.
- The Action Plan is a living document: The plan is a snapshot and should be modified as progress is made and conditions change.
- Public education and input: Transparency is critical to success.

For each of the nine strategies, the Action Plan defines specific activities and projects, involved parties, activity/project status, budget, and timing. The timing of each activity is categorized as either immediate, near term, or long term. The Action Plan is available on the Agency's website (<http://www.scwa.ca.gov/water-supply-strategy/>).

Table 6-9 Water Supply Strategies

Strategy 1	Address Dry Creek Summer Flows
Strategy 2	Modify Operation of Russian River System
Strategy 3	Evaluate Potential Climate Change Impacts on Water Supply & Flood Protection
Strategy 4	Pursue Combined Water Supply & Flood Control Projects
Strategy 5	Work With Stakeholders To Promote Sound, Information-Based Water Supply Planning Programs
Strategy 6	Improve Transmission System Reliability
Strategy 7	Take Advantage Of Energy And Water Synergies
Strategy 8	Implement Integrated Water Management
Strategy 9	Overcome Organizational Fragmentation To Promote Efficiency Of Water System Operations & Planning

6.9 Summary of Existing and Planned Sources of Water

Table 6-10 (DWR Table 6-8) summarizes the actual source and water supply volume for 2015.

Table 6-8 (DWR Table 6-8) Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
Drop down list <i>May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool</i>		Actual Volume	Water Quality <i>Drop Down List</i>	Total Right or Safe Yield <i>(optional)</i>
Add additional rows as needed				
Purchased or Imported Water	From Sonoma Co. Water Agency	6,034	Drinking Water	
Surface water		1,795	Drinking Water	
Surface water	Sold to IV Golf Course& MC Parks	178	Raw Water	
Recycled Water	North and South Service Areas	454	Recycled Water	
Total		8,461		0
NOTES: FY15 Water Purchase and Surface DW Volumes are from the Water Audit Worksheet provided in the Appendix. Raw water use is from T:\AC\Exel\wtr use\raw water use.xls. Recycled water use is from 2014-2015 Annual Report, Pg. 21.				

Table 6-11 (DWR Table 6-9) summarizes the projected source and water supply volume in five year increments over the next 25 years.

Table 6-11 (DWR Table 6-9) Retail: Water Supplies — Projected											
Water Supply	Additional Detail on Water Supply	Projected Water Supply <i>Report To the Extent Practicable</i>									
Drop down list <i>May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool</i>		2020		2025		2030		2035		2040 (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Purchased or Imported Water	Sonoma County Water Agency	8,699		8,835		8,913		9,028		9,178	
Surface water	Stafford Lake	2,500		2,125		1,750		1,375		1,000	
Recycled Water	North, South and Central	650		650		650		650		650	
Other	Raw Water	218		218		218		218		218	
Total		12,067	0	11,828	0	11,531	0	11,271	0	11,046	0
NOTES: For SCWA purchased water refer to Dec 9 2015 email from D McIntyre to D Seymour with SCWA											

6.10 Climate Change Impacts to Supply²³

DWR suggests, but does not require, that water agencies consider in their 2015 Plans the potential water supply and demand effects related to climate change. This section provides an overview of the recent direction that has been developed for California water agencies regarding climate change planning and a description of the Agency's current related activities.

²³ Email communication from Agency Engineer Don Seymour dated May 24 2016

In June 2005, Governor Arnold Schwarzenegger issued Executive Order # S-3-05 acknowledging the potential impacts of climate change on California. The executive order sets targets for greenhouse gas emissions reductions in the state, directs the formation of a Climate Action Team led by the California Environmental Protection Agency, and sets up a biannual reporting schedule for state agencies to identify impacts and potential mitigation plans.

The Executive Order's key declarations and actions include:

- link between greenhouse gas emissions and climate change;
- need for statewide consistency in planning to mitigate sea level rise and the anticipated impacts to coastal area resources and populations;
- state agencies are to work cooperatively to mitigate impacts; and
- a water adaptation strategy to be led by DWR.

DWR has been providing guidance to California water agencies on addressing climate change impacts through the issuance of several key reports and guidelines. The Agency is familiar with the climate change planning guidance that has been provided by DWR and others and is incorporating climate change planning into its water planning activities. The Agency's Water Supply Strategy 3 is to evaluate potential climate change impacts on water supply and flood protection. The strategy defines immediate actions that consist of initiating climate change modeling and support of installation of weather sensors. The near term action is the development of adaptation measures once the climate change predictive modeling is completed. The long term action is to update the climate change analysis.

As part of Strategy 3, the Agency is funding ongoing USGS studies on the potential effects of climate change on the Agency's water supply. Potential changes in air temperature and precipitation due to changes in climate are likely to result in changes in hydrology in the Russian River drainage basin. The Agency is interested in understanding how runoff and streamflow may change and hopes to obtain scientifically defensible information upon which to base infrastructure planning and approaches for resource management.

The objectives of the USGS study are to:

- (1) Develop the downscaled future climate scenarios necessary for hydrologic modeling of the Russian River Water System,
- (2) Develop and calibrate a regional-scale hydrologic model to provide daily inputs for future climate for the Agency's water management models of the Russian River water system,
- (3) Prepare future climate inputs for groundwater models in Sonoma Valley and the Santa Rosa Plain.

The results of the USGS study may allow the Agency to assess the impact of climate changes in future years on the water demands of its customers and the water supply available to the Agency. This new information will form the basis of future Urban Water Management Plans. In the interim, as a customer of the Agency, the District will continue to follow the Agency's work for any updated information regarding the USGS study. In addition, the Agency, Scripps Institute for Western Weather Extremes and the USGS have partnered on research to evaluate how climate change may impact extreme weather events such as floods and droughts.

SECTION 7

WATER SUPPLY RELIABILITY ASSESSMENT

This section presents the District's long term water supply reliability and projects water supplies available during single-and multiple-dry water years. Related short term water supply curtailment due to droughts and catastrophic supply interruptions are addressed in Section 8, Water Shortage Contingency Planning.

7.1 Constraints on Water Sources

Factors resulting in inconsistency of supply are summarized in Table 7-1. Alternatives to replace inconsistent sources may potentially include the development of groundwater wells, aquifer storage and recovery, expansion of recycled water use, use of desalinated water from MMWD, and increased conservation. Water quality issues are not anticipated to have a significant impact on water supply reliability. If applicable in the future, chemical contamination and the lowering of maximum contaminant levels (MCLs) for naturally occurring constituents can be mitigated by constructing new treatment facilities. These treatment facilities would have a significant cost.

Table 7.1 Factors Resulting in Inconsistency of Supply				
Water supply sources	Sonoma County Water Agency	Local Surface Water	Recycled Water	
Specific Sources Name (if any)	Russian River surface water	Stafford Lake	Novato Sanitary District	Las Gallinas Valley Sanitary District
Limitation Quantification	14,100 acre-feet per year 19.9 million gallons per day	8,454 acre-feet per year (6 mgd STP design capacity)	356 acre feet/year	220 acre feet/year
Legal	Controlled by 4 SWRCB permits and subject to permit constraints including reductions in water supply during water shortage years; Agency will need to increase entitlement limit by 2035 to meet demands.	Controlled by 1 SWRCB license and 1 SWRCB permit	InterAgency Agreement between NMWD as NSD	InterAgency Agreement between NMWD and LGVSD
Environmental	Biological Opinion calls for reduction of impacts to salmonids and results in minimum flow requirements during normal and dry years	None	None	None
Water Quality	None	None	None	None
Climatic	Water supply curtailments during drought conditions	None	None	None
Additional Information				

The quality of the District's water deliveries is regulated by the SWRCB Division of Drinking Water (DDW), which requires regular collection and testing of water samples to ensure that the quality meets regulatory standards and does not exceed Maximum Contaminant Levels (MCLs). Both the District and the Agency perform water quality testing, which has consistently yielded results within the acceptable regulatory limits. The District's Water Quality Division monitors water quality and provides supervision for water quality related issues.

The quality of the existing surface water supply sources over the next 25 years is expected to be adequate. Surface water will continue to be treated to drinking water standards, and no water quality deficiencies are foreseen to occur during the next 25 years. Table 7-2 summarizes the current and projected water supply changes due to water quality.

Table 7-2							
Water quality — current and projected water supply impacts							
Water source	Description of condition	2015	2020	2025	2030	2035	2040 - opt
Sonoma County Water Agency	None	0	0	0	0	0	0
Local Surface Water	None	0	0	0	0	0	0

7.2 Reliability by Type of Year

Compliance with UWMPA requires that each agency assess water supply vulnerability due to seasonal or climate shortages using the following:

1. Average Year – Most closely represents the average water supply available
1. Single Dry Year – Represents the lowest water supply available
2. Multiple Dry Year – Represents the lowest average water supply available for a multiple three year period.

Based on data from the Agency, the normal year is 1962, the single driest year is 1977 and the base multiple dry years are 1988-1991¹⁴. Table 7-3 lists the years upon which the data in Table's 7-5 and 7-6 are based.

Table 7-3	
Basis of water year data	
Water Year Type	Base Year(s)
Average Water Year	1962
Single-Dry Water Year	1977
Multiple-Dry Water Years	1988-1991

In Section 6, the Agency's projections that quantify average year water availability to the District through 2040 were presented as part of Table 6-11. For reference, these projections are also compared and contrasted against the projections given five years earlier in the District's 2010 UWMP. The decline in the projected wholesale supply when compared to the 2010 UWMP are due to the District's projected reduced water demands as compared to the 2010 UWMP and are detailed in the Maddaus Report provided in Appendix B.

Table 7-4						
Projected Wholesale Supplies						
Wholesale sources	Contracted Volume	2020	2025	2030	2035	2040 - opt
Sonoma County Water Agency	14,100	8,699	8,835	8,913	9,028	9,178
2010 UWMP SCWA Projections	14,100	9,291	9,831	10,372	10,912	NA
Percent Decrease		6.4%	10.1%	14.1%	17.3%	

The District's surface water supply from the Agency is subject to curtailment during dry years (seasonal and climatic shortages). Water supply reliability modeling results performed by the Agency for their 2015 UWMP show that there is adequate water supply to meet 100 percent of the Agency demands for both average and multiple dry years. For the single dry year (1977 baseline) scenario there are significant impacts to both Lake Mendocino and Lake Sonoma²⁴. For Lake Mendocino, the Agency would need to request reductions in minimum instream flow requirements coupled with significant demand reductions by Upper Russian River water users to prevent Lake Mendocino from dropping below 5,000 acre-feet.

Similarly, Lake Sonoma water volume is less than 100,000 ac-ft, before July 15 starting 2015 for any single dry year scenario. Accordingly, when this occurs the Agency must reduce deliveries

²⁴ Email communication from Don Seymour, SCWA Engineer to SCWA Water Contractors dated April 8, 2016

from the Russian River by 30 percent pursuant to the SWRCB Decision 1610²⁵. This results in differences between demand and supply for the Agency ranging from 15 percent in 2025 to 18 percent in 2040. The reliability of recycled water is not anticipated to be affected by single- or multiple-dry water years.

A water supply reliability comparison for all District supplies is made in Table 7-5, considering three water supply scenarios: average water year, single-dry water year, and multiple-dry water years. Table 7-5 shows that the District's water supply volume during a single dry year scenario will be 84.5% of normal (versus 89% in the 2010 UWMP).

Table 7-5						
2040 Water Supply Reliability						
Water Supply Sources	Avg/Normal Water Year	Single Dry Water Year	Multiple Dry Water Years			
			Year 1	Year 2	Year 3	Year 4
Sonoma County Water Agency	9178	7471	9178	9178	9178	
Local Surface Water	1000	1000	1000	1000	1000	
Recycled Water	650	650	650	650	650	
Raw Water	218	218	218	218	218	
Total	11,046	9,339	11,046	11,046	11,046	
Percent of Average/Normal Year:	100%	84%	100%	100%	100%	

The reliability of the District's water sources by water year type is also summarized in Table 7-6 (DWR Table 7-1) for consistency with the 2015 UWMP required standardized tables.

²⁵ SCWA 2015 UWMP

Table 7-6 (DWR Table 7-1) Retail: Basis of Water Year Data			
Year Type	Base Year <i>If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000</i>	Available Supplies if Year Type Repeats	
		<input type="checkbox"/>	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location
		<input checked="" type="checkbox"/>	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year	1962	11046	100%
Single-Dry Year	1977	9339	84%
Multiple-Dry Years 1st Year	1988	11046	100%
Multiple-Dry Years 2nd Year	1989	11046	100%
Multiple-Dry Years 3rd Year	1990	11046	100%
Multiple-Dry Years 4th Year <i>Optional</i>			
Multiple-Dry Years 5th Year <i>Optional</i>			
Multiple-Dry Years 6th Year <i>Optional</i>			
<p>Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.</p>			
<p>NOTES: Volume includes 1000 AFA Stafford Supply, 650 AFA Recycled Water and 218 AFA Raw Water. Ave Year SCWA is 9178 AFA per 2040 demand. For Single Dry Year reduce 9178 AFA by 18.6% per SCWA 2015 UWMP Table 6-3. For Multiple Dry years no reduction per SCWA 2015 UWMP Table 6-4.</p>			

7.3 Supply and Demand Assessment

Tables 7-7 (DWR Table 7-2), 7-8 (DWR Table 7-3) and 7-9 (DWR Table 7-4) compares the projected water supply and demands under normal year, single dry year and multiple dry year scenarios from 2020 to 2040, in five-year increments.

Table 7-7 (DWR Table 7-2) Retail: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals (autofill from Table 6-9)	12,067	11,828	11,531	11,271	11,046
Demand totals (autofill from Table 4-3)	10,662	10,708	10,713	10,805	10,930
Difference	1,405	1,120	818	466	116
NOTES:					

Table 7-8 (DWR Table 7-3) Retail: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	12,067	10,459	10,034	9,647	9,339
Demand totals	10,662	10,708	10,713	10,805	10,930
Difference	1,405	(249)	(679)	(1,158)	(1,591)
NOTES: SCWA supply volume from DWR Table 6-9 reduced 0% in 2020, 15.5% in 2025, 16.8% in 2030, 18% in 2035 and 18.6% in 2040 per SCWA 2015 UWMP Table 6-3. Stafford Lake supply set at 1000 AFA. No change in raw or recycled water supply. Demands from Table 4-3.					

Table 7-9 (DWR Table 7-4) Retail: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	12,067	11,828	11,531	11,271	11,046
	Demand totals	10,662	10,708	10,713	10,805	10,930
	Difference	1,405	1,120	818	466	116
Second year	Supply totals	12,067	11,828	11,531	11,271	11,046
	Demand totals	10,662	10,708	10,713	10,805	10,930
	Difference	1,405	1,120	818	466	116
Third year	Supply totals	12,067	11,828	11,531	11,271	11,046
	Demand totals	10,662	10,708	10,713	10,805	10,930
	Difference	1,405	1,120	818	466	116
Fourth year <i>(optional)</i>	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Fifth year <i>(optional)</i>	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Sixth year <i>(optional)</i>	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
NOTES: Since there is no predicted reduction in water supply for Multiple Dry Years (see SCWA April 8 2016 email from Don Seymour) all years are the same and the supply and demand volumes come from DWR Table 7-2						

The preceding tables show that the District's combined projected water supplies are sufficient to meet projected demands during normal and multiple-year conditions. During a severe drought condition, under the single-dry year scenario, the District will not have adequate supplies and will need to impose mandatory water use restrictions. The District's projected water supply portfolio is highly stable because it relies largely on current contracted and permitted water supply from the Agency and also has local surface water that can further supplement the Agency supply, particularly during drought conditions.

By 2035, the Agency will need to "perfect" its water supply from the Russian River because the combined water demands from the water contractors and water customers of the Agency will exceed the current Russian River diversion limit.

7.4 Regional Supply Reliability

The District is a member of the North Bay Water Reuse Authority (NMWRA) which is a regional water recycling organization formed to put recycled water to its broadest and most beneficial use. NBWRA consists of ten local agencies covering 315 square-miles in the portions of Marin, Sonoma and Napa counties that surround the northern rim of the San Francisco Bay. As part of NBWRA, the District has made great strides to expand recycled water use from 214 AFA to a projected 650 AFA by the year 2020. The District also continues to implement an extensive water conservation program which, similar to recycled water use, reduces the demand on imported supplies. In addition, the District plans to prepare a "Water Supply Enhancement Study" within the next 5 years to identify options available to maximize the District's local water supply source(s).

SECTION 8

WATER SHORTAGE CONTINGENCY PLANNING

This section provides information required by Water Code Section 10632. The District adopted a Water Waste Prohibition in 2000 through its Regulation 15, which is included in Appendix C. The District first adopted a Water Shortage Contingency Plan (WSCP) with its 2005 UWMP. The District's WSCP was created separately from the UWMP process and is amended as needed without amending the corresponding UWMP. However, per the UWMPA, the most current version of the District's WSCP (approved by the Board April 19, 2016) is included as part of the 2015 UWMP in Appendix C.

8.1 Stages of Actions (Water Code 10632(a))

Water Code Section 10632(a) requires a description of the actions to be undertaken by the urban water supplier in response to water supply shortages of up to 50 percent. This section also requires the water supplier to outline the specific water supply conditions that are applicable at each stage of action. The District has the authority to declare a water shortage emergency under Section 375 and 10632 of the Water Code and has developed a model resolution to exercise this authority, which is included in Appendix C. Emergencies are declared in three stages, with specific reduction methods used for each stage.

Table 8-1 (DWR Table 8-1) identifies the three water stages and their corresponding water supply conditions. Stage 1 voluntary rationing of up to 15% is based on: (1) specific Dry Conditions as determined by the District or Agency or (2) other actions imposed by the SWRCB. Stage 2 Mandatory restrictions in water use based on: (1) specific Critical Dry Conditions (or Temporary Impairment) as determined by the District or Agency, (2) other actions imposed by the SWRCB or (3) Agency implementation of a specific water shortage allocation methodology applicable for Lake Sonoma storage levels above 100,000 acre-feet. Stage 3 Mandatory rationing of up to 50% is based on: (1) when the District determines that Lake Sonoma storage levels are projected to fall below 100,000 acre-feet based on input from the Agency or (2) when the District or SWRCB determine that mandatory reductions in water use are required.

**Table 8-1 (DWR Table 8-1) Retail
Stages of Water Shortage Contingency Plan**

Stage	Complete Both	
	Percent Supply Reduction ¹ <i>Numerical value as a percent</i>	Water Supply Condition <i>(Narrative description)</i>
<i>Add additional rows as needed</i>		
1	Variable , 15% typ.	Voluntary, % based on specific Dry Conditions as determined by NMWD, Sonoma County Water Agency or State Water Resources Control Board
2	Variable, 30% typ.	Mandatory water use restriction to achieve, % based on specific Critical Dry Conditions or a Temporary Impairment of water supply as determined by NMWD, SCWA or SWRCB or SCWA enacts its' water shortage allocation methodology provided that storage in Lake Sonoma does not fall below 100,000 AF.
3	Up to 50%	Mandatory reductions in water use, up to 50% when NMWD determines that storage in Lake Sonoma is projected to fall below 100,000 AF based on advice from SCWA, or NMWD or SWRCB advises that mandatory reductions in water use are required.
¹ One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.		
NOTES: See Water Shortage Contingency Plan in Appendix C.		

8.2 Prohibitions on End Uses (Water Code 10632 (a) 4-5)

Regulation 15 specifies permanent prohibited water uses. The District's Urban Water Shortage Contingency Plan includes temporary prohibitions that are used in various stages of the water shortage emergencies. These are outlined in Table 8-2 (DWR Table 8-2).

Table 8-2 (DWR Table 8-2) Retail Only: Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Users <i>Drop down list</i> <i>These are the only categories that will be accepted by the WUEdata online submittal tool</i>	Additional Explanation or Reference <i>(optional)</i>	Penalty, Charge, or Other Enforcement? <i>Drop Down List</i>
<i>Add additional rows as needed</i>			
all times	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
all times	Other - Require automatic shut of hoses	for washing cars, boats, machinery, etc.	Yes
all times	Landscape - Other landscape restriction or prohibition	Turf surface area restrictions for residential units and no turf allowed for commercial unless irrigated with recycled water	Yes
all times	Water Features - Restrict water use for decorative water features, such as fountains	Non-recycling systems prohibited	Yes
all times	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Fix leaks within 72 hours	Yes
all times	Other - Prohibit use of potable water for washing hard surfaces	Prohibited when runoff water flows directly to a gutter or storm drain	Yes
all times	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		Yes
all times	Other	Single pass evaporative cooling systems for AC units	Yes
all times	Other	Non-recirculating industrial clothes wash systems	Yes

1	Other	All above Prohibitions plus specified % voluntary reduction	Yes
1	CII - Lodging establishment must offer opt out of linen service		Yes
1	Other - Prohibit use of potable water for construction and dust control		Yes
1	CII - Restaurants may only serve water upon request		Yes
2	Other - Prohibit use of potable water for washing hard surfaces	No exceptions allowed	Yes
2	Other water feature or swimming pool restriction	Prohibit refilling of a completely drained pool and/or initial filling.	Yes
2	Other	Prohibit non-commercial washing of privately owned vehicles, boats, etc except from a bucket with shut-off nozzle	Yes
2	Landscape - Prohibit certain types of landscape irrigation	Watering any turf or plants except from hand held hose or drip irrigation system except sprinklers can be used is customer maintains the specified water use reduction	Yes
2	Landscape - Other landscape restriction or prohibition	Watering any portion of a golf course except the tees and greens.	Yes
2	Other	Commercial vehicle washing facility in excess of the called for percent or volume reduction in water use	Yes
2	Landscape - Limit landscape irrigation to specific times	Irrigation must occur between 7 pm and 9 am.	Yes

2	Landscape - Limit landscape irrigation to specific days	Limit to specific number of days per week	Yes
3	Other	All above Prohibitions plus specified % mandatory reduction	Yes
3	Landscape - Prohibit certain types of landscape irrigation	No turf irrigation allowed	Yes
3	Landscape - Other landscape restriction or prohibition	Prohibit planting of new landscaping except for designated drought resistant plants	Yes
3	Landscape - Other landscape restriction or prohibition	Golf courses may only use private well or recycled water for irrigation	Yes
3	Landscape - Other landscape restriction or prohibition	Prohibit day and nighttime sprinkling	Yes
3	Landscape - Other landscape restriction or prohibition	Prohibit planting of annual plants, vegetables, flowers or vines.	Yes
3	Other	Limit deliveries of water	Yes
NOTES:			

8.2.1 Landscape Irrigation

The District's water conservation regulations are tailored to reduce use of potable water for landscape irrigation as much as possible. New commercial developments are prohibited from installing turf and new residential developments have turf limits (e.g., no more than 600 sq. ft. for new single family homes). The District's Water Use Prohibitions restrict unreasonable irrigation overspray or run-off onto pavements/gutters or irrigating landscape during or within 48 hours of measureable rainfall. In addition, nighttime irrigation is encouraged as a matter of routine practice. During Stage 2 Mandatory restrictions landscaping irrigation is limited between the hours of 7 p.m. and 9 a.m. and completely prohibited March 1 through September 30 during Stage 3 Mandatory restrictions.

8.2.2 Commercial, Industrial and Institutional (CII)

As part of the District's Water Use Prohibitions, serving of drinking water other than upon request in eating or drinking establishments is not allowed. This includes restaurants, hotels, cafes or other public places where food or drinks are served. Hotels and motels must also provide guests the option not to have towels and linens laundered daily. Installation and use of single-pass cooling systems is also prohibited.

8.2.3 Water Features and Swimming Pools

The District's Water Use Prohibitions do not allow for potable water to be used in non-recycling decorative fountains. In addition, Stage 2 Mandatory restrictions prohibit the refilling of a completely drained swimming pool and/or initial filling of any swimming pool.

8.2.4 Defining Water Features

The District is in compliance with CWC 10632 (b) requirements that mandates a separate distinction between water features that are artificially supplied with water such as ponds, lakes, waterfalls and fountains separately from swimming pools. The District's regulations, ordinances and WSCP specifically differentiate between non-recycling decorative fountains and swimming pools.

8.2.5 Other

Other District Water Use Prohibitions include; (1) gutter flooding, (2) failure to repair a controllable leak of water within a reasonable time and (3) washing down exterior paved areas, washing motor vehicles, etc. except from a bucket and hose equipped with a shut-off nozzle. During Stage 2 water restrictions, golf courses using raw or potable water can only irrigate tees and greens and for Stage 3 water restrictions golf course irrigation is prohibited. Other Stage 3 restrictions include prohibiting planting of any new landscaping except for drought resistant plants and prohibiting planting of annual plants, vegetables, flowers or vines.

8.3 Penalties, Charges and Other Enforcement of Prohibitions (Water Code 10632(a.6))

Table 8-3 summarizes the penalties, charges and other enforcement actions for any customer violating the District's rules and regulations related to water use prohibitions and the District's WSCP. Customers in violation will receive a written warning and order that the violation be corrected immediately or within a specified time determined to be reasonable. Water service may be disconnected due to non-compliance with the warning. If water service is disconnected, a reconnection fee of \$50 shall be paid. If that violation reoccurs water service may be disconnected again with a reconnection fee of \$75. Any water service that is disconnected twice shall be reconnected with a flow-restricting device and additional reconnection fee of

\$100. The District may also impose additional penalties in an amount approved by the Board of Directors from time to time.

Table 8-3 Water Shortage Contingency — Penalties and Charges	
Penalty or Charge	Stage When Penalty Takes Effect
Written Notice with time frame for correction	Any Stage
Personal contact with follow up written notice	Any Stage
Installation of flow restricting device	Any Stage
Imposition of water waste fees	Any Stage
Disconnection of service	Any Stage

8.4 Consumption Reduction Methods (Water Code 10632(a.5))

Consumption reduction methods are actions that are taken by the District to reduce water demand within the Novato service area, whereas the prohibitions discussed above and tabulated in Table 8-3 limit specific uses of water by the customer. These actions, summarized in Table 8-4 (DWR Table 8-3), include expanded customer outreach, various customer rebates, decreased line flushing, increased water waste patrols and a Drought Revenue Recovery Surcharge.

Table 8-4 (DWR Table 8-3) Retail Only: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier <i>Drop down list</i> <i>These are the only categories that will be accepted by the WUE data online submittal tool</i>	Additional Explanation or Reference (optional)
<i>Add additional rows as needed</i>		
All Stages	Expand Public Information Campaign	
All Stages	Improve Customer Billing	
All Stages	Offer Water Use Surveys	
All Stages	Provide Rebates on Plumbing Fixtures and Devices	
All Stages	Provide Rebates for Landscape Irrigation Efficiency	
All Stages	Provide Rebates for Turf Replacement	
All Stages	Decrease Line Flushing	
All Stages	Increase Water Waste Patrols	
All Stages	Implement or Modify Drought Rate Structure or Surcharge	
NOTES:		

8.5 Determining Water Shortage Reductions (Water Code 10632(a.9))

The District's local surface water supply and Agency supply turnouts are all equipped with water meters. In addition, each potable water customer is metered. Non-residential landscape irrigation is metered separately from indoor use at most non-residential sites. The District reads meters on a bimonthly basis and is able to document both demand reductions and a typically high water use. The District contacts individual customers to resolve issues related to a typically high water use.

The Agency is in the process of converting billing (turnout) meters to automatic read technology that will result in 24 hour daily flow measurement. In addition, the District has implemented an Automatic Meter Infrastructure (AMI) pilot program that, when fully implemented, will provide daily consumer water use consumption data.

8.6 Revenue and Expenditure Impacts (Water Code 10632(a.7))

Water restrictions through implementation of the District's WSCP has the potential to reduce revenue due to decreased water sales. The most challenging situation for the District to manage would be a 50 percent reduction in all supplies, which would require the District to employ demand management techniques that achieve 50 percent reduction in water delivered. To help address this shortfall, the District enacted a Drought Revenue Recovery Surcharge as discussed in Section 8.6.1.

8.6.1 Drought Rate Structures and Surcharges

At the April 19, 2016 meeting, the District's Board of Director's adopted a Drought Revenue Recovery Surcharge (Drought Surcharge) to help generate revenue sufficient to cover cost of water system operations and maintenance. During periods with mandatory drought regulations are in effect the Drought Surcharge adds \$1.00 per 1,000 gallons for all residential water use exceeding 300 gallons per day and \$1.00 per 1,000 gallons for all non-residential water use.

8.6.2 Use of Financial Reserves

In August 2008, the District's Board of Director's directed staff to establish a Rate Stabilization (Drought Contingency) Fund. A threshold of 3.2 billion gallons (BG) of potable water consumption was established as a benchmark for "normal" years. During any fiscal year that water sales volume exceeds 3.2 BG the incremental revenue generated is deposited into this fund. In those years when sales volume falls below the benchmark, funds are withdrawn from the reserve to maintain the budgeted revenue forecast. The goal was to build a reserve equal to 20% of budgeted annual water sales. The fund was fully depleted in Fiscal Year 2010 due to continued low water sales substantially below the 3.2 BG benchmark.

8.6.3 Other Measures

The District has, from time to time, reduced budgeted Capital Improvement Project (CIP) and operational expenditures to help offset reduced revenue from declining water sales. This occurred most recently in the District's current Fiscal Year 16 budget when the District deferred ~\$1.3M in budgeted expenditures to help offset a projected ~\$2M shortfall in water sales²⁶.

8.7 Resolution or Ordinance (Water Code 10632(a.8))

The District has adopted a Water Waste Ordinance through Regulation 15. It has developed a model resolution which can be used to declare a shortage emergency and stages of actions.

8.8 Catastrophic Supply Interruptions (Water Code 10632(a.3))

The District has prepared, in coordination with the Agency, a Water Shortage Contingency Plan to guide responses in the event of a water shortage. The Water Supply Contingency Plan and the Emergency Water Conservation Ordinance can be found in Appendix C.

In accordance with the Emergency Services Act, the District has developed an Emergency Operation Plan (EOP). This EOP guides response to unpredicted catastrophic events that might impact water delivery including regional power outages, earthquakes, or other disasters. The EOP outlines standard operating procedures for all levels of emergency, from minor accidents to major disasters. The EOP has been coordinated with the Agency and neighboring water purveyors. In addition, the District is a member of the California Water/Wastewater Agency Response Network (CalWarn) which provides mutual aid assistance between neighboring water agencies in the event of an emergency.

Table 8-5 summarizes some of the actions in the event of specific catastrophic events.

Table 8-5 Preparation Actions for a Catastrophe

Possible Catastrophe	Summary of Actions
Earthquake	Shut-off isolation valves and above ground use of flexible piping for ruptured mains
Fire	Storage supplies for fire flows
Power outage or grid failure	Portable emergency generators available for most Agency facilities
Severe Winter Storms	Portable emergency generators available for most Agency facilities
Hot Weather	Portable emergency generators available for most Agency facilities

²⁶ Board memo from the Auditor-Controller, David Bentley to the Board of Directors dated August 28, 2015

8.9 Minimum Supply Next Three Years (Water Code 10632(a.2))

An estimate of the District's minimum water supply available during each of the next three years, 2016-2018, is provided in Table 8-6 (DWR Table 8-4). This data represents the combined availability of all water sources (i.e., purchased water from the Agency, local potable supply from Stafford Lake, recycled water and raw water from Stafford Lake). Potable water supplies (purchased water and local surface water) are based on the multiple dry years of 1988, 1989 and 1990 as reported in Section 7, Table 7-5.

Table 8-6 (DWR Table 8-4) Retail: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	10,850	10,850	11,046
NOTES: 11,046 AFA (from DWR Table 7-1) minus 650 AFA RW (total future) + 454 AFA RW (current RW use, see Table 6-8) = 10,850 for 2016 and 2017. For 2018 increase total RW supply to 650 AFA due to Central RW coming online.			

SECTION 9

DEMAND MANAGEMENT MEASURES

This section provides a description of the District's Water Conservation Program and Best Management Practices (BMPs) or Water Demand Management Measures (DMMs). The section of the California Water Code addressing DMMs was significantly modified in 2014 and the UWMPA was amended by state legislation to streamline the retail agency requirements from 14 specific measures to six more general requirements plus an "other" category. BMPs and DMMs are identical and are referred to interchangeably. The District utilizes water conservation BMPs as a method to reduce water demands, thereby reducing water supply needed for NMWD.

9.1 CUWCC and BMP Implementation (Water Code 10631(i))

The District is a member of the California Urban Water Conservation Council (CUWCC). The CUWCC was created to assist in increasing water conservation statewide, under a Memorandum of Understanding (MOU). As signatory to the MOU, the District has pledged its good faith effort towards implementing BMPs identified in the CUWCC MOU Regarding Urban Water Conservation. The two primary purposes of the MOU are as follows:

- a. to expedite implementation of reasonable water conservation measures in urban areas;
and
- b. to establish assumptions for use in calculating estimates of reliable future water conservation savings resulting from proven and reasonable conservation measures. Estimates of reliable savings are the water conservation savings that can be achieved with a high degree of confidence in a given service area.

The District signed the CUWCC MOU on July 5, 2001 and submits annual BMP reports to the CUWCC in accordance with the MOU. The MOU requires that a water utility implement only the BMPs that are economically feasible. If a BMP is not economically feasible, the utility may request an economic exemption for that BMP. The District has not requested economic exemption from any of the BMPs at this time and currently implements all of the BMPs. Table 9-1 identifies the CUWCC's BMPs, the correlating Demand Management Measure number and a summary description of the program that NMWD implements.

**Table 9-1 CUWCC BMP/DMM and NMWD Water Conservation Program
Summary Description Table**

BMP #	CWC 10631 DMM #	Measure	NMWD Program Summary Description
1.1.1	(f)(b)(vi)	Conservation Coordinator	NMWD employs a Water Conservation Coordinator to implement the Water Conservation and Public Outreach Programs.
1.1.2	(f)(b)(i)	Water Waste Prevention Ordinances	NMWD enforces a strict water waste prevention/prohibition regulation (NMWD Regulation 15).
1.2	(f)(b)(v)	Water Loss Control	NMWD implements water loss control measures and audits in compliance with the CUWCC requirements
1.3	(f)(b)(ii)	Metering with Commodity Rates	All connections are metered in the NMWD Service Areas
1.4	(f)(b)(iii)	Retail Conservation Pricing	NMWD bills customers using a three-tier rate system for residential accounts and a seasonal rate (increase in summer months) for non-residential accounts.
2.1	(f)(b)(iv)	Public Information Program	NMWD implements a full scale public information program including newsletters, bill stuffers, newspaper advertisements, public outreach events, and other programs including social media.
2.2	(f)(b)(iv)	School Education Programs	NMWD receives wholesale program assistance from Sonoma County Water Agency to implement the school education program
3.1	(f)(b)(vii) (Other)	Residential Assistance Program	1) Through the Water Smart Home Survey Program, NMWD provides surveys of all indoor fixtures and appliances for existing single-family and multi-family residential customers. 2) NMWD provides free plumbing fixtures to customers, via both NMWD programs and contracted energy and water efficiency outlets that include low-flow showerheads, faucet aerators, and toilet tank retrofit devices.
3.2	(f)(b)(vii) (Other)	Landscape Water Survey	Through the Water Smart Home Survey Program, NMWD provides free outdoor landscape irrigation surveys for existing single-family and multi-family residential customers.

BMP #	CWC 10631 DMM #	Measure	NMWD Program Summary Description
3.3	(f)(b)(vii) (Other)	High Efficiency Clothes Washing Machine Financial Incentive Programs	NMWD rebates customers for purchase of qualified high efficiency clothes washing machines.
3.4	(f)(b)(vii) (Other)	Water Sense Specification Toilets	NMWD rebates customers for purchase and installation of qualified Water Sense Certified High Efficiency Toilets
4	(f)(b)(vii) (Other)	Commercial, Industrial, Institutional (CII)	NMWD offers CII customers audits to identify water efficiency measures, offers customers free fixtures and offers rebates on qualified high efficiency toilets and appliances.
5	(f)(b)(vii) (Other)	Landscape	1) All public and private irrigators of landscapes are eligible for free landscape water audits upon request. 2) Over 90% of all irrigators of landscapes with separate irrigation accounts receive a monthly or bi-monthly irrigation water use budget.

The District conducted a water conservation program analysis as a part of the *Final 2015 Urban Water Management Plan Water Demand Analysis and Water Conservation Measures Update* (Appendix B). This analysis calculated the range of conservation savings and costs for the years 2015 through 2040 through different options of implementation. Also included in the analysis were conservation programs that go above and beyond the BMPs/DMMs and new development water efficiency requirements/measures which the CUWCC now recognizes through the flex-track reporting option.

Urban water suppliers that are members of the CUWCC may submit their most recent BMP Coverage Reports for reporting years 2013-14 to meet the requirements of DWR Water Code Section 10631 subdivision (f). Since the BMPs changed in 2008 to reflect the flex-track and GPCD options, the reporting requirements changed for 2009/2010. The Foundational BMPs (BMPs 1.11 through 2.2) need to be implemented and reported very similar to previous BMP reporting; however, the Programmatic BMPs (BMPs 3.1 through 5) can be reported traditionally, or through a flex-track method using water savings calculations of other or additional

conservation programs, or through a GPCD format (Gallons per Capita Per Day pursuant to SBX7-7, The Water Conservation Act of 2009). For the Programmatic BMPs, NMWD has reported to CUWCC using the GPCD option for 2014. The CUWCC provided fully compliant Coverage Reports for 2013 and 2014 (included in Appendix C).

The District is also an active member of the Sonoma-Marín Saving Water Partnership (Partnership), established regionally with nine other local retail water utilities and Sonoma County Water Agency, with a goal to identify, recommend and fund implementation of water conservation projects, facilitate regional water use efficiency public outreach campaigns and to maximize the cost-effective projects in Sonoma and Marin Counties. The Partnership recognizes that establishing common Water Conservation Projects on a regional basis and applicable across the political and jurisdictional boundaries of each Partner may be a means of cost effectively conserving more water than would otherwise be conserved on an individual agency-by-agency basis. The Partnership establishes minimum water conservation funding requirements for each of the members, and members are also committed to remain as members in good standing of the CUWCC, implement the BMPs as specified in the MOU, implement water conservation programs that go beyond the BMPs requirements, and enforce strict new development water use efficiency standards.

SECTION 10

PLAN ADOPTION, SUBMITTAL AND IMPLEMENTATION

This section discusses CWC requirements for a public hearing, the UWMP adoption process, submitting an adopted Plan, UWMP implementation and how to amend an adopted UWMP.

10.1 Inclusion of all 2015 Data

The District's 2015 UWMP includes all water use and planning data for the entire fiscal year 2014-2015.

10.2 Notice of Public Hearing

CWC requires holding a public hearing prior to adoption of the District's 2015 UWMP. Two audiences must be noticed for the public hearing - applicable cities/counties and the public.

10.2.1 Notice to Cities and Counties (Water Code 10621(b) and 10642))

The District is required to notice any city or county within which NMWD provides water supplies a minimum of 60 days prior to the public hearing (CWC 10621(b)). This notification requirement applies, as a minimum, to both Marin and Sonoma Counties as well as the city of Novato. The District held a public hearing on June 21, 2016 and public notices were mailed out on February 4, 2016 well in advance of the 60 day notification requirement. A copy of the notice is provided in Appendix A.

This District is also required to notice the time and place of the hearing to the Counties of Marin and Sonoma, as well as the City of Novato. Said notifications were mailed on June 8, 2016 and copies are provided in Appendix A. A tabulation of the cities and counties that received notices is provided in Table 10-1 (DWR Table 10-1).

Table 10-1 (DWR Table 10-1) Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
<i>Add additional rows as needed</i>		
Novato	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
County Name <i>Drop Down List</i>	60 Day Notice	Notice of Public Hearing
<i>Add additional rows as needed</i>		
Marin County	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sonoma County	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

10.2.2 Notice to the Public (Water Code 10642 and Gov't Code 6066)

The District is required publish public hearing notices in a local paper once a week for two consecutive weeks. The notices must include time and place of the hearing as well as the location where the 2015 UWMP is available for public inspection.

Public hearing notifications are to be published in the Marin Independent Journal on June 8 and June 15, 2016. A copy of the published Notice of Public Hearing is included in Appendix A.

10.3 Public Hearing and Adoption (Water Code 10642 and 10608.26)

The District is encouraging community and public interest involvement in the Plan update through public hearing and inspection of the draft document. The hearing provides an opportunity for all residents and employees in the service area to learn and ask questions about their water supply in addition to the District's plans for providing a reliable, safe, high-quality water supply. The public hearing will also discuss economic impacts of the UWMP and, as part of the UWMP approval, adopt a method for determining water use requirements (per SBX7-

7). Copies of the draft Plan were made available for public inspection at the District's Administration Building and at the local Novato public library. Copies of the notices, advertisements, and outreach lists are provided in Appendix A.

10.3.1 Adoption

The updated 2015 UWMP was approved for adoption by the District's Board of Directors at the June 21, 2016 meeting. A copy of the adopted resolution is provided in Appendix A

10.4 Plan Submittal (Water Code 10621, 10635 and 10644)

A copy of the Final 2015 UWMP will be submitted to DWR by July 1, 2016 (using the designated website). In addition, copies (CD's) will be submitted to the following agencies no later than 30 days after adoption by the District Board of Directors:

- California State Library
- City of Novato
- Marin County
- Sonoma County and
- Sonoma County Water Agency (Agency)

10.5 Public Availability

No later than 30 days after July 1, 2016 the District will make the approved 2015 UWMP available to view or download on the District's website <http://www.nmwd.com> and at the District Administrative Headquarters.

10.6 Amending an Adopted UWMP (Water Code 10621 and 10644)

If the District amends its adopted UWMP, each of the steps for notification, public hearing, adoption and submittal must also be followed for the amended Plan.

APPENDIX A



**NORTH MARIN
WATER DISTRICT**

999 Rush Creek Place
P.O. Box 146
Novato, CA 94948

PHONE

415.897.4133

FAX

415.892.8043

EMAIL

info@nmwd.com

WEB

www.nmwd.com

February 4, 2016

To: Interested Agencies

Subject: Notice of Review and Preparation of the 2015 Urban Water Management Plan

North Marin Water District is currently reviewing and updating the District's Urban Water Management Plan (UWMP) as required by law. The 2015 UWMP is due to the California Department of Water Resources by July 1, 2016. A draft of the 2015 UWMP will be made available for public review and a public hearing will be scheduled later this year. The UWMP will provide an analysis of projected water demand and supply over the next 25 years as well as an updated water conservation plan.

If you are interested in providing input during the preparation of the UWMP, please contact Drew McIntyre at (415) 761-8912 or dmcintyre@nmwd.com.

Sincerely,

Chris DeGabriele
General Manager

Distribution List:

Sonoma County Water Agency, Attention: Grant Davis
Novato Sanitary District, Attention: Sandeep Karkal
Las Gallinas Valley Sanitary District, Attention: Mark Williams
Marin County LAFCO, Attention: Keene Simonds
Marin Municipal Water District, Attention: Krishna Kumar
County of Marin, Attention: Brian Crawford
City of Novato, Attention: Cathy Capriola
City of Sonoma, Attention: Dan Takasugi
City of Santa Rosa, Attention: David Guhin
City of Rohnert Park, Attention: Mary Grace Pawson
City of Cotati, Attention: Craig Scott
City of Petaluma, Attention: Dan St. John
Town of Windsor, Attention: Toni Bertolero
Valley of the Moon Water District, Attention: Dan Muelrath
County of Sonoma PRMD, Attention: J.T. Wick

WEDNESDAY, JUNE 8, 2016

MARIN 15

Legal Notice	Legal Notice	Legal Notice	Legal Notice	Legal Notice	Legal Notice	Legal Notice
Notice of Funding Availability The Marin County Dept. of Health and Human Services, Division of Mental Health and Substance Use Services are seeking applications for the following Request for Letters of Interest (RFI): Recovery Coach/Care Manager. For a copy of the RFI, call (415) 473-3030 or visit www.marinhhs.org/rfp . NO. 709 JUN 8, 9, 2016	NOTICE OF PUBLIC HEARING DRAFT 2015 URBAN WATER MANAGEMENT PLAN The Board of Directors of the North Marin Water District will hold a public hearing on Tuesday, June 21, 2016 at 7:00 p.m. at District Headquarters, 999 Rush Creek Place, Novato, CA for the purpose of receiving comments on the 2015 Urban Water Management Plan (UWMP). The UWMP is required to be prepared pursuant to the Urban Water Management Planning Act, sections 10610 through 10656 of the California Water Code. Only those water suppliers who provide water to more than 3,000 customers or supply more than 3,000 acre feet of water annually are required under the Act to prepare such an UWMP. The purpose of the UWMP is to consolidate regional information regarding water supply and demand, provide public information, and improve statewide water planning. The Draft 2015 UWMP may be reviewed at District Headquarters, at the Novato Public Library or on the District's website: www.nmwd.com . INVITATION / INFORMATION: You are cordially invited to attend the hearing or mail your written comments. Should you have any questions or wish more detailed information, please contact Drew McIntyre, Chief Engineer, at 1-415-761-8912 or dmcintyre@nmwd.com . NO. 703 JUN 8, 15, 2016	SUMMARY OF ORDINANCE 2016-01 ALTO SANITARY DISTRICT OF MARIN COUNTY THE DISTRICT BOARD OF DIRECTORS HEREBY ESTABLISHES THIS ORDINANCE TO INCREASE THE SEWER SERVICE CHARGE. THIS ORDINANCE WILL BE CONSIDERED FOR ADOPTION at the regular meeting of the Board of Directors of the Alto Sanitary District held on the 22ND day of June, 2016 at 7:30 PM in the conference room at the Sewerage Agency of Southern Marin, 450 Sycamore Ave., Mill Valley, CA 94941. This Ordinance gives the District, among other powers, the authority to increase the annual sewer service charge levied on each equivalent dwelling unit (EDU) from \$500.00 to \$1,100 IN FY 2016/17, AND \$1,250 IN FY 2017/18, AND \$1,500 IN FY 2018/19. The Alto Sanitary District will hold a public hearing on the need to increase the annual sewer service charge levied on properties within the District for the purpose of paying for: • THE ADMINISTRATION, OPERATION AND MAINTENANCE OF THE DISTRICT'S WASTEWATER COLLECTION SYSTEM • THE COST OF WASTEWATER TREATMENT AND DISPOSAL, INCLUDING PLANNED CAPITAL IMPROVEMENTS OF APPROXIMATELY \$30 MILLION AT SASM'S TREATMENT PLANT • THE PLANNED REPAIR AND REPLACEMENT OF THE DISTRICT'S COLLECTION SYSTEM • PROVIDING SUFFICIENT RESERVES TO FUND UNFORESEEN EMERGENCIES AND • TO PAY FOR OTHER LAWFUL OBLIGATIONS AND EXPENSES ASSOCIATED WITH THE NORMAL OPERATION OF THE DISTRICT. This rate will remain in effect until modified by future board action. Persons desiring to be heard on the matter of this increase should attend the hearing and state their concerns. A certified copy of this ordinance is posted in the office of the Clerk of the Alto Sanitary District located at 450 Sycamore Avenue, Mill Valley, CA 94941. NO. 711 JUN 8, 2016	PUBLIC NOTICE The San Rafael City School District is planning to destroy a portion of school records of students born BEFORE JULY 1, 1991, who were enrolled in Special Education or Gifted programs (MAL/GATE). The Code of Federal Regulation, C.F.R. 121a573, mandates that "Public agency shall inform parents when personally identifiable information collected, maintained, or used under this part is no longer needed to provide education services to the child." Should you wish to discuss any part of this notice, please contact Mary at 415-492-3220 before July 1, 2016. NO. 680 JUN 5, 6, 7, 8, 9, 10, 11, 2016	NOTICE OF PUBLIC SALE: ALL OVER MARIN MINI STORAGE SAN ANSELMO In accordance with the provisions of the CALIFORNIA BUSINESS AND PROFESSIONAL CODE, there being due an unpaid storage charge for which the Mini Storage is entitled to a lien on the goods hereinafter described, and due notice in the time specified in such notice for payment having expired, NOTICE IS HEREBY GIVEN THAT THESE GOODS WILL BE SOLD AT PUBLIC AUCTION AT MINI STORAGE SAN ANSELMO, 208 GREENFIELD AVENUE, SAN ANSELMO AT 1:00 P.M. WEDNESDAY, JUNE 22, 2016. The public is invited to attend. Should it be impossible to sell all the lots on the above date, the sale will continue to another date, as announced by the Auctioneer, Duane M. Hines, Board No. Red 1016142. The following items to be sold consist of household goods and personal effects, identified below. For additional information call 415 454-5710. Monday-Friday, 9:00 a.m. to 5:00 p.m. Names of owners is followed by lot number: Name of owner followed by lot numbers Liam Barnett #066 Marielena Portillo-Osborne #257 NO.685 JUN 8, 15, 2016	APN: 953095 IN DEJ Septem TO PR AT A F TION AGAIN YER, O Avenu Servic under tained on Sep 007925 Record by COI NATION SELL A DER, in payabl erty si scribin DESCRI ly here The str nation, above i KNOLLS disclaim the stre tion, if made by or impi cumbra sum of Trust, said No of the I and exp created amount tions se reasona vances, this Not \$231,019 premium increase bid at s amount, accept a national eral cred or feder ings ass Section and aut other su Trustee, accepted ance of funds be dorsee a fered for count by the Trus reason, t sive remi to the Tr have not Bidders I property there are auction. the prop Trustee a you to fre ty. You sh ing aucti are the h or may b senior to you can r are encor priority, a exist on t recorder's either of informati sources, J Lender m Deed of T erty Owne of Sale m by the Mo court, pur nia Civil C tion about made ava courtesy t you wish been poss scheduled property, 659-7765 f Default Se site addre garding th number as Informati	

Fictitious Business Name Statements

Advertise Your
DBA Statement with the IJ!

Mail your filed copy to
**Marin IJ
Legal
Department**

4000 Civic Center Drive,
Suite 301,



**NORTH MARIN
WATER DISTRICT**

999 Rush Creek Place
P.O. Box 146
Novato, CA 94948

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info@nmwd.com

WEB

www.nmwd.com

June 8, 2016

To: Interested Agencies

Subject: Notice of Public Comment Period and Public Hearing on the 2015 Urban Water Management Plan

The Board of Directors of the North Marin Water District will hold a public hearing on Tuesday, June 21, 2016 at 7:00 p.m. at District Headquarters, 999 Rush Creek Place, Novato, CA for the purpose of receiving comments on the 2015 Urban Water Management Plan (UWMP).

The UWMP is required to be prepared pursuant to the Urban Water Management Planning Act, sections 10610 through 10656 of the California Water Code. Only those water suppliers who provide water to more than 3,000 customers or supply more than 3,000 acre feet of water annually are required under the Act to prepare such an UWMP. The purpose of the UWMP is to consolidate regional information regarding water supply and demand, provide public information, and improve statewide water planning.

The Draft 2015 UWMP may be reviewed at District Headquarters, at the Novato Public Library or on the District's website: www.nmwd.com.

You are cordially invited to attend the hearing or mail your written comments. Should you have any questions or wish more detailed information, please contact Drew McIntyre, Chief Engineer, at 1-415-761-8912 or dmcintyre@nmwd.com.

Sincerely,

Chris DeGabriele
General Manager

Distribution List:

Sonoma County Water Agency, Attention: Grant Davis
Marin Municipal Water District, Attention: Krishna Kumar
Novato Sanitary District, Attention: Sandeep Karkal
Marin County LAFCO, Attention: Keene Simonds
County of Marin, Attention: Brian Crawford
City of Novato, Attention: Cathy Capriola
County of Sonoma PRMD, Attention: J.T. Wick

T:\GMUWMP 2015\Notice of 2015 UWMP public comment period_public hearing.doc

DIRECTORS: JACK BAKER • RICK FRAITES • STEPHEN PETTERLE • DENNIS RODONI • JOHN C. SCHOONOVER

OFFICERS: CHRIS DEGABRIELE, General Manager • KATIE YOUNG, Secretary • DAVID L. BENTLEY, Auditor-Controller • DREW MCINTYRE, Chief Engineer



**NORTH MARIN
WATER DISTRICT**

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June 8, 2016

To: Novato Public Library

This letter serves to transmit the North Marin Water District's 2015 Urban Water Management Plan which is to be made available for public viewing until June 21, 2016 at which time a public hearing will be conducted by the Board of Directors to consider its adoption. The public hearing shall be held at the NMWD Board of Directors meeting scheduled for 7:00 p.m. at District Headquarters, 999 Rush Creek Place, Novato.

Sincerely,


Chris DeGabriele
General Manager

Enclosure: NMWD 2015 Urban Water Management Plan

T:\GMIUWMP 2015\2015 UWMP ltr to library.doc

RESOLUTION 16-15

RESOLUTION OF THE BOARD OF DIRECTORS OF NORTH MARIN WATER DISTRICT ADOPTING THE 2015 URBAN WATER MANAGEMENT PLAN

WHEREAS, the Urban Water Management Planning Act, which is codified at California Water Code Section 10610 *et seq.*, requires that every urban water supplier which provides 3,000 acre feet or more of water annually, or which directly or indirectly supplies water for municipal purposes to more than 3,000 customers, shall prepare an Urban Water Management Plan (UWMP), the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, on February 4, 2016 a notice that the NMWD 2015 UWMP was being prepared was circulated to other appropriate public agencies in the Marin and Sonoma County area; and

WHEREAS, the NMWD 2015 UWMP must be adopted after public review and a public hearing by the District, and after adoption by the District's Board of Directors must be filed with the California Department of Water Resources; and

WHEREAS, the District has heretofore prepared the plan, and commencing on June 8, 2016, circulated for public review the draft NMWD 2015 UWMP, in compliance with the requirements of the Act, and a duly noticed public hearing was held on June 21, 2016 by the Board of Directors in accordance with said notice, and no objections have been raised, and said NMWD 2015 UWMP was adopted as prepared;

NOW THEREFORE, BE IT RESOLVED by the Board of Directors of North Marin Water District as follows:

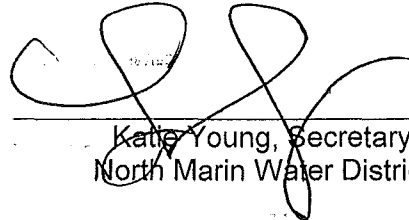
1. The Board of Directors does hereby find, determine and declare that:
 - a. This District has prepared said Plan dated June 2016.
 - b. A copy of the proposed Plan has been made available for public inspection at the principal office of the District, at the Novato Public Library and on the District website continuously since June 8, 2016.
 - c. On June 21, 2016, this Board of Directors held a public hearing on the proposed Plan. Notice of the time and place of said hearing was published in the Marin Independent Journal, a newspaper of general circulation on June 8 and June 15, 2016.

2. The 2015 Urban Water Management Plan, dated June 2016 was hereby approved and adopted by the NMWD Board of Directors on June 21, 2016.

* * * * *

I hereby certify that the foregoing is a true and complete copy of a resolution duly and regularly adopted by the Board of Directors of NORTH MARIN WATER DISTRICT at a regular meeting of said Board held on the June 21, 2016 by the following vote:

AYES:	Directors Baker, Fraites, Petterle, Rodoni and Schoonover
NOES:	None
ABSENT:	None
ABSTAINED:	None



Katie Young, Secretary
North Marin Water District

(SEAL)

APPENDIX B

MEMORANDUM

To: File April 27, 2016
From: Ryan Grisso, Water Conservation Coordinator *RG*
Subject: NMWD Calculation for Baseline and Compliance Urban Per Capita Water Use for
Consistent Implementation of SB 7X-7 for 2015 Urban Water Management Plan
R:\NON JOB No ISSUES\UWMP 2015\2016 NMWD calc SB7X7 memo to file.doc

California Department of Water Resources released an updated *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (DWR Guidance Document) in February 2016, which prescribes the calculation to be used for the 20% reduction in per capita water use by year 2020 pursuant to SB X7-7, the Water Conservation Act of 2009. This updated DWR Guidance document called for the inclusion of 2010 Census data if not used in the original calculation in 2010.

The NMWD Novato distribution system area includes customers served outside the NMWD Novato service territory. In the 2010 baseline population calculation, Census Block Maps from Census 2000 were used to determine the population by identifying specific Census Tract Blocks in the Novato service territory. These blocks included not only those blocks within our service territory, but blocks in the South Petaluma Boulevard industrial area and Windhaven area residential development adjacent to US 101 in Sonoma County. This was an extremely complicated process using extracted Census Block Group data segregated by structure type to determine a percentage population between single family and multi-family connections in the service area to be applied to the identified blocks within the NMWD service area. This resulted in a population multiplier for multi-family connections and single family connections that was used to extend the population projection back-cast to 1995 and forecast to 2010. To further complicate the calculation process, in Census Year 2000, the Hamilton Field area was served by Marin Municipal Water District. North Marin service to Hamilton Field began in 2002. Thus, a connection density multiplier with and without Hamilton Field was developed. The connection density multipliers without Hamilton field were used to back-cast to 1995 and connection density multipliers with Hamilton Field to forecast from 2002 to 2010.

To incorporate the 2010 Census data into the baseline population calculation, as prescribed by the updated DWR Guidance Document, staff attempted to duplicate this same methodology. Through that process, it was determined that a more simplified yet equally as accurate method could be applied using a dwelling unit multiplier rather than a single family and multi-family unit by connection multiplier. NMWD has always kept accurate records of dwelling units through the years

and it was determined that this would be more accurate and consistent moving forward, and therefore should be used to recalculate the baseline population. In order to change the methodology, a dwelling unit multiplier had to be calculated using 2010 Census data and also using 2000 Census data (as recommended by DWR Staff) and the baseline recalculated using the new methodology. The total population for the City of Novato was divided by the total number of households for both 2000 and 2010 Census creating a dwelling unit multiplier for each year. This multiplier was then interpolated between 2000 and 2010 and multiplied times the yearly dwelling unit counts to calculate population in the years between. The year 2000 multiplier was used to back-cast to 1995. The resulting multipliers by year and recalculated populations are included in Attachment 1. The result was a slightly larger population during the baseline period.

The new SB X7-7 ten-year average per capita water use as the baseline for determining the 20% x 2020 target was reduced from 178 to 173 gallons per person per day and the 20% reduction target by 2020 was reduced from 143 to 139 gallons per person per day. Attached are the 2015 SB X7-7 verification forms documenting the new baseline population, targets and 2015 compliance to be included in the 2015 UWMP (Attachment 2).

Attachment 1: Population Calculation Incorporating 2000 and 2010 Census Data Multiplier by Dwelling Unit
By Ryan Grisso, April 2016

Year	Active Dwelling Units by Year	Interpolated Multiplier between 2000 and 2010 and 2000 Multiplier back to 1995	Total Population Using 2000/2010 Combination
1995	20,530	2.570	52,762
1996	20,159	2.570	51,809
1997	20,214	2.570	51,950
1998	20,262	2.570	52,073
1999	20,669	2.570	53,119
2000	21,050	2.570	54,099
2001	21,297	2.569	54,712
2002	21,883	2.568	56,196
2003	21,955	2.567	56,358
2004	22,419	2.566	57,527
2005	23,059	2.565	59,146
2006	23,540	2.564	60,357
2007	23,595	2.563	60,474
2008	23,604	2.562	60,473
2009	23,740	2.561	60,798
2010	23,786	2.560	60,892
2015	23,977	2.560	61,381

2015 Dwelling Units as of December 31, 2015

SB X7-7 Table 0: Units of Measure Used in UWMP**(select one from the drop down list)*

Acre Feet

**The unit of measure must be consistent with Table 2-3*

NOTES:

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	10,583	Acre Feet
	2008 total volume of delivered recycled water	144	Acre Feet
	2008 recycled water as a percent of total deliveries	1.36%	Percent
	Number of years in baseline period ^{1, 2}	10	Years
	Year beginning baseline period range	1995	
5-year baseline period	Year ending baseline period range ³	2004	
	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range ⁴	2007	

¹ If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. ² The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.

³ The ending year must be between December 31, 2004 and December 31, 2010.

⁴ The ending year must be between December 31, 2007 and December 31, 2010.

NOTES:

SB X7-7 Table 2: Method for Population Estimates

Method Used to Determine Population (may check more than one)	
<input type="checkbox"/>	1. Department of Finance (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
<input type="checkbox"/>	2. Persons-per-Connection Method
<input type="checkbox"/>	3. DWR Population Tool
<input checked="" type="checkbox"/>	4. Other DWR recommends pre-review
NOTES: 1. Persons-per-dwelling unit multiplier method using 2000 and 2010 Census data was used to determine the baseline population number back to 1995.	

SB X7-7 Table 3: Service Area Population

Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	52,762
Year 2	1996	51,809
Year 3	1997	51,950
Year 4	1998	52,073
Year 5	1999	53,119
Year 6	2000	54,099
Year 7	2001	54,712
Year 8	2002	56,196
Year 9	2003	56,358
Year 10	2004	57,527
Year 11	2005	
Year 12	2006	
Year 13	2007	
Year 14	2008	
Year 15	2009	
5 Year Baseline Population		
Year 1	2003	56,358
Year 2	2004	57,527
Year 3	2005	59,146
Year 4	2006	60,357
Year 5	2007	60,474
2015 Compliance Year Population		
2015		61,381
NOTES:		

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Into Distribution System <i>This column will remain blank until SB X7-7 Table 4-A is completed.</i>	Deductions					Annual Gross Water Use
		Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water <i>This column will remain blank until SB X7-7 Table 4-B is completed.</i>	Water Delivered for Agricultural Use	Process Water <i>This column will remain blank until SB X7-7 Table 4-D is completed.</i>	
10 to 15 Year Baseline - Gross Water Use							
Year 1	1995	9,779			-		9,779
Year 2	1996	10,328			-		10,328
Year 3	1997	10,537			-		10,537
Year 4	1998	9,215			-		9,215
Year 5	1999	10,188			-		10,188
Year 6	2000	10,784			-		10,784
Year 7	2001	10,969			-		10,969
Year 8	2002	11,042			-		11,042
Year 9	2003	10,651			-		10,651
Year 10	2004	11,505			-		11,505
Year 11	2005	-			-		-
Year 12	2006	-			-		-
Year 13	2007	-			-		-
Year 14	2008	-			-		-
Year 15	2009	-			-		-
10 - 15 year baseline average gross water use							10,500
5 Year Baseline - Gross Water Use							
Year 1	2003	10,651			-		10,651
Year 2	2004	11,505			-		11,505
Year 3	2005	10,060			-		10,060
Year 4	2006	10,735			-		10,735
Year 5	2007	10,326			-		10,326
5 year baseline average gross water use							10,655
2015 Compliance Year - Gross Water Use							
2015	7,237	-			-		7,237
* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3							
NOTES:							

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source		Stafford/SCWA H2O		
This water source is:				
<input checked="" type="checkbox"/>	The supplier's own water source			
<input checked="" type="checkbox"/>	A purchased or imported source			
Baseline Year <i>Fm SB X7-7 Table 3</i>	Volume Entering Distribution System	Meter Error Adjustment* <i>Optional (+/-)</i>	Corrected Volume Entering Distribution System	
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1995	9,779		9,779
Year 2	1996	10,328		10,328
Year 3	1997	10,537		10,537
Year 4	1998	9,215		9,215
Year 5	1999	10,188		10,188
Year 6	2000	10,784		10,784
Year 7	2001	10,969		10,969
Year 8	2002	11,042		11,042
Year 9	2003	10,651		10,651
Year 10	2004	11,505		11,505
Year 11	2005			-
Year 12	2006			-
Year 13	2007			-
Year 14	2008			-
Year 15	2009			-
5 Year Baseline - Water into Distribution System				
Year 1	2003	10,651		10,651
Year 2	2004	11,505		11,505
Year 3	2005	10,060		10,060
Year 4	2006	10,735		10,735
Year 5	2007	10,326		10,326
2015 Compliance Year - Water into Distribution System				
2015		7,237		7,237
<i>* Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document</i>				
NOTES:				

SB X7-7 Table 4-A: Volume Entering the Distribution

Name of Source		Source 2		
This water source is:				
<input type="checkbox"/>	The supplier's own water source			

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)

Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Annual Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	52,762	9,779	165
Year 2	1996	51,809	10,328	178
Year 3	1997	51,950	10,537	181
Year 4	1998	52,073	9,215	158
Year 5	1999	53,119	10,188	171
Year 6	2000	54,099	10,784	178
Year 7	2001	54,712	10,969	179
Year 8	2002	56,196	11,042	175
Year 9	2003	56,358	10,651	169
Year 10	2004	57,527	11,505	179
Year 11	2005	-	-	
Year 12	2006	-	-	
Year 13	2007	-	-	
Year 14	2008	-	-	
Year 15	2009	-	-	
10-15 Year Average Baseline GPCD				173
5 Year Baseline GPCD				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use
Year 1	2003	56,358	10,651	169
Year 2	2004	57,527	11,505	179
Year 3	2005	59,146	10,060	152
Year 4	2006	60,357	10,735	159
Year 5	2007	60,474	10,326	152
5 Year Average Baseline GPCD				162
2015 Compliance Year GPCD				
2015		61,381	7,237	105
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day
Summary From Table SB X7-7 Table 5

10-15 Year Baseline GPCD	173
5 Year Baseline GPCD	162
2015 Compliance Year GPCD	105
NOTES:	

SB X7-7 Table 7: 2020 Target Method**Select Only One**

Target Method		Supporting Documentation
<input checked="" type="checkbox"/>	Method 1	SB X7-7 Table 7A
<input type="checkbox"/>	Method 2	SB X7-7 Tables 7B, 7C, and 7D <i>Contact DWR for these tables</i>
<input type="checkbox"/>	Method 3	SB X7-7 Table 7-E
<input type="checkbox"/>	Method 4	Method 4 Calculator

NOTES:

SB X7-7 Table 7-A: Target Method 1
20% Reduction

10-15 Year Baseline GPCD	2020 Target GPCD
173	139
NOTES:	

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target

5 Year Baseline GPCD From SB X7-7 Table 5	Maximum 2020 Target ¹	Calculated 2020 Target ²	Confirmed 2020 Target
162	154	139	139

¹ Maximum 2020 Target is 95% of the 5 Year Baseline GPCD

Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.

² 2020

NOTES:

SB X7-7 Table 8: 2015 Interim Target GPCD

Confirmed 2020 Target <i>Fm SB X7-7 Table 7-F</i>	10-15 year Baseline GPCD <i>Fm SB X7-7 Table 5</i>	2015 Interim Target GPCD
139	173	156
NOTES:		

SB X7-7 Table 9: 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments (In GPCD)					2015 GPCD (Adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2015?
		Enter '0' if Adjustment Not Used			TOTAL Adjustments	Adjusted 2015 GPCD		
		Extraordinary Events	Weather Normalization	Economic Adjustment				
105	156	From Methodology 8 (Optional)	From Methodology 8 (Optional)	From Methodology 8 (Optional)	-	105	105	YES

NOTES:

MEMORANDUM

To: File March 6, 2015
From: Chris DeGabriele, General Manager 
Subject: 2015 Urban Water Management Plan – NMWD Novato Service Territory – Population and Jobs Projections
T:\GM\UWMP 2015\population and jobs projections memo.doc

Attached is a table showing the US Census Tract Block Maps used for determining population and jobs projections for NMWD's 2015 UWMP. ABAG projections from 2003, 2005, 2007, 2009 and 2013 for total population and total jobs within the identified tracts are also tabulated for years 2010 through 2040. ABAG Projections 2013 include the most recent 2010 census data. NMWD Novato service territory includes Marin County and Sonoma County Census Tracts and blocks listed on the attached table. The ABAG population and jobs statistics are not available for individual blocks within a census tract; thus, the tabulated total population and total jobs on the table does not include data from census tracts where only certain blocks are within the NMWD Novato service territory. The census tracts are highlighted on the attached Census 2010 Block Maps.

For the 2015 Urban Water Management Plan, the District will use the population and jobs projections from ABAG for the full census tracts within the NMWD Novato service territory. The data will be averaged for ABAG Projections 2007 through 2013 and provided to consultant, Maddaus Water Management, for their use in determining water demand and water conservation projections.

Cc: D. Bentley w/o attachments
D. McIntyre w/o attachments

Population and Households

ABAG Projections 2013 Data			Population							
County	CensusTract		2010	2015	2020	2025	2030	2035	2040	
Marin	101100		2,569	2,592	2,612	2,641	2,668	2,708	2,748	
Marin	101200		2,682	2,715	2,747	2,789	2,828	2,879	2,929	
Marin	102100		2,295	2,322	2,353	2,386	2,419	2,461	2,507	
Marin	102202		5,885	5,953	6,029	6,111	6,200	6,303	6,415	
Marin	102203		4,753	4,808	4,864	4,935	5,006	5,092	5,181	
Marin	103100		7,168	7,253	7,338	7,441	7,542	7,673	7,806	
Marin	103200		6,504	6,598	6,675	6,783	6,889	7,034	7,173	
Marin	104101		7,819	7,909	8,009	8,121	8,231	8,369	8,512	
Marin	104102		5,135	5,193	5,258	5,332	5,407	5,499	5,595	
Marin	104200		5,722	5,791	5,866	5,952	6,038	6,147	6,256	
Marin	104300		1,530	1,535	1,543	1,554	1,565	1,581	1,596	
Marin	105000		6,590	6,670	6,746	6,838	6,932	7,054	7,174	
Marin	133000	N & W Marin	Note2	3,226	3,242	3,258	3,274	3,300	3,332	3,368
Projections 2013 Total			61,878	62,581	63,298	64,157	65,025	66,132	67,260	
Projections 2013 w/o 133000			58,652	59,339	60,040	60,883	61,725	62,800	63,892	
2009 Projections w/o 133000			60,326	61,174	62,494	63,610	64,851	65,734	66,816	
2007 Projections w/o 133000			60,606	62,938	65,434	67,293	68,720	69,882	71,737	
2005 Projections w/o 133000			60,338	63,656	66,484	67,914	69,306			
2003 Projections w/o 133000			60,674	64,072	66,270	67,568	68,668			
Average 2005 to 2009 (2010 UWMP)			60,423	62,589	64,804	66,272	67,626	67,808		
5 yr increment 2013	Average increment=	873		687	701	843	842	1,075	1,092	
5 yr increment 2009	Average increment=	1082		848	1,320	1,116	1,241	883		
5 yr increment 2007	Average increment=	1855		2,332	2,496	1,859	1,427	1,162		
5 yr increment 2005	Average increment=	2242		3,318	2,828	1,430	1,392			
Average 2007 to 2013 (2015 UWMP)			59,861	61,150	62,656	63,929	65,099	66,139	67,482	
Notes:										
1. The 2040 values = the sum of the 2035 value for 2009 & 2007 projections + the average increment for 2009 & 2007 respectively.			2. Census Tract 133000 covers all N & W Marin and conservatively is not included herein.							

Note 1.
Note 1.

Employment

ABAG Projections 2013 Data				Total Employment						
County	CensusTract			2010	2015	2020	2025	2030	2035	2040
Marin	101100			939	964	986	980	977	978	977
Marin	101200			1,864	1,915	1,968	1,971	1,979	1,994	2,014
Marin	102100			3,128	3,294	3,469	3,602	3,742	3,902	4,070
Marin	102202			1,375	1,393	1,414	1,405	1,397	1,392	1,389
Marin	102203			2,784	2,854	2,928	2,914	2,902	2,899	2,900
Marin	103100			531	571	612	636	661	687	713
Marin	103200			1,740	1,788	1,839	1,846	1,852	1,867	1,884
Marin	104101			1,804	1,908	2,018	2,076	2,136	2,204	2,276
Marin	104102			1,078	1,121	1,167	1,179	1,193	1,211	1,229
Marin	104200			1,400	1,433	1,465	1,441	1,421	1,404	1,388
Marin	104300			1,904	1,955	2,003	1,983	1,968	1,960	1,958
Marin	105000			3,746	3,929	4,124	4,177	4,243	4,329	4,431
Marin	133000	N & W Marin	Note 2.	2,102	2,139	2,173	2,143	2,113	2,090	2,067
Projections 2013 Total				24,395	25,264	26,166	26,353	26,584	26,917	27,296
Projections 2013 w/o 133000				22,293	23,125	23,993	24,210	24,471	24,827	25,229
2009 Projections w/o 133000				27,792	28,513	29,928	31,341	32,922	35,164	36,638
2007 Projections w/o 133000				29,288	30,805	32,539	34,642	36,626	38,885	40,720
2005 Projections w/o 133000				29,819	33,142	36,622	40,006	43,214		
2003 Projections w/o 133000				32,455	38,201	41,499	43,864	45,295		
Average 2005 to 2009 (2010 UWMP)				28,966	30,820	33,030	35,330	36,177	37,025	
5 yr increment 2013	Average increment=	507			832	868	217	261	356	402
5 yr increment 2009	Average increment=	1,474			721	1,415	1,413	1,581	2,242	
5 yr increment 2007	Average increment=	1,835			1,517	1,734	2,103	1,984		
5 yr increment 2005	Average increment=	3,349			3,323	3,480	3,384	3,208		
Average 2007 to 2013 (2015 UWMP)				26,458	27,481	28,820	30,064	31,340	32,959	34,196
Notes:										
1. The 2040 values = the sum of the 2035 value for 2009 & 2007 projections + the average increment for 2009 & 2007 respectively.				2. Census Tract 1331 covers all N & W Marin and conservatively is included herein.						



**NORTH MARIN
WATER DISTRICT**

999 Rush Creek Place
P.O. Box 146
Novato, CA 94948

PHONE

415.897.4133

FAX

415.892.8043

EMAIL

info@nmwd.com

WEB

www.nmwd.com

May 18, 2011

California Department of Water Resources
Division of Statewide Integrated Water Management
Water Use and Efficiency Branch
Attn: Manucher Alemi Chief
PO Box 942836
Sacramento, CA 94236

Dear Mr. Alemi

A regional alliance has been formed between and among the cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor and North Marin, Marin Municipal and Valley of the Moon Water Districts to comply with SBx7-7, the Water Conservation Act of 2009. The regional alliance has been formed pursuant to the Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use because the parties receive water from a common water wholesale supplier, the Sonoma County Water Agency. Data pertaining to the regional alliance can be collected through the individual cities and water districts urban water management plans to be submitted by July 1, 2011.

Should you have any questions regards the regional alliance, please contact me.

Sincerely,

Chris DeGabriele
General Manager
North Marin Water District

Chair, Technical Advisory Committee
to the Water Contractors receiving
wholesale supply from SCWA

cc: Miles Ferris, City of Santa Rosa
Darrin Jenkins, City of Rohnert Park
Milenka Bates, City of Sonoma
Damien O'Bid, City of Cotati
Pamela Tuft, City of Petaluma
Richard Burt, Town of Windsor
Krishna Kumar, Valley of the Moon Water District
Paul Helliker, Marin Municipal Water District

CD/rr

T:\GMS\SCWA\2011\dwtr letter re regional alliance.doc

Letter Agreement
Between and Among
Cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor
And
North Marin Water District, Marin Municipal Water District
and Valley of the Moon Water District
For
Establishing a Regional Alliance to Comply with
SB x7-7 the Water Conservation Act of 2009

Recitals

A. The Water Conservation Act of 2009 (SB x7-7) set a goal of achieving a 20% reduction in statewide urban per capita water use by the year 2020 and requires urban water retailers to set a 2020 urban per capita water use target. SB x7-7 provides that urban water retailers may plan, comply and report on a regional basis, individual basis or both.

B. The Parties to this Letter Agreement (Cities of Santa Rosa, Rohnert Park, Sonoma, Cotati, Petaluma, Town of Windsor and North Marin, Marin Municipal and Valley of the Moon Water Districts) are eligible to form a "Regional Alliance" pursuant to the *Department of Water Resources Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (DWR Methodologies) because the Parties receive water from a common water wholesale water supplier, the Sonoma County Water Agency (Agency). The Parties desire to establish a Regional Alliance for purposes of complying with SB x7-7.

C. The Parties and the Agency are signatories to the Sonoma-Marín Saving Water Partnership Memorandum of Understanding (S-MSWP MOU) that provides for the identification and implementation of regional water conservation programs and tasks as directed by the Water Advisory Committee (WAC). The S-MSWP MOU requires financial and reporting commitments for implementation of water conservation programs.

Agreement for Regional Alliance Target Setting and Reporting

1. Regional Alliance Formation and Target Setting

Pursuant to the DWR Methodologies, the Parties hereby form a Regional Alliance and agree to send a letter to the Department of Water Resources (DWR) prior to July 1, 2011 informing DWR that a Regional Alliance has been formed. The Parties agree that the Regional Alliance Target will be established using Option 1 (as Option 1 is described in the DWR Methodologies) and that each Party will include the Regional Alliance Target in its individual 2010 Urban Water Management Plan.

2. Regional Alliance Review

No later than December 31, 2015, the Parties agree to review and re-analyze the Regional Alliance and Regional Alliance Target as part of the preparation of the 2015 Urban Water Management Plan.

3. Regional Alliance Reporting

The Parties agree to prepare Regional Alliance Reports pursuant to the DWR Methodologies including but not limited to the following information: baseline gross water use and service area population, individual 2015 and 2020 water use targets for each Party and for the Regional Alliance, compliance year gross water use and service area population, and adjustments to gross water use in compliance year. The information will be provided by each Party and reported in the annual S-MSWP report in addition to the information required in the annual report, as outlined in the S-MSWP MOU.

4. Regional Water Supply Planning

The Parties agree to participate in discussions regarding regional water supply planning.

5. Regional Alliance Dissolution

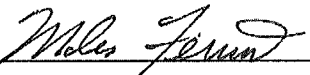
The Parties agree that each Party can withdraw from the Regional Alliance at any time without penalty by giving written notice to all other Parties. If a Party withdraws from the Regional Alliance, the Parties agree that the Regional Target will be recalculated among remaining participating Parties as set forth in the DWR Methodologies and in Section 2 above.

6. Miscellaneous

This Letter Agreement shall be between and among those Parties that have executed this Letter Agreement by May 1, 2011. If all Parties have not executed this Letter Agreement by said date, the Parties who have executed this Letter Agreement by May 1, 2011, agree that the Regional Target will be recalculated among participating Parties as set forth in the DWR Methodologies and in Section 2 above.

7. Letter Agreement Authorization

This Letter Agreement may be signed in counterparts. By signing below, each signatory states that he or she is authorized to sign this Letter Agreement on behalf of the Party for which he or she is signing.



Name: Miles Ferris
City of Santa Rosa

4/20/11

Date

Name: _____
City of Rohnert Park

Date

Name: _____
City of Sonoma

Date

Name: _____
City of Cotati

Date

6. Miscellaneous

This Letter Agreement shall be between and among those Parties that have executed this Letter Agreement by May 1, 2011. If all Parties have not executed this Letter Agreement by said date, the Parties who have executed this Letter Agreement by May 1, 2011, agree that the Regional Target will be recalculated among participating Parties as set forth in the DWR Methodologies and in Section 2 above.


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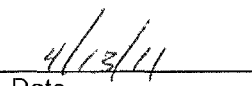
Name: _____

City of Santa Rosa

Date


Name: Gabriel A. Gonzalez

City of Rohnert Park


Date

Per Rohnert Park City Council
Resolution No. 2011-30 adopted on
April 12, 2011

Name: _____

City of Sonoma

Date

Name: _____

City of Cotati

Date

6. Miscellaneous


This Letter Agreement shall be between and among those Parties that have executed this Letter Agreement by May 1, 2011. If all Parties have not executed this Letter Agreement by said date, the Parties who have executed this Letter Agreement by May 1, 2011, agree that the Regional Target will be recalculated among participating Parties as set forth in the DWR Methodologies and in Section 2 above.

7. Letter Agreement Authorization

This Letter Agreement may be signed in counterparts. By signing below, each signatory states that he or she is authorized to sign this Letter Agreement on behalf of the Party for which he or she is signing.

_____	_____
Name: _____	Date
City of Santa Rosa	

_____	_____
Name: _____	Date
City of Rohnert Park	

	
_____	_____
Name: <u>Milenka Bates</u>	Date <u>4/19/2011</u>
City of Sonoma	

_____	_____
Name: _____	Date
City of Cotati	

6. Miscellaneous

This Letter Agreement shall be between and among those Parties that have executed this Letter Agreement by May 1, 2011. If all Parties have not executed this Letter Agreement by said date, the Parties who have executed this Letter Agreement by May 1, 2011, agree that the Regional Target will be recalculated among participating Parties as set forth in the DWR Methodologies and in Section 2 above.

7. Letter Agreement Authorization

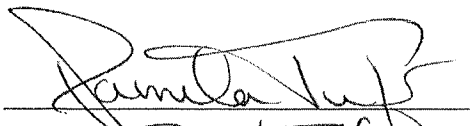
This Letter Agreement may be signed in counterparts. By signing below, each signatory states that he or she is authorized to sign this Letter Agreement on behalf of the Party for which he or she is signing.

_____	_____
Name: _____	Date
City of Santa Rosa	

_____	_____
Name: _____	Date
City of Rohnert Park	

_____	_____
Name: _____	Date
City of Sonoma	

	_____
Name: <u>Dianne Thompson</u>	5-17-11
City of Cotati	Date


Name: PAMELA Tuft
City of Petaluma

4-11-11
Date

Name: _____
Town of Windsor

Date

Name: _____
North Marin Water District

Date

Name: _____
Marin Municipal Water District


Date

Name: _____
Valley of the Moon Water District

Date

Name: _____
City of Petaluma

Date



Name: J. Matthew Mullan
Town of Windsor

4-12-11

Date

Name: _____
North Marin Water District

Date

Name: _____
Marin Municipal Water District

Date

Name: _____
Valley of the Moon Water District

Date

Name: _____
City of Petaluma

Date

Name: _____
Town of Windsor

Date

Chris DeGabriele

Name: Chris DeGabriele
North Marin Water District

4/26/2011

Date

Name: _____
Marin Municipal Water District

Date

Name: _____
Valley of the Moon Water District

Date

Name: _____
City of Petaluma

Date

Name: _____
Town of Windsor

Date

Name: _____
North Marin Water District

Date

Paul Helliker
Name: Paul Helliker
Marin Municipal Water District

5/13/11
Date

Name: _____
Valley of the Moon Water District

Date

Name: _____
City of Petaluma

Date

Name: _____
Town of Windsor

Date

Name: _____
North Marin Water District

Date

Name: _____
Marin Municipal Water District

Date

Krishna Kumar
Name: KRISHNA KUMAR
Valley of the Moon Water District

April 11, 2011
Date

RECEIVED

3



**NORTH MARIN
WATER DISTRICT**



**North Marin Water District
NMWD Job No. 1 4050.00**

**2015 Urban Water Management Plan Water Demand
Analysis and Water Conservation Measures Update**

FINAL

July 1, 2015



**MADDAUS
WATER
MANAGEMENT INC.**

TABLE OF CONTENTS

LIST OF FIGURES	4
LIST OF TABLES	4
LIST OF ACRONYMS	5
EXECUTIVE SUMMARY	6
Introduction	6
Long-Term Demand and Conservation Program Analysis Results	6
1. INTRODUCTION	12
1.1 Goals and Objectives	12
1.2 Approach and Methodology	12
1.3 Collaboration between SMSWP, Water Contractors and SCWA	13
1.4 Content of Report	13
2. DATA COLLECTION AND VERIFICATION PROCESS	14
2.1 Data Collection Process	14
2.2 Types of Data Collected	14
3. DEMAND PROJECTIONS	17
3.1 Demand Methodology Overview	17
3.2 Future Population and Employment Projections	19
3.3 Water Use Data Analysis and Key Inputs to the DSS Model	20
3.4 Water Use Targets	23
3.5 Water Demand Projections With and Without the Plumbing Code	24
3.6 Water Demand Projections – 2015 Urban Water Management Plan (UWMP) Format	25
4. COMPARISON OF INDIVIDUAL CONSERVATION MEASURES	28
4.1 Selecting Conservation Measures to be Evaluated (Conservation Measure Screening)	28
4.2 Conservation Measures Evaluated	28
4.3 Water Reduction Methodology	32
4.4 Perspectives on Benefits and Costs	32
4.5 Present Value Parameters	32
4.6 Measure Assumptions including Unit Costs and Water Savings	33
4.7 Assumptions about Avoided Costs	33
4.8 Comparison of Individual Measures	35
5. RESULTS OF CONSERVATION PROGRAM EVALUATION	39
5.1 Selection of Measures for Programs	39
5.2 Results of Program Evaluation	40
6. CONCLUSIONS	45
APPENDIX A - ASSUMPTIONS FOR THE DSS MODEL	46
A.1 Plumbing Codes and Legislation	46
A.2 Present Value Parameters	56
A.3 Assumptions about Measure Costs	56
A.4 Assumptions about Measure Savings	57

APPENDIX B - WATER USE GRAPHS FOR PRODUCTION AND CUSTOMER CATEGORIES	58
APPENDIX C - MEASURE SCREENING PROCESS AND RESULTS	68
APPENDIX D - ASSUMPTIONS FOR WATER CONSERVATION MEASURES EVALUATED IN THE DSS MODEL	72
APPENDIX E - LIST OF CONTACTS.....	97
APPENDIX F - REFERENCES.....	99

LIST OF FIGURES

Figure ES-1. Conservation Measure Program Scenarios.....	8
Figure ES-2. Long Term Demands with Conservation Programs*	9
Figure ES-3. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD.....	10
Figure 3-1. DSS Model Flow Diagram	18
Figure 3-2. Historical and Projected Population and Employment.....	19
Figure 3-3. Potable Water Use Projections for North Marin Water District (AFY).....	25
Figure 5-1. Conservation Measures Selected for Programs.....	40
Figure 5-2. Long Term Demands with Conservation Programs.....	41
Figure 5-3. Present Value of Utility Costs versus Cumulative Water Saved.....	42
Figure 5-4. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD	44
Figure A-1. DSS Model Overview Used to Make Potable Water Demand Projections.....	50
Figure A-2. Example Toilet Replacement Percentages by Type of Toilet	51
Figure A-3. Example Residential Toilet Initial Proportions from Fixture Analysis used for DSS Fixture Model	52
Figure A-4. Example Residential Toilet Fixture Screenshot from DSS Model	53
Figure A-5. Example Future Replacement Rates of Fixtures from DSS Model	54
Figure A-6. End Use Breakdown Example Screenshot.....	55
Figure A-7. Single Family End Use Breakdown and Fixture Use Frequency Example Screenshot	55
Figure C-1. Water Contractor-Only Measures Screening Ranking.....	69
Figure C-2. Regional Measures Screening Ranking.....	70

LIST OF TABLES

Table ES-1 Conservation Measures Evaluated.....	7
Table ES-2. Potable Water Use Projections (Acre-Feet/Year)*	8
Table ES-3. Water Demand Program Savings Projections	9
Table ES-4. Water Conservation Program Savings Projections - SB X7-7 Target GPCD.....	10
Table ES-5. Economic Analysis of Alternative Programs	11
Table 2-1. Data Collected for Water Contractors.....	16
Table 3-1. Historical and Projected Population and Employment.....	20
Table 3-2. Water Use Data Analysis and DSS Model Key Assumptions.....	22
Table 3-3. Potable Water Use Projections (Acre-Feet/Year)*.....	24
Table 3-4. (DWR Table 2-2) Population – Current and Projected	25
Table 3-5. Demands and Accounts by Customer Category*	26
Table 3-6. (DWR Table 3-1) Retail Uses of Potable and Raw Water - Actual and Projected (Acre-Feet/Year)	27
Table 3-7. (DWR Table 3-4) Losses from Potable Water System (Acre-Feet/Year).....	27
Table 3-8. (DWR Table 3-6) Total Potable Water Use (Acre-Feet/Year)*	27
Table 3-9. (DWR Table 3-8) Passive Savings (Acre-Feet/Year)*	27
Table 4-1. Water Use Efficiency Measure Descriptions.....	29
Table 4-2. Water Contractor Avoided Costs of Water.....	34
Table 4-3. Conservation Measure Cost and Savings	37
Table 5-1. Potable Water Use Projections (Acre-Feet/Year)*.....	41
Table 5-2. Long Term Conservation Program Savings.....	42
Table 5-3. Comparison of Long-Term Conservation Programs – Utility Costs and Savings	43
Table 5-4. Water Conservation Program Savings Projections - SB X7-7 Target GPCD	43
Table 6-1. Potable Water Use Projections (Acre-Feet/Year)*	45
Table A-1. CALGreen Building Code Summary Table.....	47
Table A-2. New Development Ordinances	48

LIST OF ACRONYMS

AB	Assembly Bill	ILI	Infrastructure Leakage Index
ABAG	Association of Bay Area Governments	IRR	Irrigation
ACS	American Community Survey	MF	Multi-family
AF	acre-foot/acre-feet	MG	Million gallons
AFY	acre-foot/acre-feet per year	MMDD	Master measure design database
AMI	Automated Meter Infrastructure	MMWD	Marin Municipal Water District
AWWA	American Water Works Association	MWM	Maddaus Water Management, Inc.
AWWARF	American Water Works Association Research Foundation	ND	New Development
BMP	Best Management Practice	NMWD	North Marin Water District
CCR	California Code of Regulations	NRW	Non-revenue water
CII	Commercial, Industrial, and Institutional	PV	Present value
CPI	Consumer Price Index	PWSS	Public Water System Statistics
CUWCC	California Urban Water Conservation Council	SB	Senate Bill
DWR	Department of Water Resources	SCWA	Sonoma County Water Agency
DSS	Decision Support System	SF	Single Family
FY	Fiscal Year	SMSWP	Sonoma-Marin Saving Water Partnership
GPCD	Gallons per capita per day	UHET	Ultra High Efficiency Toilet
gpf	Gallons per flush	ULFT	Ultra Low Flow Toilet
HE	High Efficiency	UWMP	Urban Water Management Plan
HEU	High Efficiency Urinal	WF	Water factor
		WSA	Water Supply Assessment

EXECUTIVE SUMMARY

Introduction

To prepare for the submission of the 2015 Urban Water Management Plan, a demand and conservation technical analysis was conducted by Maddaus Water Management, Inc. (MWM) for North Marin Water District (NMWD or Water Contractor). The primary purpose of this analysis was to:

1. Calculate a demand forecast for the years 2015 to 2040.
2. Calculate the range of conservation costs and savings for the years 2015 to 2040. This effort included:
 - Evaluating twenty-five existing and new conservation programs that can possibly reduce future water demand.
 - Estimating the costs and water savings of these measures.
 - Combining the measures into increasingly more aggressive programs and evaluating the costs and water savings of these programs.

Long-Term Demand and Conservation Program Analysis Results

The MWM project included analysis for all the Sonoma and Marin County Water Contractors receiving Russian River Water Supply from Sonoma County Water Agency, including NMWD, and consisted of two main parts: (1) create a demand and conservation analysis for 2015 to 2040, and (2) evaluate conservation savings potential for the years 2015 to 2040 with a variety of different measures and conservation programs.

The first step in the analysis was to review and analyze historical water use production and billing data. Building on MWM's previous year 2010 demand and conservation technical analysis effort, for most Water Contractors, billing data was provided for the years 2010 to 2014. The data was graphically analyzed and discussed with the individual Water Contractors.

The historical water use, the selected population and employment projections, the plumbing code information, and discussions with the Water Contractors were used to create a demand forecast for the years 2015 to 2040, as further described in Section 3.

Once the demands were completed, the conservation measures were analyzed for a total of 25 measures shown in Table ES-1. The conservation analysis included all the measures selected by the Sonoma-Marin Water Contractors via electronic survey. The following important assumptions about the conservation measures were included in this analysis:

1. The measures reviewed for each Water Contractor is listed in the following table and described in Section 4.
2. New development ordinances were updated to reflect new local ordinances, the Model Water Efficient Landscape Ordinance, and the CALGreen building code (as of May 1, 2015). This can be found in Appendix A.

The following tables and figures present the water demands and conservation savings for this analysis. The Plumbing Code includes the new California State Law (Assembly Bill 715), which requires High Efficiency Toilets and High Efficiency Urinals as of 2014. The Plumbing Code also includes SB 407, which applies to all new construction and replacements as of 2017 for single family and 2019 for multifamily and commercial properties. The increase of projected growth in population and/or jobs will cause water demand to increase. For each Water Contractor the three conservation Program scenarios are organized as follows:

- **Program A:** "Existing Program" option includes the measures that the Water Contractor currently offers. These measures may not necessarily be designed the way they are currently implemented, having, in some cases, more aggressive annual account targets planned for the future.
- **Program B:** "Optimized Program" represents the measures that the Water Contractor currently offers plus Automated Meter Infrastructure (AMI). These measures are not necessarily designed the way they are currently implemented, having, in some cases, more aggressive annual account targets. .

- **Program C:** “All Measures Analyzed” presents a scenario where all 25 measures are implemented.

Table ES-1 presents the conservation measures modeled in this analysis sorted by utility, CII, landscape, and residential category.


Table ES-1 Conservation Measures Evaluated

Utility Measures	CII Measures	Landscape Measures	Residential Measures
Water Loss	Indoor and Outdoor Surveys - CII	Outdoor Large Landscape Audits & Water Budgeting/Monitoring	HE Faucet Aerator / Showerhead Giveaway - SF, MF
AMI	Replace CII Inefficient Equipment	Landscape Rebates and Incentives for Equipment Upgrade	Indoor and Outdoor Surveys - SF, MF
Pricing	Efficient Toilet Replacement Program - CII	Turf Removal - MF, CII	Efficient Toilet Replacement Program – SF
Public Info & School Education - SMSWP	Urinal Rebates – CII	Turf Removal - SF	Direct Install UHET, Showerheads, and Faucet Aerators - SF, MF
Public Info & School Education - Water Contractor	Plumber Initiated UHET & HEU Retrofit Program	Water Conserving Landscape and Irrigation Codes	HE Clothes Washer Rebate - SF, MF
Prohibit Water Waste	Require <0.25 gal/flush Urinals in New Development	Require Smart Irrigation Controllers and Rain Sensors in New Development	Submeters Incentive
HE Faucet Aerator / Showerhead Giveaway – CII			

Sonoma Marin Saving Water Partnership (SMSWP) program includes all Sonoma and Marin County Water Contractors receiving water from Sonoma County Water Agency (SCWA). The conservation programs implemented in 2015 do vary among the individual water contractors.

Figure ES-1 presents the collective Water Contractors’ conservation measure program scenarios, indicating which measures have been selected by North Marin Water District for implementation within each program.

Figure ES-1. Conservation Measure Program Scenarios

Program Scenarios				
 Program Scenarios	Measures	Program A	Program B	Program C
	Water Loss	✓	✓	✓
	AMI	□	✓	✓
	Pricing	✓	✓	✓
	Public Info & School Education - SMWSP	✓	✓	✓
	Public Info & School Education - Water Contractor	✓	✓	✓
	Prohibit Water Waste	✓	✓	✓
	Indoor and Outdoor Surveys - CII	✓	✓	✓
	Replace CII Inefficient Equipment	□	□	✓
	Efficient Toilet Replacement Program - CII	✓	✓	✓
	Urinal Rebates – CII	✓	✓	✓
	Plumber Initiated UHET & HEU Retrofit Program	□	□	✓
	Require <0.125 gal/flush Urinals in New Development	✓	✓	✓
	HE Faucet Aerator / Showerhead Giveaway – CII	✓	✓	✓
	HE Faucet Aerator / Showerhead Giveaway - SF, MF	✓	✓	✓
	Indoor and Outdoor Surveys - SF, MF	✓	✓	✓
	Efficient Toilet Replacement Program – SF	✓	✓	✓
	Direct Install UHET, Showerheads, and Faucet Aerators - SF, MF	□	□	✓
	HE Clothes Washer Rebate - SF, MF	✓	✓	✓
	Submeters Incentive	□	□	✓
	Outdoor Large Landscape Audits & Water Budgeting/Monitoring	✓	✓	✓
	Landscape Rebates and Incentives for Equipment Upgrade	✓	✓	✓
	Turf Removal - MF, CII	✓	✓	✓
	Turf Removal - SF	✓	✓	✓
	Water Conserving Landscape and Irrigation Codes	✓	✓	✓
	Require Smart Irrigation Controllers and Rain Sensors in New Development	✓	✓	✓

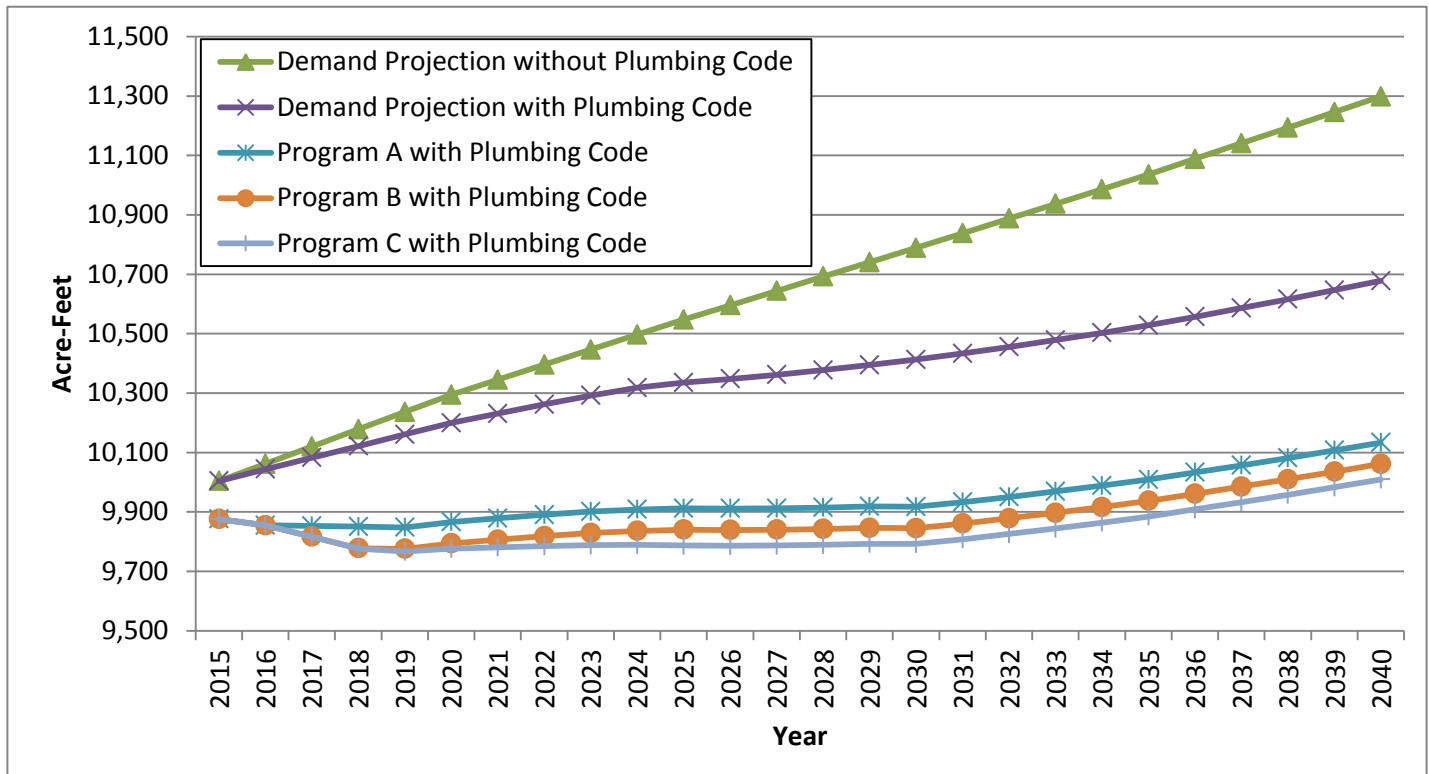
The following table presents NMWD's potable water use projections without plumbing code savings, with only plumbing code savings and no active conservation activity, and with plumbing code savings and Program A, Program B, and Program C active conservation program implementation savings.

Table ES-2. Potable Water Use Projections (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Demand without Plumbing Code (AFY)	10,004	10,294	10,547	10,789	11,036	11,298
Demand with Plumbing Code (AFY)	10,004	10,199	10,336	10,413	10,528	10,678
Demand with Plumbing Code and Program A	9,876	9,866	9,912	9,917	10,009	10,133
Demand with Plumbing Code and Program B	9,876	9,794	9,840	9,845	9,937	10,062
Demand with Plumbing Code and Program C	9,876	9,777	9,787	9,792	9,885	10,009

*Data is not weather normalized. Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP.

Figure ES-2 exhibits NMWD's long term demands without plumbing code savings, with only plumbing code savings and no active conservation activity, and with plumbing code savings and Program A, Program B, and Program C active conservation program implementation savings.

Figure ES-2. Long Term Demands with Conservation Programs*

Note: All line types shown in the legend are presented in the graph. The following demand scenarios, Program A, Program B, and Program C, are close in value and therefore may be indistinguishable in the figure.

Table ES-3 shows the annual water savings for plumbing codes only as well as plumbing codes with Program A, Program B, and Program C active conservation program implementation in five-year increments.

The benefit to cost ratio for each conservation program from the perspective of the Water Contractor (water utility) and the perspective of the Water Contractors and customers (community) is also presented.

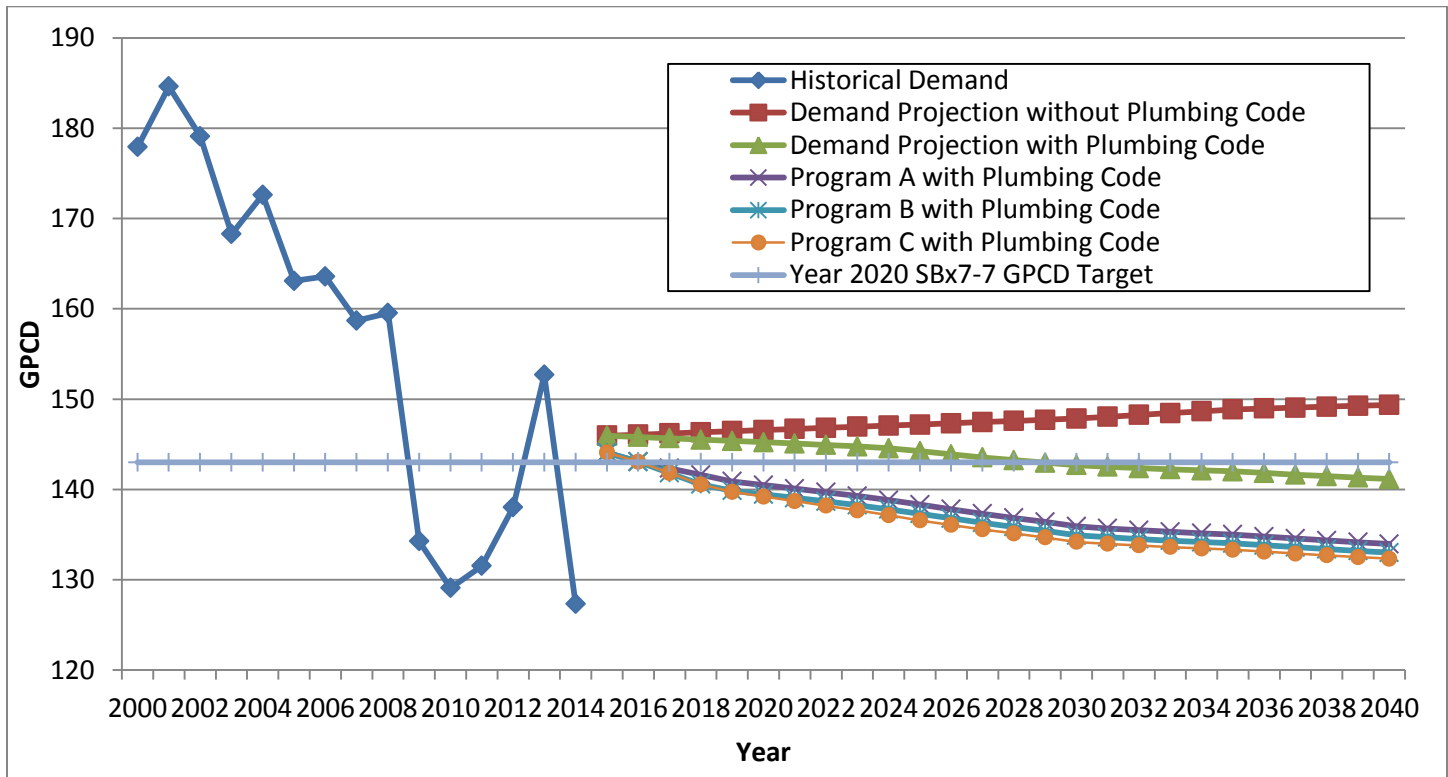
Table ES-3. Water Demand Program Savings Projections

Conservation Program Water Savings (AFY)	2015	2020	2025	2030	2035	2040	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio
Plumbing Code	-	95	212	376	508	620	N/A	N/A
Program A with Plumbing Code	128	428	635	871	1,026	1,165	2.07	0.90
Program B with Plumbing Code	128	500	707	944	1,098	1,237	1.55	0.87
Program C with Plumbing Code	128	517	760	996	1,151	1,289	1.35	0.85

Table ES-4 and Figure ES-3 present the SB X7-7 target GPCD and year as well as projected GPCD demand estimates with plumbing codes alone, and with plumbing codes with Program A, Program B, and Program C for North Marin Water District. NMWD has elected to track their year 2018 CUWCC GPCD target, which is also 143 GPCD, the same value as the SB X7-7 target.

Table ES-4. Water Conservation Program Savings Projections - SB X7-7 Target GPCD

GPCD Target Source	SB X7-7
GPCD Goal	143
GPCD Goal Year	2020
GPCD with Plumbing Code in 2020	145
GPCD Program A with Plumbing Code in 2020	140
GPCD Program B with Plumbing Code in 2020	139.5
GPCD Program C with Plumbing Code in 2020	139.2

Figure ES-3. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD**Notes:**

1. All line types shown in the legend are presented in the graph. The following demand scenarios, Program A, Program B, and Program C, are close in value and therefore may be indistinguishable in the figure.
2. Note the decline in water use in the 2014 dry year and 2008-2011 economic recession.

Table ES-5 shows the year 2040 indoor and outdoor water savings for the three conservation programs modeled; the present value of water savings and the present value of costs to the utility and community are also displayed. The cost of utility savings per unit volume of water is shown in the far-right column.

Table ES-5. Economic Analysis of Alternative Programs

	2040 Indoor Water Savings (AFY)	2040 Outdoor Water Savings (AFY)	2040 Total Water Savings (AFY)	Present Value of Water Savings (\$)	Present Value of Utility Costs (\$)	Present Value of Community Costs (\$)	Cost of Utility Savings per Unit Volume (\$/AF)
Program A with Plumbing Code	672	493	1,165	\$10,429,611	\$5,043,185	\$12,988,745	\$461
Program B with Plumbing code	700	537	1,237	\$12,074,388	\$7,804,387	\$15,749,946	\$617
Program C with Plumbing Code	752	537	1,289	\$12,998,976	\$9,634,690	\$18,092,648	\$705

1. INTRODUCTION

The North Marin Water District has a current water conservation program. This report evaluates whether expanding existing conservation efforts is a cost-effective way to meet future water needs.

In this report, the terms demand management and water conservation are used interchangeably. The evaluation includes measures directed at existing accounts as well as new development measures that mandate that new residential and business customers become more water efficient. Three program scenarios were provided to help evaluate the net effect of running multiple measures together over time. Assumptions and results for each of the 25 individual measures and three programs will be described in detail in this report.

1.1 Goals and Objectives

The purpose of this report is to present an overview of the demand and conservation evaluation process which has been completed for the North Marin Water District (NMWD or Water Contractor). The goal was to develop forecasts of demand and conservation savings for the 2015 Urban Water Management Plan. The local water utility retail Water Contractors of the Sonoma Marin Saving Water Partnership (SMSWP) including City of Cotati, Marin Municipal Water District (MMWD), North Marin Water District, City of Petaluma, City of Rohnert Park, City of Santa Rosa, City of Sonoma, Valley of the Moon Water District, and Town of Windsor, collectively known as the Water Contractors, worked together to prepare a Water Demand Analysis and Water Conservation Measures Report (Project).

This Project included the development of transparent, defensible, and uniform demand and conservation projections for the nine Sonoma-Marín Saving Water Partnership (SMSWP) Water Contractors, using a common methodology that can be used to support regional planning efforts as well as individual contractor work. Pursuant to this goal, the specific objectives of the Project were as follows:

- (1) Quantify the total average-year water demand for each SMSWP Water Contractor to the year 2040;
- (2) Quantify the passive and active conservation water savings potential for each individual SMSWP Water Contractor through 2040;
- (3) Identify conservation programs for further consideration for regional implementation by SMSWP; and
- (4) Provide each SMSWP Water Contractor with a user-friendly model that can be used to support ongoing demand and conservation planning efforts.

1.2 Approach and Methodology

To accomplish the above goal and objectives, each Water Contractor's water demands and conservation savings was forecasted through 2040 using the Demand Side Management Least Cost Planning Decision Support System (DSS Model). The DSS Model prepares long-range, detailed water demand and conservation savings projections to enable a more accurate assessment of the impact of water efficiency programs on demand. The DSS Model can use either a statistical approach to forecast demands (e.g., an econometric model), or it can use forecasted increases in population and employment to evaluate future demands. Furthermore, the DSS Model evaluates conservation measures using benefit cost analysis with the present value of the cost of water saved and benefit-to-cost ratio as economic indicators. The analysis is performed from various perspectives including the utility and community. The DSS Model was also used to forecast demands for the Water Contractors in prior planning efforts in 2005 and 2009 (except the City of Petaluma in 2009).

1.3 Collaboration between SMSWP, Water Contractors and SCWA

This report was completed as a collaborative effort between staff of the SMSWP Water Contractors, and the consulting team from Maddaus Water Management, Inc. The Sonoma County Water Agency (SCWA) also provided input on technical items associated with the conservation analysis, given its role as the wholesale water agency to the nine Water Contractors and SMSWP members. Over the course of this report's development, input was solicited from the aforementioned groups (Project Team) through multiple forums, including workshops, one-on-one meetings, and web-based meetings.

1.4 Content of Report

This report provides a general overview for the methodology, assumptions, and results for the demand forecast and conservation analysis. The following information is included in this report and is discussed in individual sections below:

- Section 2 - Data Collection and Verification Process
- Section 3 - Demand Projections
- Section 4 - Comparison of Individual Conservation Measures
- Section 5 - Results of Conservation Program Evaluation
- Section 6 - Conclusions
- Appendix A - Assumptions for the DSS Model
- Appendix B - Water Use Graphs for Production and Customer Categories
- Appendix C - Measure Screening Process and Results
- Appendix D - Assumptions for Water Conservation Measures Evaluated in the DSS Model
- Appendix E – List of Contacts
- Appendix F – References

2. DATA COLLECTION AND VERIFICATION PROCESS

This section presents an overview of the long term demand and conservation evaluation process including the initial data collection steps.

2.1 Data Collection Process

The initial phase of this effort included a data collection process using a Data Collection and Verification File (Data File). The quantitative Data File was developed in Microsoft Excel to collect, organize, and verify the necessary input data for the DSS Model. The data required for the demand and conservation projections was organized into the Data Files (one per Water Contractor). This task was streamlined by populating the Data File using a variety of existing data sources based on previous project collaborations and readily available information prior to distributing the files to the individual Water Contractors. Each Water Contractor was then asked to verify that the information in the Data File was accurate and update any missing information. A key source for existing data was the CUWCC database, the Sonoma Marin Saving Water Partnership Conservation Reports and SCWA Rates for Water Deliveries annual reports, which capture much of the required data. Other significant data sources included 2010 UWMPs, Department of Water Resources Public Water System Statistics (DWR PWSS) Reports and the 2013 Association of Bay Area Governments (ABAG) Projections (population and employment forecasts).

The Data File was completed and verified by the member Water Contractors through the following steps:

- (1) **Distribution of Files to Individual Water Contractors:** The files were distributed to the individual Water Contractors in January 2015 via the Project's ftp site.
- (2) **Instructional Meetings:** A kick off meeting with the Water Contractors was held on January 21, 2015 to disseminate information related to the data collection process. During the meeting, the Project Team reviewed the Data File contents with the Water Contractors and provided instructions for completing the files.
- (3) **Data File Completion by Water Contractors:** Each Water Contractor reviewed and completed its individual Data File, which required:
 - Verification of the data that was pre-populated in the file by the Project Team
 - Data entry of missing information into the Data File as needed
- (4) **Data File Submission by Water Contractors:** Water Contractors submitted the files via the Project ftp site between the end of February and early March 2015 after completing Step 3.
- (5) **Data File Review and Refinement:** The Project Team reviewed the individual data files in the order submitted. If further data and refinement were required, the Project Team contacted the individual Water Contractor to obtain the necessary information.
- (6) **Data Signature Forms:** Once the data was submitted by each Water Contractor and deemed to be complete, the Water Contractor signed a data verification form to acknowledge the data was ready for the demand analysis portion of the project.

2.2 Types of Data Collected

The data needs of the DSS Model drove the data collection effort. The individual data elements within each category are documented in Table 2-1. Data including water rates and total employment (jobs) were collected to evaluate the historical growth and future growth in the service area. The service area data was used for both of the demand forecasting tools in the DSS Model and for the conservation analysis.

Service area demographic data such as the number of dwelling units were collected from the 2010 U.S. Census data and 2011-2013 American Community Survey (ACS) 3-Year Estimates. Population sources include the 2010 UWMPs, the 2013

ABAG Projections (population and employment forecasts), SMSWP conservation reports, prior DSS Models, and Water Contractor provided projections. The service area demographics were used for future demand forecasting.

Historical conservation data from the SMSWP and CUWCC conservation activity databases was incorporated into the Project for a review of future conservation program levels of saturation and as a benchmark of reasonable levels of implementation for future conservation programs.

Table 2-1. Data Collected for Water Contractors

Model Input Parameter	Time Period	Units	Source(s)
Service Area Data			
Agency Info	Current	NA	Water Contractor Provided
Contact Info	Current	Name, number, email	Water Contractor Provided
Planning Documents	Varies	NA	2010 UWMP Water Contractor Provided
Abnormal Years	Varies	Years	Water Contractor Provided
Customer Classes	Varies	NA	Water Contractor Provided
System Input Volume (Water Production)	1997-2014 or longer if provided	Volume	Previous DSS Models SMSWP & CUWCC Conservation Database 2010 UWMPs DWR PWSS Reports
Consumption and Accounts	1997-2014 or longer if provided	Volume	
Cost of Water	Varies	\$ / Volume	Water Contractor provided
Maximum Day Demand	Varies	Date & Volume	Water Contractor provided
Water System Audits	2010 to 2014 if available	NA	Water Contractor Provided American Water Works Association (AWWA) Methodology
Service Area Demographics			
Historical Service Area Population	2000-2014	People	Water Contractor Provided
Projected Population	2015-2040	People	ABAG 2013 2010 UWMP Prior DSS Models Water Contractor Provided
DP-1 General Profile and Housing Characteristics	2010	Various units	2010 US Census 2013 ACS 3-yr
DP04 Selected Housing Characteristics	2010	Various units	2010 US Census 2013 ACS 3-yr
B25033 Population in Housing Units	2010	Dwelling units	2010 US Census 2013 ACS 3-yr
Economy			
Historical Service Area Employment	2000-2014	Jobs	ABAG 2013 2010 UWMP Prior DSS Models Water Contractor Provided
Projected Jobs	2015-2040	Jobs	ABAG 2013 DSS Models Water Contractor Provided
Conservation			
Historical Conservation	Program Inception to 2014	Various units	SMSWP and CUWCC Database Prior DSS Models Water Contractor Provided
Conservation Targets	2018, 2020 or other	GPCD	SMSWP and CUWCC Database Water Contractor Provided

3. DEMAND PROJECTIONS

The purpose of Section 3 is to document the demand projections developed for the Project. This section presents:

- Demand methodology overview,
- Population and employment projections,
- Water use data analysis inputs and key assumptions for the DSS Model,
- Water use targets
- Water demand projections with and without the plumbing code savings through 2040 (this is the demand before incorporating planned water savings from future active conservation efforts), and
- Water demand projections in the 2010 Urban Water Management Plan (UWMP) format in preparation for the 2015 UWMP

3.1 Demand Methodology Overview

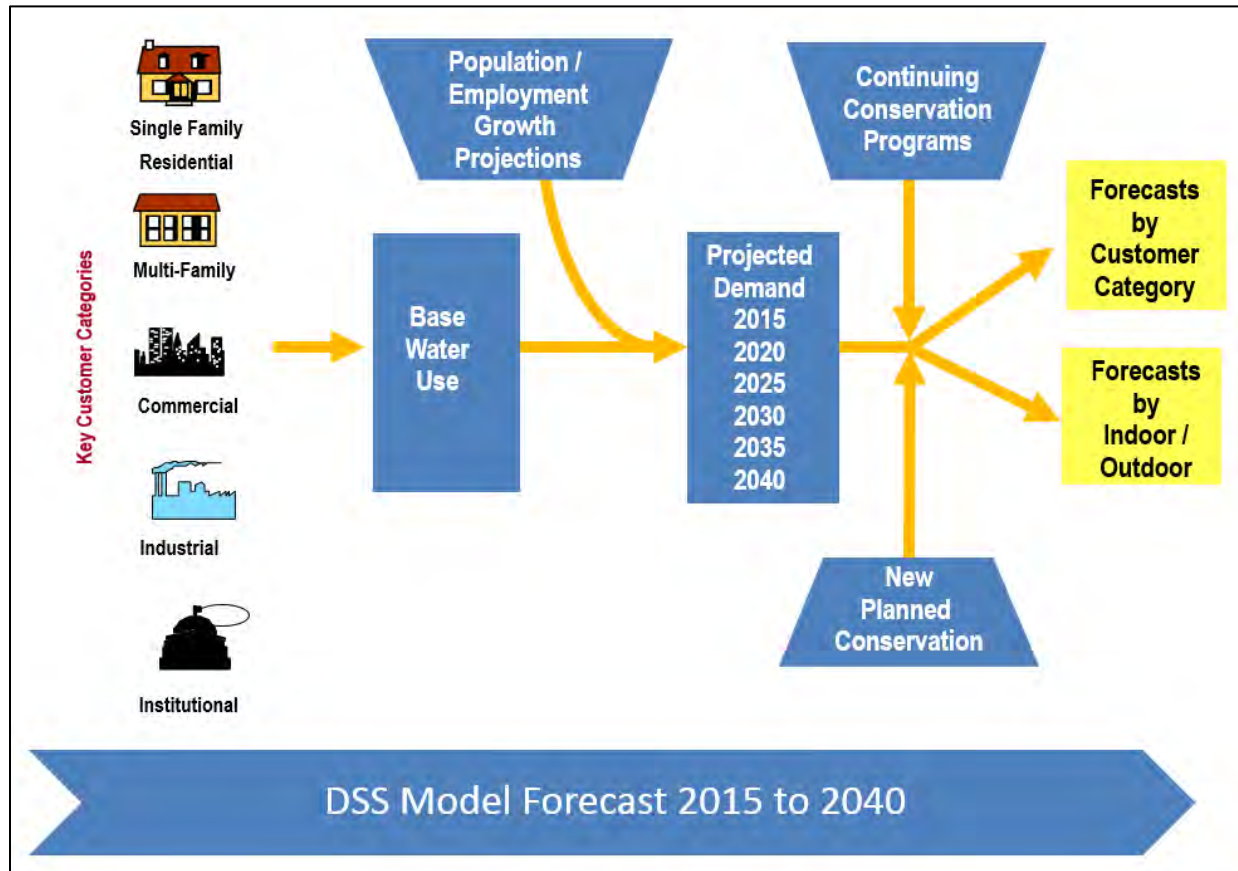
Each Water Contractor's water demand (i.e., average year demand before additional active conservation savings were incorporated) was forecasted through 2040 using the DSS Model. The demand analysis process included forecasting future water demand (2015-2040) by customer category based upon forecasted increases in population and employment. Average water use per customer category account was based on an analysis of historical data between 1990 and 2014 (or a shorter period if a Water Contractor's historical data was incomplete) historical range. To forecast water demands, the DSS Model relies on demographic and employment projections, combined with the effects of natural fixture replacement due to the implementation of plumbing codes to forecast future demands. Natural fixture replacement due to the implementation of plumbing codes is part of passive conservation savings. Passive conservation refers to water savings resulting from actions and activities that do not depend on direct financial assistance or educational programs from Water Contractors. These savings result primarily from (1) the natural replacement of existing plumbing fixtures with water-efficient models required under current plumbing code standards and (2) the installation of water-efficient fixtures and equipment in new buildings and retrofits as required under CALGreen Building Code Standards. The DSS Model evaluated water savings associated with these codes and standards to project passive conservation savings. Section 3 of this report presents the DSS Model's demand estimates taking into account savings only from passive conservation.

3.1.1 DSS Model Methodology

For the demand projections (2015 through 2040), the DSS Model was used to forecast water demand for each Water Contractor. The DSS Model also includes a conservation component that quantifies savings from passive conservation (e.g. plumbing codes) and active conservation programs. The DSS Model's conservation component covers the entire forecast period, 2015-2040. Quantification of water savings potential from active conservation programs is presented in Sections 4 and 5.

The DSS Model prepares long-range, water demand and conservation water savings projections. The DSS Model is an end-use model that breaks down total water production (i.e., water demand in the service area) into specific water end uses, such as toilets, faucets, irrigation, etc. This "bottom-up" approach allows for detailed criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The purpose of using end use data is to enable a more accurate assessment of the impact of water efficiency programs on demand and to provide a rigorous and defensible modeling approach necessary for projects subject to regulatory or environmental review.

Figure 3-1. DSS Model Flow Diagram



As shown in Figure 3-1, the first step for forecasting water demands using the DSS Model was to gather customer category billing data from each Water Contractor. The next step was to check the model by comparing water use data with available demographic data to characterize water usage for each customer category (single family, multi-family, commercial, industrial, and institutional) in terms of number of users per account and per capita water use. During the model calibration process data were further analyzed to approximate the indoor/outdoor split by customer category. The indoor/outdoor water usage was also further divided into typical end uses for each customer category. Published data on average per-capita indoor water use and average per-capita end use were combined with the number of water users to verify that the volume of water allocated to specific end uses in each customer category is consistent with social norms from end use studies on water use behavior (e.g., for flushes per person per day).

3.1.2 Water Contractor Input and Review

As part of the Project's collaborative approach, an instructional webinar conference call was held in April 2015 to facilitate SMSWP Water Contractor understanding of and involvement in the development of the demand projections. The webinar was attended by the SMSWP Water Contractors. During the webinar, the Project Team reviewed the methodology using a real example with preliminary results from one of the SMSWP Water Contractors. The goal of the webinar was (1) to review the demand modeling approach and results, and (2) to answer Water Contractor questions.

The Water Contractors had the opportunity to review the demand modeling results and to provide questions and comments at the one-on-one calls and emails with the Project Team. In addition, individual in-person meetings were held between MWM modeling staff and Water Contractor representatives to review the draft demand projections in May 2015.

3.2 Future Population and Employment Projections

Each Water Contractor's future population and employment projections were incorporated into each DSS Model to project future demand. The Water Contractor used 2010 census data in their estimation of population for baseline years and the determination of baseline GPCD. Population and employment projections through 2040 were provided or confirmed by each Water Contractor through the data collection process described in Section 2. These growth projections were used to develop a projected demand through the year 2040. Population projections were obtained from one of the following sources:

- Local General Plan (population and employment) – Typically these plans, depending upon when they were published, have a population and jobs forecast for 2040 and build out.
- Association of Bay Area Governments (ABAG) (population and employment) – ABAG recently published a new projections report in 2013 that includes population and employment estimates for each city in the San Francisco Bay Area. The ABAG projections report provides population and employment estimates for 2000, 2005, 2010, 2015, 2020, 2025, 2030, 2035, and 2040. ABAG now publishes its projections report every four years consistent with the Sustainable Community Strategies time line. The previous DSS Model projections and ABAG Projections for 2013 were reviewed to determine the most appropriate data set to use in this DSS Model update.
- Water Supply Assessment (WSA) – No WSAs were provided by any of the Water Contractors for use in this Project but sometimes WSA's can have demographic projections.

At the Water Contractor's request, the population and employment projections were based on an average of Association of Bay Area Government (ABAG) Jurisdictional estimates from years 2007, 2009, and 2013 using census tracts - to be consistent with the Water Contractor's planning projections. Population and Employment projections are shown in Figure 3-2 and Table 3-1.

Figure 3-2. Historical and Projected Population and Employment

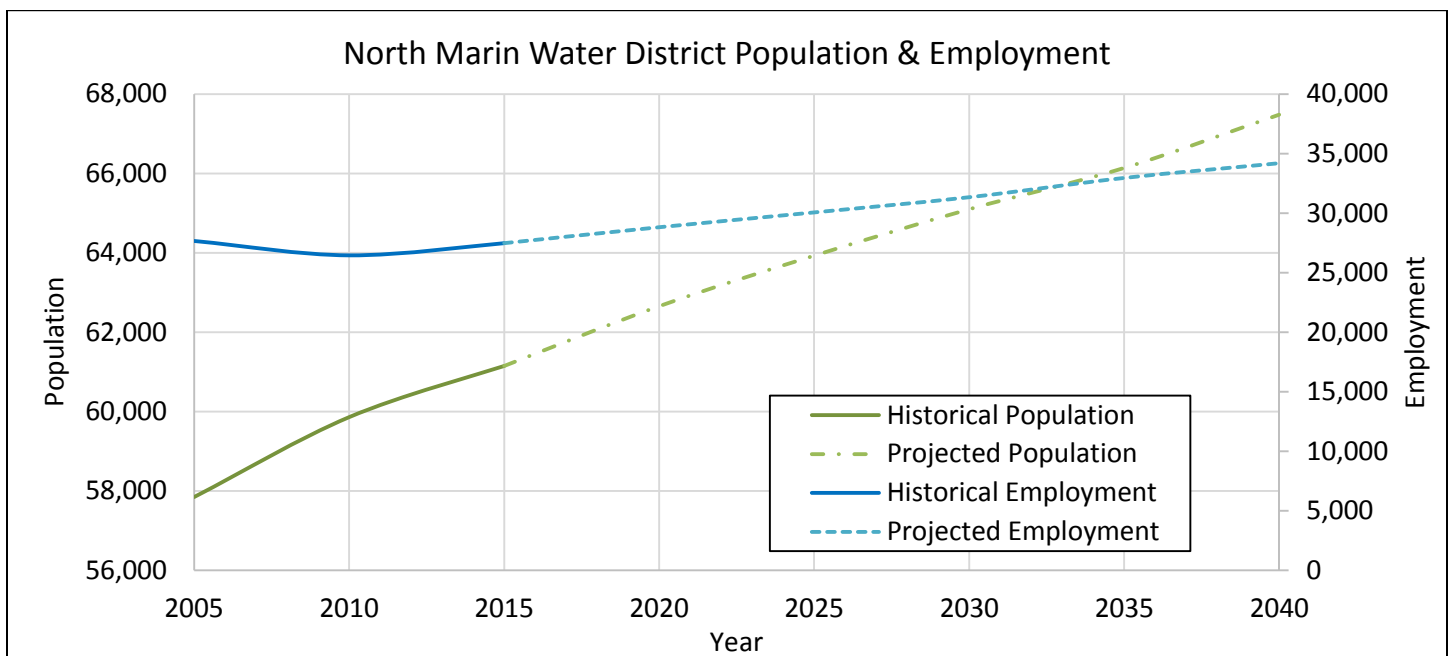


Table 3-1. Historical and Projected Population and Employment

Year	Population	Employment
2005	57,848	27,664
2010	59,861	26,458
2015	61,150	27,481
2020	62,656	28,820
2025	63,929	30,064
2030	65,099	31,340
2035	66,139	32,959
2040	67,482	34,196

Notes:

1. Population projections are based on ABAG Jurisdictional estimates from years 2007, 2009, and 2013 using census tracts (For NMWD Staff only, the file is located at T:\GM\Census Info\2013 Projections\Projections 2013 Marin.xlsx).
2. Employment projections are based on ABAG Jurisdictional estimates from years 2007, 2009, and 2013 using census tracts (For NMWD Staff only, the file is located at T:\GM\Census Info\2013 Projections\Projections 2013 Marin.xlsx).

3.3 Water Use Data Analysis and Key Inputs to the DSS Model

The demand analysis process includes using baseline average water use per customer to forecast water demands by customer category based upon forecasted increases in population and employment to predict customer category account growth. Average water use per customer category account was based on a water use data analysis investigating historical and current water use data and demographic data. This analysis includes the following elements:

- *Model Start Year* – This is the starting year for the analysis. For this project, the start year for the model is 2015. The DSS Model includes 25 years of data projecting information until the year 2040.
- *Base Year for Future Water Factors* – Based on an analysis of historical water billing data, each Water Contractor selected a year or average of multiple years that is representative of current water use and used as a base year demand factor for developing future water use projections. The year (or average of multiple years) was chosen by the Water Contractors for the following reasons:
 - The selected year, or average of years, shows less of an effect from the recession. For many of the Water Contractors, the years 2008 through 2011 show a dip in water demand in many areas due to reduction in economic activity and regulatory restrictions on deliveries from the Russian River.
 - The year(s) selected had relatively “normal” climate conditions (i.e., not a drought or excessively wet year), so no significant weather adjustments were necessary. For all Water Contractors, the year 2014 was affected by drought conditions. The water billing or production data shown in Appendix B was not weather normalized for this analysis.
 - Many Water Contractors elected to average a few years of data for the analysis. Some Water Contractors selected an individual year as they felt it was representative in terms of weather, vacancy, and customer water use for demand projection purposes.
 - Appendix B presents historical customer category water use graphs. Historical water use was provided by NMWD, taken from DWR’s annual PWSS reports, or taken from previous modeling efforts conducted by MWM. The data was reviewed and confirmed by NMWD. Units shown are average gallons of water per account per day. These graphs were reviewed to better identify outlier data points and years so that a representative baseline water use value (of average

account water use by category) could be determined. The effects of drought, economic recessions, service line failures, and meter inaccuracies are typically evident in these figures.

- *Average gal/day/acct* – This is the amount of water in gallons that is used per day, per account.
- *Indoor/outdoor Water Use* – This is the amount of water per account split into the percent that is used indoors and outdoors.
- *Non-Revenue Water (NRW)* – This is the sum of all water input to the system that is not billed (metered and unmetered) water consumption, including apparent (metering accuracy) and real losses. The values were calculated by taking the difference between the amount of water produced and the amount of water that was sold. Data provided by the Water Contractor was used, if provided, unless another more accurate value from the AWWA M36 Water Loss reports was provided.
- *Census Data* – The 2010 Census data or 2013 American Community Survey 3-year data was used as a general reference when determining population, housing units and household sizes for each individual city (and/or unincorporated area) serviced by the Water Contractors. Housing units and household sizes were used to estimate water use per person in the service area as well as individual residential customer categories.
- *Current Service Area Population* – The 2015 total population for the Water Contractors was taken directly from the selected population projection source shown in Table 3-1.
- *Procedure for service areas not contiguous with city boundaries* – When a Water Contractor serves an area outside a city boundary, estimates were generated either from census tract data (when available for the unincorporated areas), Department of Finance data, ABAG Projections, Department of Water Resources (DWR) reported data, General Plan data, or by the local Water Contractor if known. If none of these six sources were available, then the Project Team was provided data from the local Water Contractor to make reasonable estimates.
- *Employment data* – The employment figures were obtained from the selected source as discussed earlier in this report.

The following Table 3-2 shows the key inputs and assumptions used in the model. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of estimated non-revenue water. More details on these assumptions, including screenshots of where they are incorporated into the DSS Model, can be found in Appendix A.

Table 3-2. Water Use Data Analysis and DSS Model Key Assumptions

Parameter	Model Input Value, Assumptions, and Key References				
Model Start Year	2015				
Water Demand Factor Year(s) [Base Year(s)]	2007, 2008, 2010, 2011, 2012, 2013. 2009 was not used because it was a regulatory drought. 2014 was not used since it was a drought year.				
Non-Revenue Water in Start Year	6.5%				
	This value can be found in the green NRW section of each Water Contractor’s DSS Model.				
Population Projection Source	ABAG Jurisdictional estimates from years 2007, 2009, and 2013 using census tracts.				
Employment Projection Source					
Avoided Cost of Water	\$1,429/AF (\$4,386/MG). This value can be found in the “Avoided Costs” red section of each Water Contractor’s DSS Model.				
Base Year Water Use Profile (average of years 2007, 2008, 2010, 2011, 2012, 2013)					
Customer Categories	Start Year Accounts	Total Water Use Distribution	Demand Factors (gal/day/acct)	Indoor Use %	Residential Indoor Water Use (gpcd)
Single Family	14,898	61%	342	52%	67
Apartments	592	8%	1,084	89%	55
Condos	3,132	6%	166	94%	56
Commercial	815	10%	1,070	71%	N/A
Government	102	3%	2,240	28%	N/A
Irrigation	396	8%	1,666	0%	N/A
Pools	93	1.0%	908	0%	N/A
Mobile Homes	103	2.6%	2,078	59%	63
Miscellaneous	424	0.4%	69	0%	N/A
Total	20,554	100%	N/A	N/A	N/A
Residential End Uses	CA DWR Report "California Single Family Water Use Efficiency Study," 2011, AWWARF Report “Residential End Uses of Water” (DeOreo, 1999, 2015) (2015 AWWARF Report is pending). Water Contractor supplied data on costs and savings, professional judgment where no published data available. Each Water Contractor’s water end use breakdown can be found in the “End Uses” section of their DSS Model on the “Breakdown” worksheet.				
Non-Residential End Uses, %	AWWARF Report "Commercial and Institutional End Uses of Water” (Dziegielewski, 2000). Each Water Contractor’s water end use breakdown can be found in the “End Uses” section of their DSS Model on the “Breakdown” worksheet.				
Efficiency Residential Fixture Current Installation Rates	U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Reference "High Efficiency Plumbing Fixtures - Toilets and Urinals" (Koeller & Company, 2005). Reference Consortium for Efficient Energy (www.cee1.org) This information is included in the “Codes and Standards” green section of each Water Contractor’s DSS Model by customer category fixtures.				

Parameter	Model Input Value, Assumptions, and Key References
Water Savings for Fixtures, gal/capita/day	<p>AWWARF Report “Residential End Uses of Water” 1999, CA DWR Report “California Single Family Water Use Efficiency Study”, 2011, Water Contractor supplied data on costs and savings, professional judgment where no published data available.</p> <p>This information is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model.</p>
Non-Residential Fixture Efficiency Current Installation Rates	<p>U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Assume commercial establishments built at same rate as housing, plus natural replacement.</p> <p>This information is included in the “Codes and Standards” green section of each Water Contractor’s DSS Model by customer category fixtures.</p>
Residential Frequency of Use Data, Toilets, Showers, Washers, Uses/user/day	<p>Falls within ranges in AWWARF Report “Residential End Uses of Water” 1999. This information is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model, and confirmed in each “Service Area Calibration End Use” worksheet by customer category.</p>
Non-Residential Frequency of Use Data, Toilets and Urinals, Uses/user/day	<p>Estimated based using AWWARF Report “Commercial and Institutional End Uses of Water” 2000.</p> <p>This information is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model, and confirmed in each “Service Area Calibration End Use” worksheet by customer category.</p>
Natural Replacement Rate of Fixtures	Residential Toilets 2% (1.28 gpf and 1.6 gpf toilets), 2.5% (3.5 gpf and higher toilets)
	Commercial Toilets 2% (1.28 gpf and 1.6 gpf toilets), 2.5% (3.5 gpf and higher toilets)
	Residential Showers 4%
	Residential Clothes washers 10%
	A 4% replacement rate corresponds to 25 year life of a new fixture.
	A 10% replacement rate corresponds to 10 year washer life based on 2014 AWWARF Report “Residential End Uses of Water” and “Bern Clothes Washer Study, Final Report, Energy Division, Oak Ridge National Laboratory, for U.S. Department of Energy, March 1998, Online: www.energystar.gov
	This information is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model.
Future Residential Water Use	Increases Based on Population Growth and Demographic Forecast
Future Non-Residential Water Use	Increases Based on Employment Growth and Demographic Forecast

3.4 Water Use Targets

SB X7-7 or “The Water Conservation Act of 2009” was enacted to ensure California continues to have reliable water supplies, requiring urban water agencies to collectively reduce statewide per capita water use by 20% before December 31, 2020. The law establishes that the base daily per capita use be based on total gross water use, divided by the service area population. Each Water Contractor has a different per capita consumption baseline value and year 2020 water use target.

In tracking per capita water use, which is measured in gallons per capita per day (GPCD), the primary project driver is the SB X7-7 20x2020 compliance requirements that require calculation using population in future UWMPs including tracking of: baseline GPCD (10 years between 1994 and 2010), a 2015 target, and a 2020 target. The Water Contractor used 2010 census data in their estimation of population for baseline years and the determination of baseline GPCD. The year 2020 SB X7-7 GPCD target for North Marin Water District is 143. NMWD has also elected to track their year 2018 CUWCC GPCD target, also 143.¹

3.5 Water Demand Projections With and Without the Plumbing Code

Water demand projections were developed to the year 2040 using the DSS Model. Table 3-3 shows projected demands in 5-year increments with and without plumbing codes and appliance standards. Information and assumptions about plumbing code and appliance standards can be found in Appendix A.

The demand projections reflect average water use assuming average weather conditions and do not reflect drier and hotter drought conditions. Likewise, climate change (which might alter weather patterns), increased or decreased rainfall, and possibly increased irrigation demand in the spring and fall due to a warmer climate have NOT been addressed in this analysis.

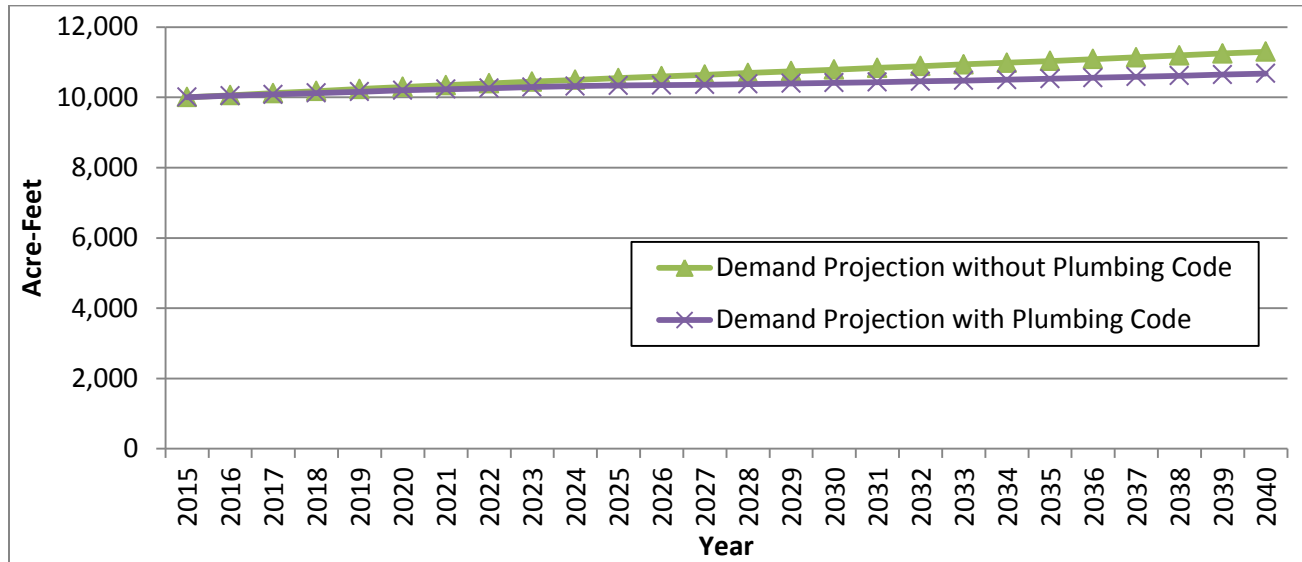
Table 3-3. Potable Water Use Projections (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Demand without Plumbing Code (AFY)	10,004	10,294	10,547	10,789	11,036	11,298
Demand with Plumbing Code (AFY)	10,004	10,199	10,336	10,413	10,528	10,678

*Data is not weather normalized. Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP. Values include NRW.

Figure 3-3 shows the potable water demand projections with and without the plumbing code through 2040.

¹ Source: NMWD 2010 UWMP Page 3-4 using Method 1.

Figure 3-3. Potable Water Use Projections for North Marin Water District (AFY)

3.6 Water Demand Projections – 2015 Urban Water Management Plan (UWMP) Format

The draft 2015 Urban Water Management Plan Guidance Document from the California Department of Water Resources (CA DWR) was released in April 2015 and the final guidance document is not planned to be released until after July 1, 2015. Without the final guidance document, the exact formatting of the tables for the 2015 UWMP are not known. Therefore, it was elected to place the demand data into the draft 2015 UWMP format.

The 2015 draft Urban Water Management Plan Guidance Document from the California Department of Water Resources requests that future demand information be in a specific format. The following tables are the 2015 draft UWMP tables relating to population and demand that are requested. The demand projection shown is the “with Plumbing Code” demands and is otherwise the same as Table 3-3 and Figure 3-3.

Table 3-4 below provides population projections for the service area.

Table 3-4. (DWR Table 2-2) Population – Current and Projected

	2015	2020	2025	2030	2035	2040
Population Served	61,150	62,656	63,929	65,099	66,139	67,482

The current and projected number of connections and deliveries to the Water Contractor’s water distribution system, by sector, are identified in the following Table 3-5 and Table 3-6. Deliveries include plumbing code savings but do not include non-revenue water (NRW).

Table 3-5. Demands and Accounts by Customer Category*

		Single Family	Apartments	Condos	Commercial	Government	Irrigation	Pools	Mobile Homes	Miscellaneous	Total (no NRW)
2015	# of accounts	14,898	592	3,132	815	102	396	93	103	424	20,554
	Deliveries AFY	5,707	719	584	977	256	740	95	240	33	9,349
2020	# of accounts	15,265	606	3,209	854	104	415	95	106	434	21,089
	Deliveries AFY	5,807	717	582	1,015	262	776	97	242	34	9,531
2025	# of accounts	15,575	618	3,274	891	106	433	97	108	443	21,547
	Deliveries AFY	5,878	706	572	1,049	267	809	99	242	34	9,658
2030	# of accounts	15,860	630	3,334	929	108	452	99	110	451	21,973
	Deliveries AFY	5,903	690	558	1,086	272	844	101	241	35	9,730
2035	# of accounts	16,114	640	3,387	977	110	475	101	111	458	22,373
	Deliveries AFY	5,935	680	549	1,133	277	887	103	240	36	9,838
2040	# of accounts	16,441	653	3,456	1,014	112	493	103	114	468	22,853
	Deliveries AFY	6,004	676	546	1,167	282	920	105	242	36	9,978

*Based on Demand WITH Plumbing Code, excluding NRW.

Table 3-6. (DWR Table 3-1) Retail Uses of Potable and Raw Water - Actual and Projected (Acre-Feet/Year)

Use Type	2015	2020	2025	2030	2035	2040
Single Family	5,707	5,807	5,878	5,903	5,935	6,004
Apartments	719	717	706	690	680	676
Condos	584	582	572	558	549	546
Commercial	977	1,015	1,049	1,086	1,133	1,167
Government	256	262	267	272	277	282
Irrigation	740	776	809	844	887	920
Pools	95	97	99	101	103	105
Mobile Homes	240	242	242	241	240	242
Miscellaneous	33	34	34	35	36	36
Total	9,349	9,531	9,658	9,730	9,838	9,978

For this project, losses or non-revenue water (NRW) is defined as the difference between total water produced and water sold to customers. Non-revenue water use normally includes unmetered water use, such as for fire protection and training, system and street flushing, sewer cleaning, construction, system leaks, meter inaccuracy, and unauthorized connections. Non-revenue water can also result from meter inaccuracies. The total current and future water losses for the system are shown in Table 3-7.

Table 3-7. (DWR Table 3-4) Losses from Potable Water System (Acre-Feet/Year)

	2015	2020	2025	2030	2035	2040
Potable System	655	668	678	683	690	700

The total current and future water use for the system is shown in Table 3-8.

Table 3-8. (DWR Table 3-6) Total Potable Water Use (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Retail Uses	9,349	9,531	9,658	9,730	9,838	9,978
Losses	655	668	678	683	690	700
Total	10,004	10,199	10,336	10,413	10,528	10,678

*Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in another section of the UWMP.

Passive savings due to plumbing codes and standards as well as documented historical conservation activity are presented in the following Table 3-9. These savings include savings from toilets, urinals, showerheads and clothes washers.

Table 3-9. (DWR Table 3-8) Passive Savings (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Total Passive Savings	0	95	212	376	508	620

*Passive savings are accounted for in the water use projections in DWR Table 3-1.

4. COMPARISON OF INDIVIDUAL CONSERVATION MEASURES

This section presents the conservation measure screening process, a description of the measures selected to be analyzed in the Water Contractor's DSS Model, measure design assumptions and modeling methodology, and a comparison of the individual conservation measure costs and savings.

4.1 Selecting Conservation Measures to be Evaluated (Conservation Measure Screening)

An important step in updating the water conservation program is the review and screening of new water conservation measures. New measures were designed with an implementation schedule reflecting dates sometime in the future when the Water Contractor might begin such programs. The first step in the conservation analysis was to review historical water conservation activity and savings. The purpose of this review was to look at historically successful programs, past penetration rates (activity levels) for individual measures, and the types of programs that were implemented (and for which customers – single family, multi-family, commercial, etc.) by each of the Water Contractors since the 2010 UWMP. The participation rates were incorporated into the design of each of the 25 conservation measure activity levels in the DSS Model analysis.

Following the review of the historical conservation efforts, a list of over 50 potential conservation measures was provided to each Water Contractor to be considered for further evaluation in the DSS Model. This list of measures was then screened by SMSWP and the Water Contractors to: (1) identify those measures with the highest level of interest and potential for implementation within the region and (2) identify which entity (SMSWP or individual Water Contractors) would be best suited to implement each measure. Through this process, a total of 25 measures were selected for analysis in the individual Water Contractor DSS models. The screening process and results are described in Appendix C. Once the 25 measures were selected for analysis, a master measure design database (MMDD) was created to streamline the individual measure design process by being a starting point for all the Water Contractor's measures so that measure design parameters such as target end uses, customer classes, unit costs and savings would initially align.

4.2 Conservation Measures Evaluated

Table 4-1 includes the 25 water use efficiency measures that were included in the DSS Model analysis. The table includes measures, devices and programs (e.g., direct install high efficiency toilets) that can be used to achieve water use efficiency, methods through which the device or program will be implemented and what distribution method, or mechanism, can be used to activate the device or program. The list of potential measures was drawn from MWM and Water Contractor general experience and review of local Water Contractor's water use efficiency programs. The measure descriptions apply generally to each Water Contractor; Water Contractor-specific measure descriptions can be found in Appendix D where screen shots of every conservation measure's inputs from each Water Contractor's DSS Model are presented.

Water use efficiency savings due to plumbing codes such as CALGreen (California Statewide New Development Building Code), SB 407 (Plumbing Fixture Retrofit on Resale or Remodel), and any new development ordinances specific to each individual Water Contractor are included in the DSS Model and presented in Appendix A.

Table 4-1. Water Use Efficiency Measure Descriptions

No.	Measure Name	Measure Description
1	Water Loss	WATER CONTRACTOR MEASURE: Maintain a thorough annual accounting of water production, sales by customer class and quantity of water produced and billed consumption (to define non-revenue water). In conjunction with system accounting, include water system audits that identify and quantify known legitimate uses of non-revenue water in order to determine remaining potential for reducing real (physical) water losses. Goal would be to lower the Infrastructure Leakage Index (ILI) and real water losses water every year by a pre-determined amount based on cost-effectiveness. These programs typically pay for themselves based on savings in operational costs (and saved rate revenue can be directed more to system repairs/replacement and other costs) and recovered revenue through addressing apparent losses. Specific goals and methods to be developed by Utility. May include accelerated main and service line replacement. Enhanced real loss reduction may include more ambitious main replacement and active leak detection. Capture water from water main flushing and hydrant flow testing for reuse.
2	AMI	WATER CONTRACTOR MEASURE: Retrofit system with AMI meters and associated network capable of providing continuous consumption data to Utility offices. Improved identification of system and customer leaks is a major conservation benefit. Some costs of these systems are offset by operational efficiencies and reduced staffing, as regular meter reading and opening and closing accounts are accomplished without the need for a site visit. Also enables enhanced billing options and ability to monitor unauthorized usage, such as use/tampering with closed accounts or irrigation when time of day or days per week are regulated. Customer service is improved as staff can quickly access continuous usage records to address customer inquiries. Optional features include online customer access to their usage, which has been shown to improve accountability and reduce water use. A five-year change-out would be a reasonable objective and may take longer if coupled with a full meter replacement program (on the order of 10 years). Require that new, larger or irrigation customers install such AMI meters as described above and possibly purchase means of viewing daily consumption inside their home, business, or by their landscape/property managers, either through the Internet (if available) or separate device. The AMI system would, on demand, indicate to the customer and Utility where and how their water is used, facilitating water use reduction and prompt leak identification. This would require Utility to install an AMI system.
3	Pricing	WATER CONTRACTOR MEASURE: Assumes average annual price increase of 5% for the next 25 years unless otherwise specified by the Water Contractors. Measure converts price increases to real price increases net of inflation; Annual increase must be above user set threshold (such as assuming a 2% inflation) to trigger a demand reduction.
4	Public Info & School Education - SMSWP	REGIONAL MEASURE: Continue with regional public information and school education campaign. School education includes: school assembly program, classroom presentations, and other options for school education.
5	Public Info & School Education - Water Contractor	WATER CONTRACTOR MEASURE: Public information dissemination and school education initiatives beyond those conducted by SMSWP.
6	Prohibit Water Waste	WATER CONTRACTOR OR REGIONAL MEASURE: Adopt or modify ordinance that prohibits the waste of water defined as gutter flooding, restrictions on watering days and failure to repair leaks in a timely manner.
7	Indoor and Outdoor Surveys	WATER CONTRACTOR OR REGIONAL MEASURE: Top water customers from each CII category would be offered a professional water survey that would evaluate ways for the

No.	Measure Name	Measure Description
	- CII	business to save water and money. The surveys would be for targeted to large users (accounts that use more than 5,000 gallons of water per day) such as hotels, restaurants, large stores and schools. Emphasis will be on supporting the top users in each customer category.
8	Replace CII Inefficient Equipment	WATER CONTRACTOR OR REGIONAL MEASURE: After undergoing a free water use survey, SMSWP will analyze the recommendations on the provided findings report and determine if the site qualifies for a financial incentive. Financial incentives will be provided after analyzing the cost benefit ratio of each proposed project. Incentives are tailored to each individual site as each site has varying water savings potentials. Incentives will be granted at the sole discretion of SMSWP while funding lasts.
9	Efficient Toilet Replacement Program - CII	WATER CONTRACTOR MEASURE: Efficient Toilet Replacement Program - CII. Provide a rebate or voucher for the installation of a high efficiency flushometer toilet - toilets flushing 1.28 gpf or less. Rebate amounts reflect the incremental purchase cost.
10	Urinal Rebates – CII	WATER CONTRACTOR MEASURE: Provide a rebate or voucher for the installation of a high efficiency urinals. WaterSense standard is 0.5 gpf or less, though models flushing as low as 0.125 gpf (1 pint) are available and function well, so could be specified. Rebate amounts would reflect the incremental purchase cost.
11	Plumber Initiated UHET & HEU Retrofit Program	WATER CONTRACTOR MEASURE: Plumber Initiated Ultra High Efficiency Toilet (UHET) and/or Urinal Retrofit Program. The Water Contractor would subsidize the installation cost of a new UHET or High Efficiency Urinal (HEU) purchased by the Water Contractor. If elected to be run as a regional measure, then SMSWP would subsidize the installation cost of a new UHET or HEU purchased by SMSWP. Licensed plumbers, pre-qualified by SMSWP would solicit customers directly. Customers would get a new UHET and HEU installed at a discounted price.
12	Require <0.125 gal/flush Urinals in New Development	WATER CONTRACTOR MEASURE: Require that new buildings be fitted with .125 gpf (1 pint) or less urinals rather than the current standard of 0.5 gal/flush models.
13	HE Faucet Aerator / Showerhead Giveaway – CII	WATER CONTRACTOR MEASURE: High Efficiency Faucet Aerator / Showerhead Giveaway – CII. Utility would buy showerheads and faucet aerators in bulk and give them away at Utility office or community events.
14	HE Faucet Aerator / Showerhead Giveaway - SF, MF	WATER CONTRACTOR MEASURE: High Efficiency Faucet Aerator / Showerhead Giveaway - SF, MF. Utility would buy showerheads and faucet aerators in bulk and give them away at Utility office or community events. Need to coordinate this program with the School Education measure on retrofit kit giveaways to the same customer categories.
15	Indoor and Outdoor Surveys - SF, MF	REGIONAL OR WATER CONTRACTOR MEASURE: Indoor and outdoor water surveys for existing residential customers. Target those with high water use and provide a customized report to owner. May include give-away of efficient shower heads, aerators, and toilet devices. Customer leaks can go uncorrected at properties where owners are least able to pay costs of repair. These programs may require that customer leaks be repaired, with either part of the repair subsidized and/or the cost paid with revolving funds paid back with water bills over time. May also include an option to replace inefficient plumbing fixtures at low-income residences. May include adjustments to irrigation schedules on automatic irrigation controllers. Provide incentive to install pressure regulating valve on existing properties with pressure exceeding 80 psi.
16	Efficient Toilet	WATER CONTRACTOR MEASURE: Provide a rebate or voucher for the installation of an

No.	Measure Name	Measure Description
	Replacement Program – SF	ultra-high efficiency toilet (UHET). UHET toilets flush 1.28 gpf or less and include dual flush technology. Rebate amounts would reflect the incremental purchase cost. Replacement program can be either a direct install or rebate program. Includes replacement of 1.6 gpf that are not well functioning.
17	Direct Install UHET, Showerheads, and Faucet Aerators - SF, MF	WATER CONTRACTOR OR REGIONAL MEASURE: Direct Install High Efficiency Toilets, Showerheads, and Faucet Aerators in Residential Buildings. Utility would subsidize installation cost of a new UHET purchased by the utility. Licensed plumbers, pre-qualified by the Utility would solicit customers directly. Customers would get a new UHET and showerheads and faucet aerators installed at a discounted price.
18	HE Clothes Washer Rebate - SF, MF	WATER CONTRACTOR MEASURE: Provide a rebate for efficient washing machines to residential customers. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology.
19	Submeters Incentive	WATER CONTRACTOR MEASURE: Require or provide a partial cost rebate to meter all remaining mobile home parks that are currently master metered but not separately metered. Provide a rebate (per unit) to assist MF building owners installing submeters on each existing individual apartment or condominium unit.
20	Outdoor Large Landscape Audits & Water Budgeting/Monitoring	WATER CONTRACTOR OR REGIONAL MEASURE: Outdoor water audits offered for existing large landscape customers. Normally those with high water use are targeted and provided a customized report on how to save water. All large multi-family residential, CII, and public irrigators of large landscapes would be eligible for free landscape water audits upon request. Website will provide feedback on irrigation water use (budget vs. actual). May include the cost for dedicated meter conversion.
21	Landscape Rebates and Incentives for Equipment Upgrade	WATER CONTRACTOR MEASURE: For SF, MF, CII, and IRR customers with landscape, provide a Smart Landscape Rebate Program with rebates for substantive landscape retrofits or installation of water efficient upgrades; Rebates contribute towards the purchase and installation of water-wise plants, compost, mulch and selected types of irrigation equipment upgrades including: Large Rainwater Catchment Systems, Rain Barrels, Rain Sensors, Rotating Sprinkler Nozzles, Drip Irrigation Equipment, Weather Based Irrigation Controllers and Gray Water Systems.
22	Turf Removal - MF, CII	WATER CONTRACTOR MEASURE: Provide a per square foot incentive to remove turf and replace with low water use plants or hardscape. Rebate is based on price per square foot removed, and capped at an upper limit for multi-family or commercial residence.
23	Turf Removal - SF	WATER CONTRACTOR MEASURE: Provide a per square foot incentive to remove turf and replace with low water use plants or permeable hardscape. Rebate based on dollars per square foot removed and capped at an upper limit for single family residences.
24	Water Conserving Landscape and Irrigation Codes	WATER CONTRACTOR MEASURE: Develop and enforce Water Efficient Landscape Design Standards. Standards specify that development projects subject to design review be landscaped according to climate appropriate principals, with appropriate turf ratios, plant selection, efficient irrigation systems and smart irrigation controllers. The ordinance could require certification of landscape professionals.
25	Require Smart Irrigation Controllers and Rain Sensors in New Development	WATER CONTRACTOR MEASURE: Require Weather Adjusting Smart Irrigation Controllers per CALGreen on New Development. It is optional to require Rain Sensors in CALGreen for New Development. Require developers for all properties (100%) of greater than four residential units and all commercial development to install the weather based irrigation controllers. May require landscaper training.

4.3 Water Reduction Methodology

Each conservation measure targets a particular water use such as indoor single family water use. Targeted water uses are categorized by water user group and by end use. Targeted water user groups include single family residential, multi-family residential, commercial, industrial, and institutional (CII), etc. Measures may apply to more than one water user group. Targeted end uses include indoor and outdoor use. The targeted water use is important to identify because the water savings are generated from reductions in water use for the targeted end use. For example, a residential retrofit conservation measure targets single family and multi-family residential indoor use, and in some cases specifically shower use. When considering the water savings potential generated by a residential retrofit one considers the water saved by installing low-flow showerheads in single family and multi-family homes.

The market penetration goal for a measure is the extent to which the product or service related to the conservation measure occupies the potential market. In essence, the market penetration goal identifies how many fixtures, rebates, surveys, etc. the wholesale customer would have to offer or conduct over a period of time to reach its water savings goal for that conservation measure. This is often expressed in terms of the number of fixtures, rebates, surveys, etc. offered or conducted per year.

The potential for errors in market penetration goal estimates for each measure can be significant because they are based on previous experience, chosen implementation methods, projected utility effort, and funds allocated to implement the measure. The potential error can be corrected through re-evaluation of the measure as the implementation of the measure progresses. For example, if the market penetration required to achieve specific water savings turns out to be more or less than predicted, adjustments to the implementation efforts can be made. Larger rebates or additional promotions are often used to increase the market penetration. The process is iterative to reflect actual conditions and helps to ensure that market penetration and needed savings are achieved regardless of future variances between estimates and actual conditions.

In contrast, market penetration for mandatory ordinances can be more predictable with the greatest potential for error occurring in implementing the ordinance change. For example, requiring dedicated irrigation meters for new accounts through an ordinance can assure an almost 100 percent market penetration for affected properties.

Water contractors are constantly looking at when a measure reaches saturation. Baseline surveys are the best approach to having the most accurate information on market saturation. This was taken into account when analyzing individual conservation measures where best estimates were made. MWM was not provided with any baseline surveys for this analysis, but discussions were held with the individual Water Contractors on what their best estimates were for saturation for their service area.

4.4 Perspectives on Benefits and Costs

The determination of the economic feasibility of water conservation programs involves comparing the costs of the programs to the benefits provided. This analysis was performed using the DSS Model developed by MWM. The DSS Model has received the endorsement of the California Urban Water Conservation Council, and calculates cost effectiveness of conservation measure savings at the end-use level; for example, the model determines the amount of water a toilet rebate program saves in daily toilet use for each single family account. Additional detail on the DSS Model and assumptions can be found in Appendix A.

4.5 Present Value Parameters

The time value of money is explicitly considered. The value of all future costs and benefits is discounted to 2015 (the model start year) at the real interest rate of 3.01%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). The formula to calculate the real interest rate is: $(\text{nominal interest rate} - \text{assumed rate of inflation}) / (1 + \text{assumed rate of inflation})$. Cash flows discounted in this manner are subsequently referred to as “Present Value” sums. Additional information on Present Value referenced in Appendix A.

4.6 Measure Assumptions including Unit Costs and Water Savings

Appendix D presents the assumptions and inputs used in the Water Contractor's DSS Model to evaluate each water conservation measure. Assumptions regarding the following variables were made for each measure:

- Targeted Water User Group End Use – Water user group (e.g., single family residential) and end use (e.g., indoor or outdoor water use).
- Utility Unit Cost – Cost of rebates, incentives, and contractors hired (by Water Contractor or SMSWP) to implement measures. The assumed dollar values for the measure unit costs were closely reviewed by staff and are found to be adequate for each individual measure. The values in the majority of cases are in the range of what is currently offered by other water utilities in the region.
- Retail Customer Unit Cost – Cost for implementing measures that is paid by retail customers (i.e., the remainder of a measure's cost that is not covered by a utility rebate or incentive).
- Utility Administration and Marketing Cost – The cost to the utility for administering the measure, including consultant contract administration, marketing, and participant tracking. The mark-up is sufficient (in total) to cover conservation staff time and general expenses and overhead.

Costs are determined for each of the measures based on industry knowledge, past experience and data provided by the Water Contractor. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that are used in marketing the measure. Measure costs are estimated each year between 2015 and 2040. Costs are spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

Lost revenue due to reduced water sales is not included as a cost because the conservation measures evaluated herein generally take effect over a span of time that is sufficient to enable timely rate adjustments as necessary to meet fixed cost obligations.

Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to ten years after the start of implementation, depending upon the implementation schedule.

The unit costs vary according to the type of customer account and implementation method being addressed. For example, a measure might cost a different amount for a residential single family account, than a residential multi-family account, and for a rebate versus an ordinance requirement or a direct installation implementation method. Typically water utilities have found there are increased costs associated with achieving higher market saturation, such as more surveys per year. The DSS Model calculates the annual costs based on the number of participants each year. The general formula for calculating annual utility costs is:

- Annual Utility Cost = Annual market penetration rate x total accounts in category x unit cost per account x (1+administration and marketing markup percentage)
- Annual Customer Cost = Annual number of participants x unit customer cost
- Annual Community Cost = Annual utility cost + annual customer cost

4.7 Assumptions about Avoided Costs

The most expensive source of water for almost all of the Water Contractors, and in some cases the only source of water, is the SCWA Russian River Supply. The price of the water to the Water Contractors is set by SCWA every year and varies by Water Contractor location, depending upon which aqueduct they draw from. Since 1990, the annual price of water has increased significantly. The annual rate of increase from 1989/90 to 2013/14 has varied from 4.0 to 5.1% per year, depending upon the aqueduct.

Since 1990, the annual rate of inflation has been 2.64% per year in the San Francisco Bay Area, as measured by the Consumer Price Index (CPI). Based on this data the price of SCWA water has increased faster than the CPI.

Therefore, in evaluating the benefit-cost ratio of conservation measures and programs it is appropriate to consider the net increase in benefits (i.e., the net increase in the avoided cost of water). Other costs, such as the cost of conservation, will increase presumably at the CPI rate. Also, the cost of conservation programs will be paid for with inflated dollars.

For this evaluation, the avoided costs are escalated from the 2014 value to a projected 2030 value (16 years). The total avoided cost of water escalated is the 2014 current SCWA price of water plus the chemical/treatment and pumping and distribution costs. The chemical/treatment and pumping and distribution costs were provided by the Water Contractors in their data collection workbooks.

The net increase and the water production avoided costs used in this evaluation are provided in Table 4-2. The 2014 SCWA cost of water is escalated to a 2030 projected value using a 4% per year rate increase. The cost of treatment distribution and pumping is escalated at 2% per year.

Table 4-2. Water Contractor Avoided Costs of Water

Water Contractor	Rate Basis	SCWA FY 2014-15 Water Rates (per AF)	Estimated SCWA 2030 Water Rates (per AF)	2014 Treatment, Distribution and Pumping Costs (per AF)	Estimated 2030 Treatment, Distribution and Pumping Costs (per AF)	Total Estimated 2030 Water Production Operational Costs (per AF) ¹
City of Santa Rosa	Santa Rosa Aqueduct	\$ 730.68	\$ 1,368.55	\$0.00	\$0.00	\$1,368.55
City of Petaluma	Petaluma Aqueduct	\$ 730.68	\$ 1,368.55	\$0.23	\$0.32	\$1,368.87
City of Rohnert Park		\$ 730.68	\$ 1,368.55	\$0.00 ²	\$0.00	\$1,368.55
City of Cotati		\$ 730.68	\$ 1,368.55	\$0.00 ²	\$0.00	\$1,368.55
Valley of the Moon Water District	Sonoma Aqueduct	\$ 793.24	\$ 1,485.72	\$0.00 ²	\$0.00	\$1,485.72
City of Sonoma		\$ 793.24	\$ 1,485.72	\$0.00 ²	\$0.00	\$1,485.72
Town of Windsor	Individual Rate	\$ 876.81	\$ 1,368.55	\$0.00 ²	\$0.00	\$1,368.55
North Marin Water District	Individual Rate	\$ 741.78	\$ 1,389.34	\$29.09 ³	\$39.93	\$1,429.27
Marin Municipal Water District	Individual Rate for first 4,300 acre-feet from SCWA	\$ 786.91	\$ 1,473.87	\$65.65	\$90.12	\$1,563.99

¹ This value is used in each Water Contractor's DSS Model.

² Water Contractors did not provide specific energy/cost quantities, therefore, the distribution cost is assumed to be zero which as an avoided cost will produce a more conservation estimate for the value of conserved water.

³ As provided by MNWD: In 2014 NMWD purchased 7,050 AF of water and spent \$205,060 to treat/pump/move it. \$205,060 cost is 87.4% of the prior year's supply cost. \$205,060 divided by 7,050 AF = \$29.09/AF 2014 treatment/distribution and pumping costs.

For those Water Contractors with wastewater operation costs including chemical, treatment, energy, and transport costs, a 2% per year escalation was used to a projected 2030 value. These values can be found in each Water Contractor's data collection workbook and DSS Model.

This avoided cost determination process has the effect of raising the benefit-cost ratios in our evaluation by the amount that is roughly the percentage difference in the future versus the current price of SCWA water. In our opinion, this escalation represents a more realistic comparison of benefits and costs of conservation.

4.8 Comparison of Individual Measures

Table 4-3 presents how much water the measures will save through 2040, how much they will cost, and what the cost of saved water will be per unit volume *if the measures are implemented on a stand-alone basis (i.e. without interaction or overlap from other measures that might address the same end use(s))*. Thus, savings from measures which address the same end use(s) are not additive. The model uses impact factors to avoid double counting in estimating the water savings from programs of measures. For example, if two measures are planned to address the same end use and both save 10% of the prior water use then the net effect is not the simple sum (20%). Rather it is the cumulative impact of the first measure reducing the use to 90% of what it was without the first measure in place and then reducing the use another 10% to result in the use being 81% of what it was originally. In this example the net savings is 19%, not 20%. Using impact factors, the model computes the reduction as follows, $0.9 \times 0.9 = 0.81$ or 19% water savings.

Since interaction between measures has **not** been accounted for in Table 4-3, it is **not** appropriate to include totals at the bottom of the table. However, the table is useful to give a close approximation of the cost effectiveness of each individual measure.

Cost categories are defined below:

- Utility Costs - those costs that the Water Contractor as a water utility will incur to operate the measure including administrative costs.
- Utility Benefits - the avoided cost of producing water.
- Customer Costs - those costs customers will incur to implement a measure in the Water Contractor's service area and maintain its effectiveness over the life of the measure.
- Customer Benefits - the savings other than from reduced water/sewer utility bills, such as energy savings resulting from reduced use of hot water. Conservation program participants will see lower water and sewer bills but overall there will be no net customer benefit.
- Community Costs and Benefits - Community Costs and Benefits include Utility Costs plus Customer Costs, and Utility Benefits plus Customer Benefits, respectively.

The column headings in Table 4-3 are defined as follows:

- Present Value (PV) of Utility and Community Costs and Benefits (\$) = the present value of the 25-year time stream of annual costs or benefits, discounted to the base year.
- Utility Benefit-Cost ratio = PV of Utility Costs divided by PV of Utility Benefits over 25 years.
- Community Benefit-Cost ratio = (PV of Utility Benefits plus PV of customer energy savings) divided by (sum of PV of Utility Costs plus PV of Customer Costs), over 25 years.
- Five Years Total Cost to Utility (\$) = the sum of the annual Utility Costs for years 2015 through 2019. Only those measures that are run between 2015 and 2020 will have a cost. The measures start in the years as specified for each measure shown in Appendix D.

- Water Savings in 2020 (AFY) = water saved in acre-feet per year. The year 2020 is provided as this information is helpful as relates to the statewide SB X7-7 legislation (the legislation is described earlier in this Plan).
- Utility Cost of Water Saved per Unit Volume (\$/AF) = PV of Utility Costs over 25 years divided by the 25-Year Water Savings. This value is compared to the utility's avoided cost of water as one indicator of the cost effectiveness of conservation efforts. It should be noted that the value somewhat undervalues the cost of savings because program costs are discounted to present value and the water benefit is not.

Table 4-3. Conservation Measure Cost and Savings

Measure	Present Value of Water Utility Benefits	Present Value of Community Benefits	Present Value of Water Utility Costs	Present Value of Community Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Five Years of Water Utility Costs 2015-2020 ¹	Water Savings in 2020 (AFY)	Cost of Savings per Unit Volume (\$/AF)
Water Loss	\$1,886,575	\$1,886,575	\$919,716	\$919,716	2.05	2.05	\$250,000	70	\$490
AMI	\$1,795,352	\$1,795,352	\$2,761,202	\$2,761,202	0.65	0.65	\$2,973,470	79	\$1,492
Pricing	\$329,363	\$329,363	\$319,813	\$319,813	1.03	1.03	\$50,000	86	\$74
Public Info & School Education - SMSWP	\$735,440	\$1,049,953	\$494,902	\$494,902	1.49	2.12	\$129,764	28	\$673
Public Info & School Education - Water Contractor	\$367,720	\$524,976	\$164,967	\$164,967	2.23	3.18	\$43,255	14	\$449
Prohibit Water Waste	\$56,462	\$56,462	\$346,659	\$577,765	0.16	0.10	\$76,545	2	\$5,879
Indoor and Outdoor Surveys - CII	\$103,629	\$191,673	\$173,554	\$289,257	0.60	0.66	\$43,744	4	\$1,626
Replace CII Inefficient Equipment	\$85,797	\$218,248	\$80,576	\$142,558	1.06	1.53	\$36,889	3	\$878
Efficient Toilet Replacement Program - CII	\$145,126	\$145,126	\$171,556	\$303,523	0.85	0.48	\$181,976	6	\$1,168
Urinal Rebates – CII	\$1,669	\$1,669	\$4,040	\$6,194	0.41	0.27	\$3,515	0.1	\$2,385
Plumber Initiated UHET & HEU Retrofit Program	\$85,200	\$85,200	\$170,909	\$211,360	0.50	0.40	\$40,141	2	\$1,858
Require <0.25 gal/flush Urinals in New Development	\$78,450	\$78,450	\$126,879	\$588,259	0.62	0.13	\$34,810	1.8	\$1,466
HE Faucet Aerator / Showerhead Giveaway – CII	\$21,182	\$54,445	\$32,992	\$87,978	0.64	0.62	\$34,995	3	\$1,980
HE Faucet Aerator / Showerhead Giveaway - SF, MF	\$79,595	\$168,469	\$86,284	\$230,090	0.92	0.73	\$91,502	10	\$1,379
Indoor and Outdoor Surveys - SF, MF	\$327,964	\$431,132	\$557,852	\$647,997	0.59	0.67	\$146,270	14	\$1,662
Efficient Toilet Replacement Program – SF	\$108,659	\$108,659	\$146,305	\$263,349	0.74	0.41	\$155,153	5	\$1,332
Direct Install UHET,	\$796,729	\$1,386,726	\$538,879	\$671,526	1.48	2.07	\$93,417	14	\$615

Measure	Present Value of Water Utility Benefits	Present Value of Community Benefits	Present Value of Water Utility Costs	Present Value of Community Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Five Years of Water Utility Costs 2015-2020 ¹	Water Savings in 2020 (AFY)	Cost of Savings per Unit Volume (\$/AF)
Showerheads, and Faucet Aerators - SF, MF									
HE Clothes Washer Rebate - SF, MF	\$383,374	\$954,245	\$139,302	\$741,087	2.75	1.29	\$147,726	19	\$366
Submeters Incentive	\$41,865	\$70,082	\$1,039,940	\$1,317,257	0.04	0.05	-	0.2	\$20,928
Outdoor Large Landscape Audits & Water Budgeting/Monitoring	\$48,772	\$48,772	\$61,113	\$70,167	0.80	0.70	\$34,078	4	\$1,480
Landscape Rebates and Incentives for Equipment Upgrade	\$336,527	\$336,527	\$357,387	\$611,784	0.94	0.55	\$379,021	28	\$1,257
Turf Removal - MF, CII	\$137,549	\$137,549	\$300,720	\$2,151,306	0.46	0.06	\$169,031	4	\$2,066
Turf Removal - SF	\$378,524	\$378,524	\$216,936	\$1,551,927	1.74	0.24	\$122,241	11	\$542
Water Conserving Landscape and Irrigation Codes	\$1,006,375	\$1,006,375	\$210,732	\$1,315,311	4.78	0.77	\$65,330	21	\$187
Require Smart Irrigation Controllers and Rain Sensors in New Development	\$674,045	\$674,045	\$211,476	\$1,653,355	3.19	0.41	\$64,650	14	\$281

¹Some measures have no Water Utility Costs from 2015 to 2020, indicated by a dash (-) in the table. This means that there are no costs for these five years only, from 2015, inclusive, up to 2020, exclusive. It is not indicative of any activity before 2015 or during and/or after 2020. This column is meant to be helpful for budgeting purposes only.

5. RESULTS OF CONSERVATION PROGRAM EVALUATION

This section describes the process of selecting conservation measures for developing alternative conservation program scenarios and various cost, savings, and target results.

5.1 Selection of Measures for Programs

The 25 conservation measures were incorporated into each Water Contractor's DSS Model for cost-benefit analysis and selection of a conservation program to meet the Water Contractor's goals. Included in each Water Contractor's DSS Model was a list of measures in each of three alternative conservation programs (Programs A, B, and C), which were designed to illustrate a range of various measure combinations and resulting water savings. Four key items were taken into consideration during measure selection for Programs A, B, and C:

- Existing Water Contractor water use efficiency measures;
- Programs run by SMSWP;
- Measures focused on Programmatic BMP defined by the CUWCC's Memorandum of Understanding if the individual Water Contractor had reported on a measure; and
- New and innovative measures.

These programs are not intended to be rigid frameworks but rather to demonstrate the range in savings that could be generated if selected measures were run together. For each Water Contractor the three program scenarios are organized as follows:

- **Program A:** "Existing Program" option includes the measures that the Water Contractor currently offers. These measures are not necessarily designed the way they are currently implemented having, in some cases, more aggressive annual account targets. Again, though Program A represents the conservation measures each Water Contractor is currently implementing, it is important to note that these measures are designed in each Water Contractor's DSS Model to represent how the measure will be implemented in the future and not necessarily how it has historically been implemented.
- **Program B:** "Optimized Program" represents the measures that the Water Contractor currently offers plus AMI. These measures are not necessarily designed the way they are currently implemented having, in some cases, more aggressive annual account targets. These measures are typically cost-effective and save significant amounts of water. Key benchmarks for the proposed strategies include: (1) cost-effectiveness, (2) compliance with CUWCC's BMPs, (3) ability to help achieve water use reduction targets by 2020 (SB X7-7) if applicable for the individual Water Contractor, (4) reflects reasonable predicted annual water contract budget allocations for water conservation activities.
- **Program C:** "All Measures Analyzed" presents a scenario where all 25 measures are implemented. Though it is unlikely that the Water Contractor would elect to implement all the measures, this program offers the opportunity to explore what the water savings (and costs) would potentially be should the Water Contractor implement such an extensive conservation program.

The Water Contractor's DSS Model presents estimated average per capita per day savings with the plumbing codes only, and each of the alternative programs (Program A, B, and C). Plumbing code includes current state and federal standards (including CALGreen, Senate Bill 407 and Assembly Bill 715) for items such as toilets, showerheads, faucets, pre-rinse spray valves. SB 407 and AB 715 require the replacement of non-water conserving plumbing fixtures with water-conserving fixtures.


The Water Contractor was provided a copy of the DSS Model to review the conservation program options, tailor the programs to meet its needs, and select the program that fit its individual water savings goals and budgets. The reasons

that each member Water Contractor selected a particular suite of measures varied and included the following consideration:

- Measure cost-effectiveness to Water Contractor
- Applicability to service area
- Amount of water savings generated
- Cost to Water Contractor
- Ease of implementation for Water Contractor and staffing required
- Whether the measure was being run by SCWA or SMSWP
- Local preferences

Figure 5-1 displays which measures are in each program.

Figure 5-1. Conservation Measures Selected for Programs

Program Scenarios				
 Program Scenarios	Measures	Program A	Program B	Program C
	Water Loss	✓	✓	✓
	AMI	☐	✓	✓
	Pricing	✓	✓	✓
	Public Info & School Education - SMWSP	✓	✓	✓
	Public Info & School Education - Water Contractor	✓	✓	✓
	Prohibit Water Waste	✓	✓	✓
	Indoor and Outdoor Surveys - CII	✓	✓	✓
	Replace CII Inefficient Equipment	☐	☐	✓
	Efficient Toilet Replacement Program - CII	✓	✓	✓
	Urinal Rebates – CII	✓	✓	✓
	Plumber Initiated UHET & HEU Retrofit Program	☐	☐	✓
	Require <0.125 gal/flush Urinals in New Development	✓	✓	✓
	HE Faucet Aerator / Showerhead Giveaway – CII	✓	✓	✓
	HE Faucet Aerator / Showerhead Giveaway - SF, MF	✓	✓	✓
	Indoor and Outdoor Surveys - SF, MF	✓	✓	✓
	Efficient Toilet Replacement Program – SF	✓	✓	✓
	Direct Install UHET, Showerheads, and Faucet Aerators - SF, MF	☐	☐	✓
	HE Clothes Washer Rebate - SF, MF	✓	✓	✓
	Submeters Incentive	☐	☐	✓
	Outdoor Large Landscape Audits & Water Budgeting/Monitoring	✓	✓	✓
	Landscape Rebates and Incentives for Equipment Upgrade	✓	✓	✓
	Turf Removal - MF, CII	✓	✓	✓
	Turf Removal - SF	✓	✓	✓
	Water Conserving Landscape and Irrigation Codes	✓	✓	✓
	Require Smart Irrigation Controllers and Rain Sensors in New Development	✓	✓	✓

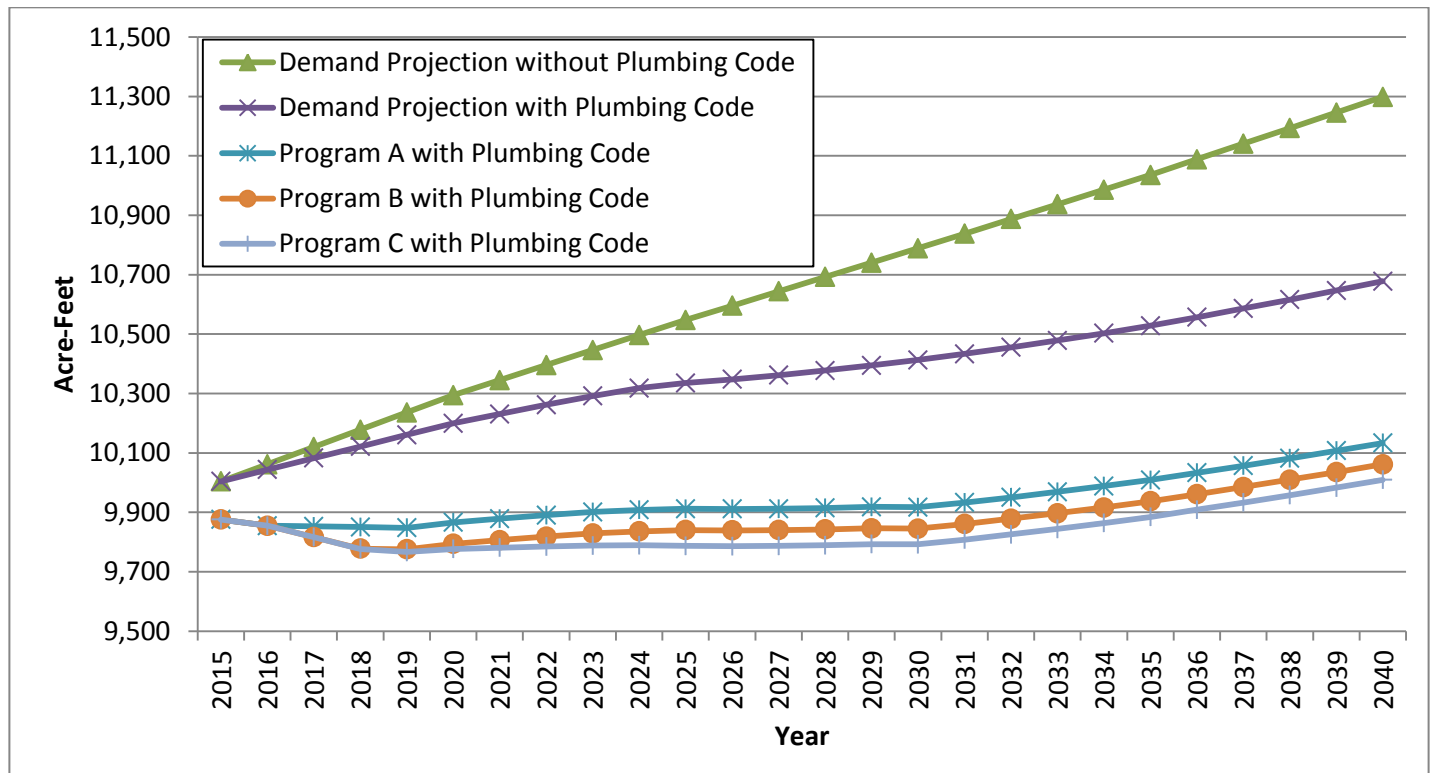
5.2 Results of Program Evaluation

Table 5-1 and Figure 5-2 shows annual water demand with no conservation (plumbing code only) and the three conservation programs.

Table 5-1. Potable Water Use Projections (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Demand without Plumbing Code (AFY)	10,004	10,294	10,547	10,789	11,036	11,298
Demand with Plumbing Code (AFY)	10,004	10,199	10,336	10,413	10,528	10,678
Demand with Plumbing Code and Program A	9,876	9,866	9,912	9,917	10,009	10,133
Demand with Plumbing Code and Program B	9,876	9,794	9,840	9,845	9,937	10,062
Demand with Plumbing Code and Program C	9,876	9,777	9,787	9,792	9,885	10,009

*Data is not weather normalized. Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP.

Figure 5-2. Long Term Demands with Conservation Programs

Note: All line types shown in the legend are presented in the graph. The following demand scenarios, Program A, Program B, and Program C, are close in value and therefore may be indistinguishable in the figure.

Table 5-2 shows the savings in 5-year increments for all three conservation programs; these are from the conservation programs alone and include the plumbing code savings. The separate starting points for the demand with and without the plumbing code versus the conservation programs is directly correlated to the variation in individual measures selected for each individual Program A, B, and C.

Table 5-2. Long Term Conservation Program Savings

Conservation Program Water Savings (AFY)	2015	2020	2025	2030	2035	2040	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio
Plumbing Code	-	95	212	376	508	620	N/A	N/A
Program A with Plumbing Code	128	428	635	871	1,026	1,165	2.07	0.90
Program B with Plumbing Code	128	500	707	944	1,098	1,237	1.55	0.87
Program C with Plumbing Code	128	517	760	996	1,151	1,289	1.35	0.85

Figure 5-3 shows how marginal returns change as more money is spent to achieve savings. Most recently it may be impacted by the goals set forth by SB X7-7, which calls for a reduction in per capita water use by 2020 (this is independent of the economic analysis).

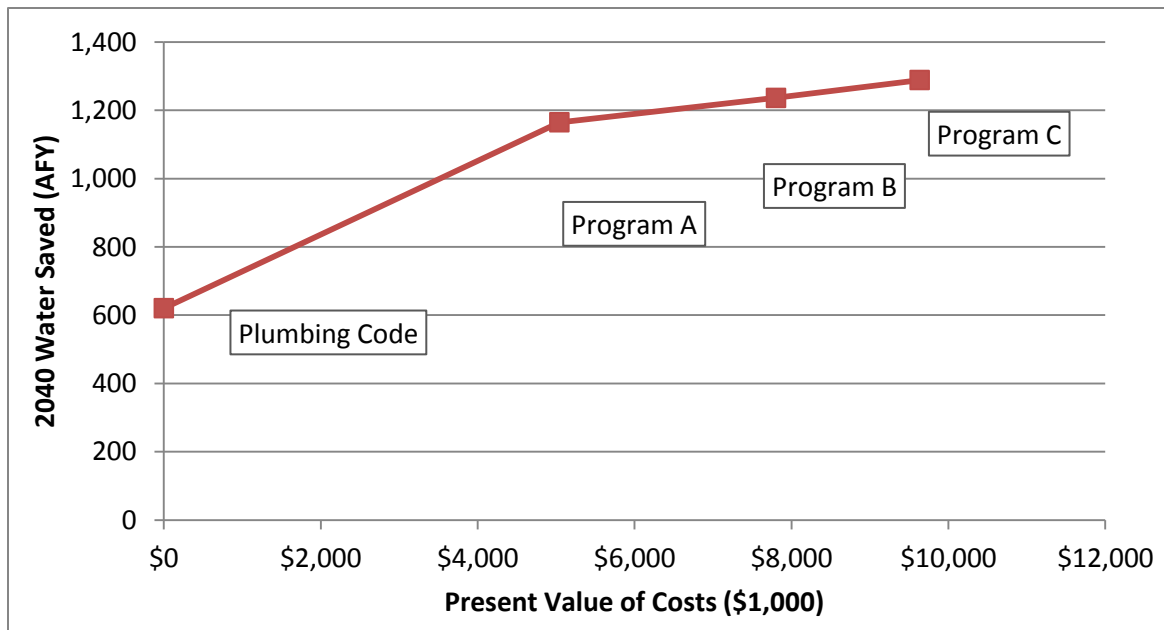
Figure 5-3. Present Value of Utility Costs versus Cumulative Water Saved

Table 5-3 presents key evaluation statistics compiled from the DSS Model. Assuming each program's measures are successfully implemented, projected indoor, outdoor and total water savings for 2040 in AFY are shown; these savings do include plumbing code savings. Savings and costs in the following table are a result of each program's conservation measures and any plumbing codes. Total present value costs and savings are estimated over the 25 year analysis period using an interest rate of 3%. The cost of water saved is presented for the utility. These cost parameters are derived from the annual time stream of utility, customer, and community costs.

Table 5-3. Comparison of Long-Term Conservation Programs – Utility Costs and Savings

	2040 Indoor Water Savings (AFY)	2040 Outdoor Water Savings (AFY)	2040 Total Water Savings (AFY)	Present Value of Water Savings (\$)	Present Value of Utility Costs (\$)	Present Value of Community Costs (\$)	Cost of Utility Savings per Unit Volume (\$/AF)
Program A with Plumbing Code	672	493	1,165	\$10,429,611	\$5,043,185	\$12,988,745	\$461
Program B with Plumbing code	700	537	1,237	\$12,074,388	\$7,804,387	\$15,749,946	\$617
Program C with Plumbing Code	752	537	1,289	\$12,998,976	\$9,634,690	\$18,092,648	\$705

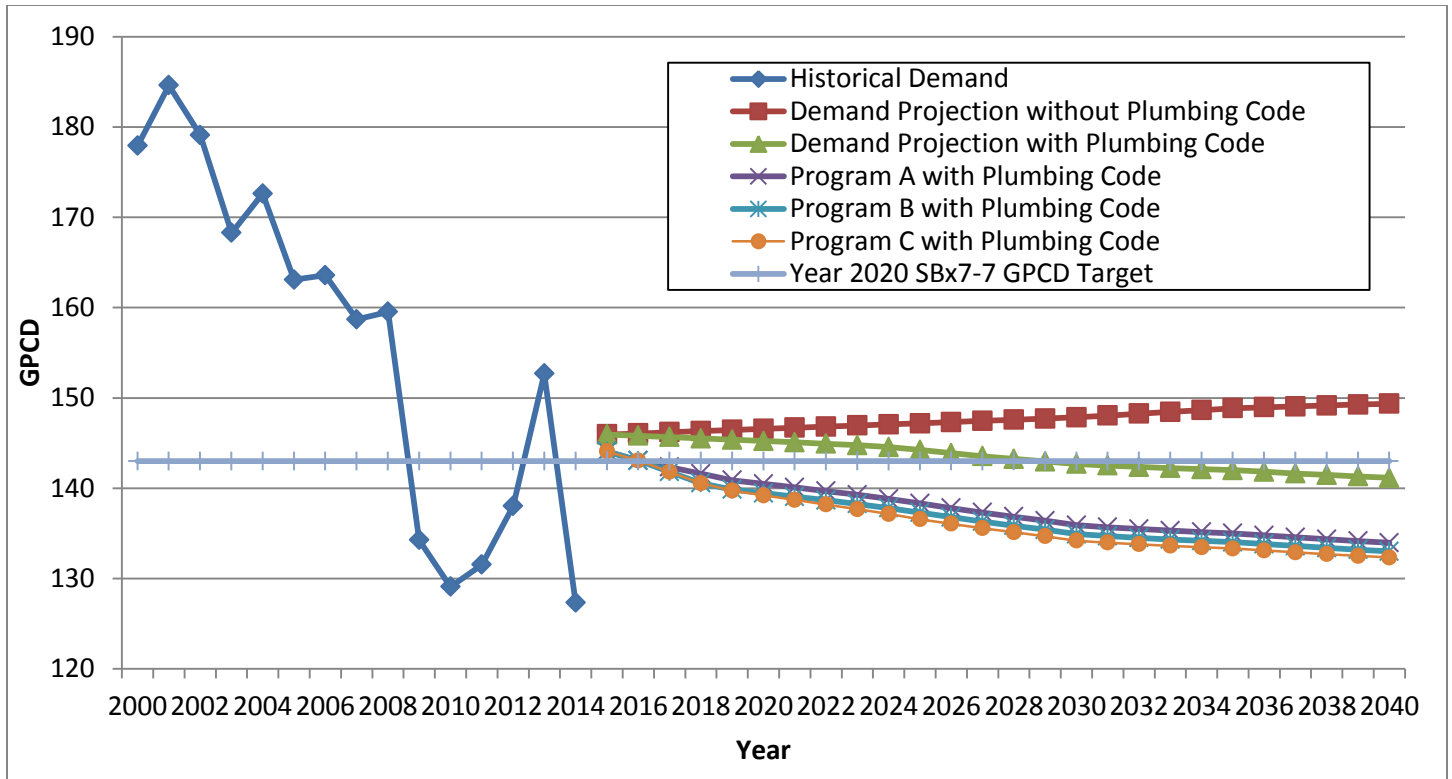
Table 5-4 presents the year 2020 GPCD target and Program A, B, and C GPCD estimates for the Water Contractor.

Table 5-4. Water Conservation Program Savings Projections - SB X7-7 Target GPCD

GPCD Target Source	SB X7-7
GPCD Goal	143
GPCD Goal Year	2020
GPCD with Plumbing Code in 2020	145
GPCD Program A with Plumbing Code in 2020	140
GPCD Program B with Plumbing Code in 2020	139.5
GPCD Program C with Plumbing Code in 2020	139.2

Figure 5-4 presents the year 2020 GPCD target and historical and projected GPCD estimates with plumbing codes and Program A, B, and C savings.

Figure 5-4. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD



Notes:

1. All line types shown in the legend are presented in the graph. The following demand scenarios, Program A, Program B, and Program C, are close in value and therefore may be indistinguishable in the figure.
2. Note the decline in water use in the 2014 dry year and 2008-2011 economic recession.

6. CONCLUSIONS

This section presents a discussion of the relative savings and cost-effectiveness of the Water Contractor's alternative conservation programs.

North Marin Water District's service area has a relatively high portion of residential water use and a significant amount of outdoor water use. Consequently, residential and irrigation conservation programs produce the most savings. NMWD's service area is not a heavy manufacturing sector, so the conservation potential in the commercial sector is relatively low. Based on the assumed avoided cost of water, water conservation programs are cost-effective. Overall conclusions are as follows:

- The change in water demands from years 2015 to 2040 are provided in Table 6-1. Five projected demand scenarios have been analyzed for the 25-year study period.
- Water savings from implementation of Program A, Program B, and Program C conservation programs would reduce water needs in 2040 by approximately 5.1%, 5.8%, and 6.3% percent respectively when compared to 2040 potable water demand with the plumbing code.
- For Program A, B, and C measures, approximately 86% of the active conservation water savings potential in 2040 (or 42% of the water savings total if the plumbing code is included) is reducing outdoor use; the rest is indoor use reduction potential.
- The average cost of water saved over 30-years is lower than the current price of SCWA water. Thus, measures that are cost-effective at today's water rates will be more so if SCWA rates rise in the future.
- Water savings contributed by Program A measures alone are 545 acre-feet in 2040 (active program savings).
- Water savings contributed by Program B measures alone are 616 acre-feet in 2040 (active program savings).
- Benefit-cost ratios of Program A, Program B, and Program C conservation alternatives are 2.1, 1.6, and 1.4 respectively, indicating that all program combinations are cost-effective from the utility standpoint.

Table 6-1. Potable Water Use Projections (Acre-Feet/Year)*

	2015	2020	2025	2030	2035	2040
Demand without Plumbing Code (AFY)	10,004	10,294	10,547	10,789	11,036	11,298
Demand with Plumbing Code (AFY)	10,004	10,199	10,336	10,413	10,528	10,678
Demand with Plumbing Code and Program A	9,876	9,866	9,912	9,917	10,009	10,133
Demand with Plumbing Code and Program B	9,876	9,794	9,840	9,845	9,937	10,062
Demand with Plumbing Code and Program C	9,876	9,777	9,787	9,792	9,885	10,009

*Data is not weather normalized. Baseline water use is based on an average of 2007, 2008, 2010, 2011, 2012, and 2013. 2009 was not used in the baseline demand average because it was an abnormal year. 2014 was not used since it was a drought year. Total water use is potable only. Does not include recycled water use. Recycled water use and projection are in a separate section in the UWMP.

APPENDIX A - ASSUMPTIONS FOR THE DSS MODEL

The following section presents the key assumptions used in the DSS Model. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and finally the percent of estimated real water losses. This section presents DSS Model assumptions regarding plumbing code water savings, present value parameters, and active conservation measure costs and savings.

A.1 Plumbing Codes and Legislation

The DSS Model incorporates the following three items as a “code” meaning that the savings are assumed to occur and are therefore “passive” savings.

1. National Plumbing Code
2. CALGreen
3. AB 715
4. AB 407

Each of the three items is described below. In the sections following the descriptions is information on how the DSS Model handles these items and what information is needed for input.

National Plumbing Code

The Federal Energy Policy Act of 1992, as amended in 2005 requires only fixtures meeting the following standards can be installed in new buildings:

- Toilet – 1.6 gal/flush maximum
- Urinals – 1.0 gal/flush maximum
- Showerhead - 2.5 gal/min at 80 psi
- Residential Faucets – 2.2 gal/min at 60 psi
- Public Restroom Faucets - 0.5 gal/min at 60 psi
- Dishwashing pre-rinse spray valves – 1.6 gal/min at 60 psi

Replacement of fixtures in existing buildings is also governed by the Federal Energy Policy Act that requires only devices with the specified level of efficiency (shown above) can be sold today (since 2006). The net result of the plumbing code is that new buildings will have more efficient fixtures and old inefficient fixtures will slowly be replaced with new more efficient models. The national plumbing code is an important piece of legislation and must be carefully taken into consideration when analyzing the overall water efficiency of a service area.

In addition to the plumbing code the US Department of Energy regulates appliances such as residential clothes washers. Regulations to make these appliances more energy efficient has driven manufactures to dramatically reduce the amount of water these efficient machines use. Generally, front loading washing machines use 30 to 50% less water than conventional models (which are still available). In a typical analysis the DSS Model forecasts a gradual transition to high efficiency clothes washers (using 12 gallons or less) so that by the year 2025 this will be the only type of machines purchased. In addition to the industry becoming more efficient, rebate programs for washers have been successful in encouraging customers to buy more water efficient models. Given that machines last about 10 years, eventually all machines will be of this type. In 2012, the United States Environmental Protection Agency estimated the Energy Star clothes washer market share in the US in 2011 to be over 60%. Energy Star washing machines have a water factor (WF) of 6.0 or less. A WF of 6.0 is the equivalent of using 3.1 cubic feet or 23.2 gallons of water per load.

State Building Code – CALGreen

The CALGreen requirements effect all new development in the State of California after January 1, 2011. The new development requirements under CALGreen are listed in the following figure. MWM added the CALGreen requirements that effect all new development in the State of California after January 1, 2011. MWM modeled water savings from the CALGreen building code by adding Multi-family and Commercial customer categories as appropriate to applicable conservation measures.

Table A-1. CALGreen Building Code Summary Table

CALGreen Building Code						
Building Class	Component	Effective Date*	Indoor Fixtures Included	Indoor Requirement	Landscaping & Irrigation Requirements	Are the Requirements Mandatory?
Residential	Indoor	1/1/2011	Toilets, Showers, Lavatory & Kitchen Faucets, Urinals	Achieve 20% savings overall below baseline		Yes
	Outdoor	1/1/2011			Provide weather adjusting controllers	Yes
Non Residential	Indoor	1/1/2011	Submeter leased spaces	Only if building >50,000 sq. ft. & if leased space use >100 gpd		Yes
			Toilets, Showers, Lavatory & Kitchen Faucets, Wash Fountains, Metering Faucets, Urinals	Achieve 20% savings overall below baseline		Yes
	Outdoor	1/1/2011			Provide water budget	> 1,000 sq ft. landscaped area
					Separate meter	As per Local or DWR ordinance
					Prescriptive landscaping requirements	> 1,000 sq ft. landscaped area
					Weather adjusting irrigation controller	Yes

* Effective date is 7/1/2011 for toilets.

New Development Ordinances – Water Contractor-Specific

The new development ordinances for each Water Contractor are listed in the following Table A-2 below.

Table A-2. New Development Ordinances

New Development (ND) Measure	NMWD	City of Rohnert Park ¹	City of Cotati ²	City of Santa Rosa	Town of Windsor	City of Sonoma	Valley of the Moon WD	Marin Municipal Water District	City of Petaluma	CALGreen Requirement
Applicability (Customer Classes)	All	All	All	All	All	All	All	All	All	All
ND1-Rain Sensor Retrofit	2005	No	No	2010	2010 (SF>4 lots) & >2,500 sq ft/lot	No	2010, SF>5,000 sq ft	2000	Yes	No
ND2-Smart Irrigation Controller	2005	Yes	2010	2010	2010 (SF>4 lots) & >2,500 sq ft/lot	No	2010, SF>5,000 sq ft	2011	Yes	Yes
ND3- High Efficiency Toilets	2005	Yes	2009	2011	2011	No	No	2011	Yes	Yes
ND4- Dishwasher New Efficient	2005	No	2009	No	No	No	No	2012	Yes	No
ND5-Clothes Washing Machine Requirement	2000	No	2009	No	No	No	No	2011	Yes	No
ND6-Hot Water on Demand	No	No	No	No	No	No	No	No	No	No
ND7-High Efficiency Faucets and Showerheads	2006	Yes	2009	2011	2011	No	No	2011	Yes	Yes
ND8-Landscape and Irrigation Requirements	2004	2010 (State ordinance)	2010	SF since 2007. All other since 1993	2010 for landscapes > 2,500 sq ft (applies	2010 (adopted ordinance planned to	2010 for All except SF<5,000 sq. ft. and	1994	Yes	Yes

New Development (ND) Measure	NMWD	City of Rohnert Park ¹	City of Cotati ²	City of Santa Rosa	Town of Windsor	City of Sonoma	Valley of the Moon WD	Marin Municipal Water District	City of Petaluma	CALGreen Requirement
					to all but SF<5 lots)	be adopted September 1, 2010, budgets w/ 60% ET	turf<600 sq ft			
Urinals	2008	No	No	2011	2011	2009	No	2011	Yes	Yes
Source	NMWD Reg 15	Measure is mandatory under CALGreen. City adopted CALGreen effective January 2011.	Use Build it Green Checklist (Mandatory)	Adopting CALGreen 2010	Adopted WELO June 2010, CALGreen + Tier 1 January 2011	Use Build it Green Checklist (Mandatory)	County ordinance effective Jan 1, 2010	MMWD Title 13 Water Service Conditions	City ordinance 2009	State Reqmt; May take effect 2012

¹City of Rohnert Park has extensive green building ordinance requiring developers to select from a set of green building measures including some of the listed measures.

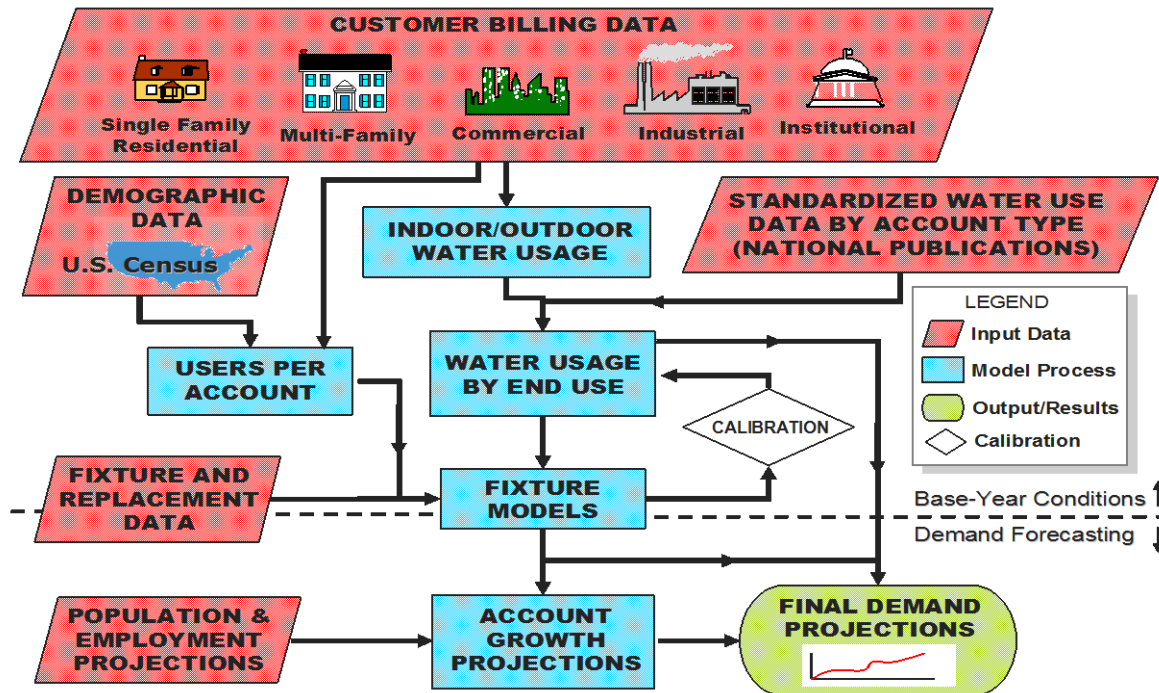
²City of Cotati ND-3 confirmed to start in 2009 based on July 27, 2010 with City of Cotati at the request of Damien O'Bid. Build It Green Checklist mandatory, beginning in the year 2004. The year 2009 was selected as a start date for 100% deployment of measures, as the measures can be selectively deployed providing the overall point minimum is achieved.

State Plumbing Code – AB 715

The Plumbing Code includes the new CCR Title 20 California State Law (AB 715) requiring High Efficiency Toilets and High Efficiency Urinals be exclusively sold in the state by 2014.

The following figure conceptually describes how the National plumbing code, CALGreen and AB 715 are incorporated into the flow of information in the DSS Model.

Figure A-1. DSS Model Overview Used to Make Potable Water Demand Projections



California State Law – SB 407

SB 407 (Plumbing Fixture Retrofit on Resale or Remodel): The DSS Model carefully takes into account the overlap with SB 407, the plumbing code (natural replacement), CALGreen, AB 715 and rebate programs (such as toilet rebates). SB 407 begins from the year 2017 in residential and 2019 in commercial properties. SB 407 program length is variable and continues until all the older high flush toilets have been replaced the service area. The number of accounts with high flow fixtures is tracked to make sure that the situation of replacing more high flow fixtures than actually exist does not occur.

DSS Model Fixture Replacement

The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example currently toilets can be purchased that can flush at a rate of 0.8 gallons per flush, 1.0 gallon per flush or 1.28 gallons per flush. The 1.6 gpf and higher gallons per flush toilets still exist but no longer can be purchased in California and cannot therefore be used for a replacement or new installation. So the DSS Model utilizes a fixture replacement table to decide what type of fixture is installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage as shown in the following figure. For example, a value of 100% would represent that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type. The DSS Model contains a pair of replacement tables for each fixture type and customer category combination. For example, the DSS Model will contain a

pair of replacement tables for Residential Single Family toilets, Residential Multi-family toilets, Commercial toilets, Residential clothes washing machines, Commercial washing machines, etc.

Figure A-2. Example Toilet Replacement Percentages by Type of Toilet

Replacement Appliance Market Shares				
Year	1.28 gpf HET	1.6 gpf ULFT	High Use Toilet	Total
2012	75%	25%	0%	100%
2014	100%	0%	0%	100%
2020	100%	0%	0%	100%
2030	100%	0%	0%	100%
2050	100%	0%	0%	100%
New Appliance Market Shares				
Year	1.28 gpf HET	1.6 gpf ULFT	High Use Toilet	Total
2012	100%	0%	0%	100%
2014	100%	0%	0%	100%
2020	100%	0%	0%	100%
2030	100%	0%	0%	100%
2050	100%	0%	0%	100%

In the previous example, the DSS Model combines the effects of the following for the toilet fixture type:

- Federal Policy Act
 - Determines the “saturation” of 1.6 gpf toilets as it was in effect from 1992-2014 for toilet replacements.
- CALGreen
 - Determines that all “new appliance market share” toilets in “new” development will be 1.28 gpf
 - The year 2012 was selected as the beginning of the toilet portion of the code did not go into effect until July 1, 2011 and it also takes a while to get a permit, build the facility or residence, and have the toilets functioning with the building occupied, such that the savings would not actually occur until the year 2012 rather than the year 2011.
- AB 715
 - Determines that the “replacement appliance market” and “new appliance market” toilets will all be 1.28 gpf toilets or lower.

DSS Model Initial Fixture Proportions

The DSS Model also needs a place to start when it comes to fixture replacement. It needs to know what the initial proportions (or percentages) of each type of fixture that are currently installed (also known as fixture saturation rate) in the modeled service area for each customer class.

Figure A-3 presents an example of the initial proportions determined for residential toilets in the year 2010. In the following **example** the model started in 2010, therefore it is assumed the initial proportions of the 1.28 gallon per flush type toilets is 0% as they were not readily available at that time. Then using the 2010 DP-04 census data, which shows the age of houses in the service area, it is calculated that 39.3% of the total current homes were built since 1992 when 1.6 gallon per flush toilets were required to be installed in new homes. Then an average natural replacement rate (rate of broken or remodeled toilet) of 2.5% per year for higher flush volume toilets is assumed. Then, in this example, a 3.96% replacement rate is calculated due to a rebate program that was raising the replacement rate of toilets. This gives the initial proportion of 1.6 gallon per flush (gpf) toilets to be 90.0%, and 1.28 gpf toilets 3.3%. In this case the initial proportion of high flush toilets is assumed to be the remainder of 6.7%. This figure shows an example of a toilet fixture model and how it incorporates the changes from each of these legislative items. There are similar fixture models for showers, clothes washers, and urinals. There is one fixture model for each of the following categories:

- Single family toilets
- Multi-family toilets


- Commercial toilets
- Commercial urinals
- Single family showers
- Multi-family showers
- Single Family clothes washers
- Multi-family clothes washers

Figure A-3. Example Residential Toilet Initial Proportions from Fixture Analysis used for DSS Fixture Model

Fixture Model:		Residential Toilets				Comments	Replacement Data	
Appliance Data								
Fixture Type	Volume per Use (Gallons) ¹	Proportion of Homes by Age ²	Net Change due to Natural Replacement	Net Change due to Rebate Program ³	Initial Proportions ⁴		Fixture Type	Percent Annual Replacement ⁵
1.28 gal/flush High Efficiency Toilets (HET)	1.3	0.0%	0.0%	3.30%	3.3%	3.4% as these toilets were not very prevalent in the start year.	1.28 gal/flush High Efficiency Toilets (HET)	2.0%
1.6 gal/flush Ultra Low Flow Toilets (ULFT)	1.8	39.3%	50.0%	0.66%	90.0%	39.3% new homes since 1990 + 50% natural replacement + 15% retrofit program	1.6 gal/flush Ultra Low Flow Toilets (ULFT)	2.0%
High Flush and 3.5 gal/flush	4.0	60.7%	-50.00%	-3.96%	6.7%	Remainder	High Flush and 3.5 gal/flush	2.5%
NOTES:								
1a. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf.								
1b. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census.								
2. Assume homes constructed after 1992 installed ULFTs.								
3. Net change due to rebate program is based on historical active conservation activity.								
4. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." No fixture % can exceed 90%.								
5a. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they were required.								
5b. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.								

These initial proportions determine in the fixture model and found in each Water Contractor's Water Use Data Analysis workbook, are then entered into the DSS Model for each fixture's "Codes and Standards" worksheet. A screenshot of the single family toilets codes and standards worksheet is shown in the following figure. Most DSS Models include fixture models for SF and MF toilets, showers, and clothes washers; and commercial toilets and urinals.

Figure A-4. Example Residential Toilet Fixture Screenshot from DSS Model

Single Family Toilets		
 <p>Single Family Toilets</p> <p>Categories</p>	General	
	Measure Category	Default Plumbing Code
	Start Year	2012
	Description	<p>The DSS Model is capable of modeling multiple types of fixtures, including fixtures with slightly different design standards. For example currently toilets can be purchased that can flush at 1.28 gallons per flush or 1.6 gallons per flush. The higher flush toilets (3.5gpf) still exist but no longer can be purchased in California and cannot therefore be used for a replacement or new installation. The DSS Model utilizes a fixture replacement table to decide what type of toilet is installed when a fixture is replaced or a new fixture is installed. The replacement of the fixtures is listed as a percentage. For example, a value of 100% would represent that all the toilets sold would be of one particular flush volume. A value of 75% means that three out of every four toilets installed would be of that particular flush volume type.</p> <p>The DSS Model combines the effects of the following for the toilet fixture type:</p> <ul style="list-style-type: none"> • Federal Policy Act: Determines the "saturation" of 1.6 gpf toilets as it was in effect from 1992-2014 for toilet replacements. • Cal Green: Determines that all "new appliance market share" toilets in "new" development will be 1.28 gpf. The year 2012 was selected for the model input as the toilet portion of the code did not go into effect until July 1, 2011 and it also takes a while to get a permit, build the facility or residence, and have the toilets functioning with the building occupied, such that the savings would not actually occur until the year 2012 rather than the year 2011. • AB 715: Determines that the "replacement appliance market" and "new appliance market" toilets will all be 1.28 gpf toilets. <p>An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling or other reason for replacement over time. To do this the DSS Model uses a percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, a natural replacement rate of 2.5% is used for older toilets. This value can be modified by the user as shown on the previous worksheet. Each year the number of remaining accounts with old toilets is calculated as 0.975 times the prior year's value.</p>
	Comments	<p>1. Volumes-per-use are based on average flush volumes for age of toilet. New toilets when out of adjustment flush at an average of 1.8 gpf instead of 1.6 gpf.</p> <p>2. Initial proportions of fixtures installed in homes are based on the age of homes as provided in the 2010 Census.</p> <p>3. Assume homes constructed after 1992 installed ULFTs.</p> <p>4. Net change due to rebate program is based on historical active conservation activity.</p> <p>5. The initial proportions are fundamentally calculated by taking the initial proportions of homes by age (corresponding to efficiency levels) and adding the net change due to natural replacement and adding change due to rebate program minus the "free rider effect." No fixture % can exceed 90%.</p> <p>6. Assume a 2.5% replacement rate for older toilets to the ULFTs over the 17 years since they were required.</p> <p>7. Assume a future annual replacement rate of 2.0% for high efficiency fixtures, 2.0% for medium efficiency fixtures and 2.5% for low efficiency fixtures. 2.0% corresponds to a 50 year fixture life. 2.5% corresponds with a 40 year fixture life.</p>
	Customer Category	Single Family
	End Use	Toilets
	Effected Fixtures	
	1.28 gpf HET	<input checked="" type="checkbox"/>
	1.6 gpf ULFT	<input checked="" type="checkbox"/>
High Use Toilet	<input checked="" type="checkbox"/>	
Initial Fixture Proportions		
1.28 gpf HET	2.7%	
1.6 gpf ULFT	90.0%	
High Use Toilet	7.3%	
Total	100.0%	

DSS Model Fixture Replacement Rates

An additional input to the DSS Model is the natural replacement rate of fixtures due to breakage, remodeling or other reason for replacement over time. To do this the DSS Model uses an percentage value for each fixture type that becomes the assumed natural replacement rate for that fixture. For example, high flush toilets have a replacement rate value of 2.5%. Each year the number of remaining accounts with old toilets is calculated as 0.975 times the prior year's value. This value can be modified by the user for any fixture as shown in Figure A-5 below.

Also included in the following figure are example fixture efficiencies, which can be adjusted to any desired level based on service area characteristics. MWM can update data on efficiency levels found in the field and the 2011 California Single Family Water Use Efficiency Study (Bill DeOreo) or other recent information related to fixture saturation rates.


Figure A-5. Example Future Replacement Rates of Fixtures from DSS Model

			Fixtures			
Fixture Name	End Use		Average Water Use	Units	Fixture Life (yrs)	Replacement Rate
1.28 gpf HET	Toilets	▼	1.30	gpf	50	2.0%
1.6 gpf ULFT	Toilets	▼	1.80	gpf	50	2.0%
High Use Toilet	Toilets	▼	3.50	gpf	40	2.5%
1 gpf Urinal	Urinals	▼	1.00	gpf	50	2.0%
0.5 gpf Urinal	Urinals	▼	0.50	gpf	50	2.0%
Waterless Urinal	Urinals	▼	0.00	gpf	50	2.0%
High Use Urinals	Urinals	▼	3.00	gpf	40	2.5%
Quart Urinals	Urinals	▼	0.25	gpf	50	2.0%
High Efficiency 2 gpm	Showers	▼	13.92	gal per use	25	4.0%
Low Flow 2.5 gpm	Showers	▼	18.27	gal per use	25	4.0%
High Flow > 3 gpm	Showers	▼	23.49	gal per use	25	4.0%
Efficient	Clothes Washers	▼	12.00	gal per use	10	10.0%
Medium Efficiency	Clothes Washers	▼	19.20	gal per use	10	10.0%
Top Loader	Clothes Washers	▼	34.20	gal per use	10	10.0%

DSS Model End Uses


Indoor and outdoor residential and non-residential end use breakdowns can be found in the “End Uses” section of each Water Contractor’s DSS Model on the “Breakdown” worksheet. As screenshot example of this worksheet is shown in Figure A-6. The source of these values is the California DWR Report "California Single Family Water Use Efficiency Study", 2011, AWWARF’s Report “Residential End Uses of Water” 2015 (pending), and Water Contractor supplied data on costs and savings. AWWARF’s 2000 "Commercial and Institutional End Uses of Water" is also used.

Figure A-6. End Use Breakdown Example Screenshot

Breakdown								
 Breakdown	Indoor							
	End Use Name	SF	MF	COM	IND	INST	IRR	OTH
	Toilets	16.0%	18.0%	16.5%	12.0%	18.0%		
	Urinals			4.0%	3.0%	5.0%		
	Faucets	21.0%	12.0%	13.0%	14.0%	14.0%		
	Showers	24.0%	28.0%	8.0%	8.0%	8.0%		
	Dishwashers	2.0%	5.0%	6.0%	6.0%	6.0%		
	Clothes Washers	13.0%	16.5%	15.0%	15.0%	15.0%		
	Process			23.0%	27.0%			
	Kitchen Spray Rinse			5.0%	5.0%	5.0%		
	Internal Leakage	7.0%	5.0%	9.5%	10.0%	10.0%		
	Baths	2.5%	1.5%					
	Other	14.5%	14.0%	0.0%	0.0%	19.0%		
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%	0.0%
	Outdoor							
	End Use Name	SF	MF	COM	IND	INST	IRR	OTH
	Irrigation	80.0%	83.0%	95.0%	95.0%	95.0%	95.0%	
	Pools	1.0%	2.0%					
	Wash Down	7.0%	4.0%					
	Car Washing	7.0%	4.0%					
	External Leakage	5.0%	7.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Outdoor							95.0%
	Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

End use breakdown values will differ slightly between Water Contractors due to differing demographics of their service area population. Residential frequency of use information for toilets, showers, and washers, and non-residential frequency of use of toilets and urinals is included in the “Codes and Standards” green section on the “Fixtures” worksheet of each Water Contractor’s DSS Model, and then confirmed in each “Service Area Calibration End Use. Calculated frequencies of use in uses/user/day for customer end uses are presented in each customer category’s “Service Area Calibration End Use” worksheet and compared to an industry-accepted use range based on AWWARF’s residential, commercial and institutional end use reports mentioned previously. An example of this calibration sheet is shown in the screenshot in Figure A-7 below.

Figure A-7. Single Family End Use Breakdown and Fixture Use Frequency Example Screenshot

Single Family							
 Single Family	End Use	Use Percentage	Uses/User/Day	Lower	Upper	State	Fixture Model
	Toilets	16.0%	4.76	4.5	5.6	Calibrated	Edit
	Faucets	21.0%					
	Showers	24.0%	0.73	0.6	0.9	Calibrated	Edit
	Dishwashers	2.0%					
	Clothes Washers	13.0%	0.32	0.3	0.42	Calibrated	Edit
	Internal Leakage	7.0%					
	Baths	2.5%					
	Other	14.5%					
	Total	100.0%					

A.2 Present Value Parameters

Present value analysis using constant FY 2014 dollars and a real discount rate of 3% is used to discount costs and benefits to the base year. From this analysis, benefit-cost ratios of each measure are computed. When measures are put together in programs, the model is set up to avoid double counting savings from multiple measures that act on the same end use of water. For example, multiple measures in a program may target toilet replacements. The model includes assumptions to apportion water savings between the multiple measures.

Economic analysis can be performed from several different perspectives, based on which party is affected. For planning water use efficiency programs for utilities, the perspectives most commonly used for benefit-cost analyses are the “utility” perspective and the “community” perspective. The “utility” benefit-cost analysis is based on the benefits and costs to the water provider. The “community” benefit-cost analysis includes the utility benefit and costs together with account owner/customer benefits and costs. These include customer energy and other capital or operating cost benefits plus costs of implementing the measure, beyond what the utility pays.

The utility perspective offers two advantages. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving versus supplying increased quantities of water. Second, revenue shifts are treated as transfer payments, which means program participants will have lower water bills and non-participants will have slightly higher water bills so that the utility’s revenue needs continue to be met. Therefore, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. It should be noted that there is a significant difference between the utility’s savings from the avoided cost of procurement and delivery of water and the reduction in retail revenue that results from reduced water sales due to water use efficiency. This budget impact occurs slowly, and can be accounted for in water rate planning. Because it is the water provider’s role in developing a water use efficiency plan that is vital in this study, the utility perspective was primarily used to evaluate elements of this report.

The community perspective is defined to include the utility and the customer costs and benefits. Costs incurred by customers striving to save water while participating in water use efficiency programs are considered, as well as the benefits received in terms of reduced energy bills (from water heating costs) and wastewater savings, among others. Water bill savings are not a customer benefit in the aggregate for reasons described above. Other factors external to the utility, such as environmental effects, are often difficult to quantify or are not necessarily under the control of the utility. They are therefore frequently excluded from economic analyses, including this one.

The time value of money is explicitly considered. Typically the costs to save water occur early in the planning period whereas the benefits usually extend to the end of the planning period. A long planning period of 30-40 years is typically used because costs and benefits that occur beyond 2050 years have very little influence on the total present value of the costs and benefits. The value of all future costs and benefits is discounted to the first year in the DSS Model (the base year, which in this case is 2015), at the real interest rate of 3.01%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%). The formula to calculate the real interest rate is: $(\text{nominal interest rate} - \text{assumed rate of inflation}) / (1 + \text{assumed rate of inflation})$. Cash flows discounted in this manner are herein referred to as “Present Value” sums.

A.3 Assumptions about Measure Costs

Costs were determined for each of the measures based on industry knowledge, past experience and data provided by the individual Water Contractors. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the costs to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials that will be used in marketing the measure. The model was run for 36 years (each year between FY 2014 and FY 2050). Costs were spread over the time period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

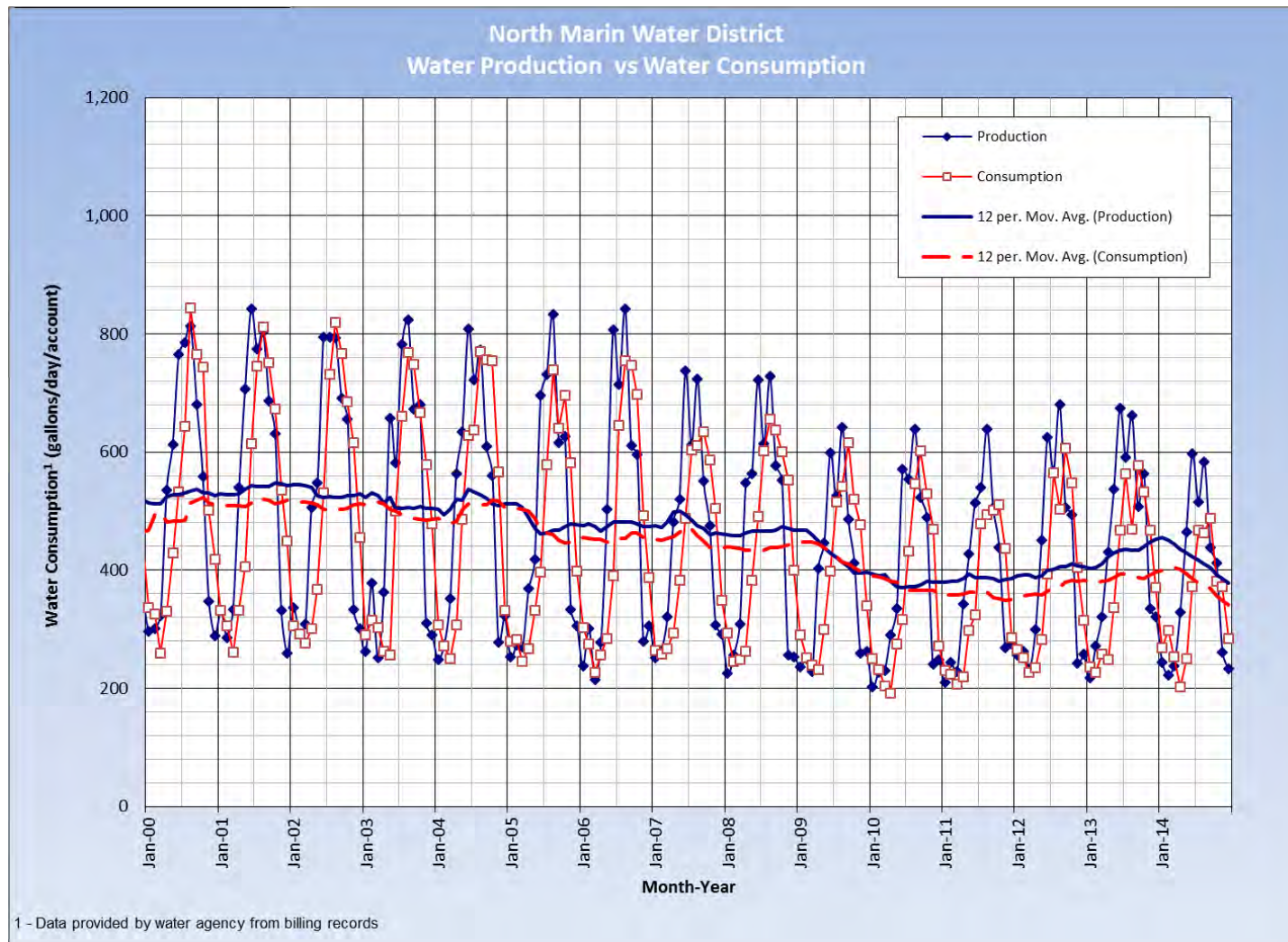
Lost revenue due to reduced water sales is not included as a cost because the water use efficiency measures evaluated herein generally take effect over a long span of time that is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations and savings on variable costs such as energy and chemicals.

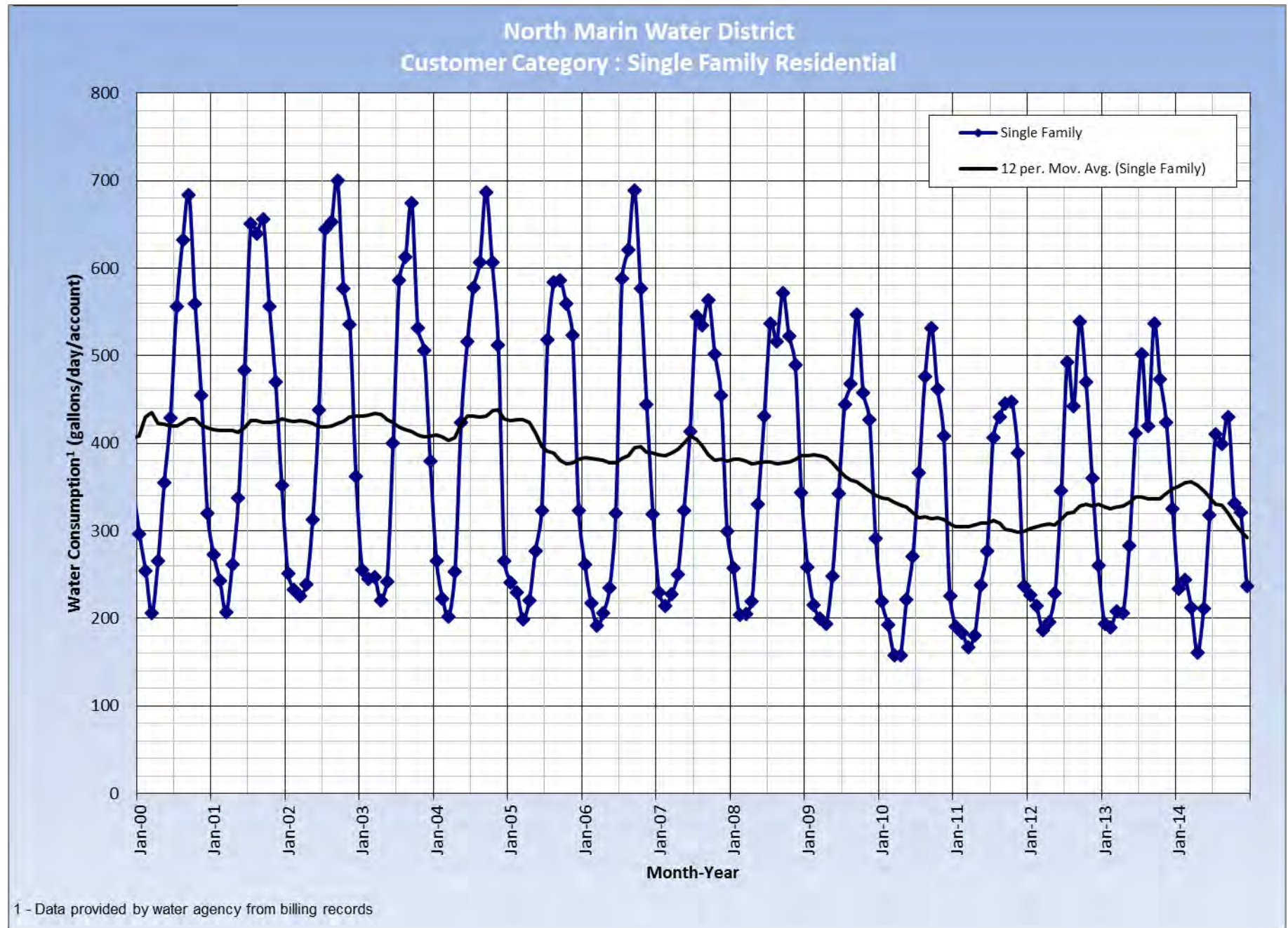
A.4 Assumptions about Measure Savings

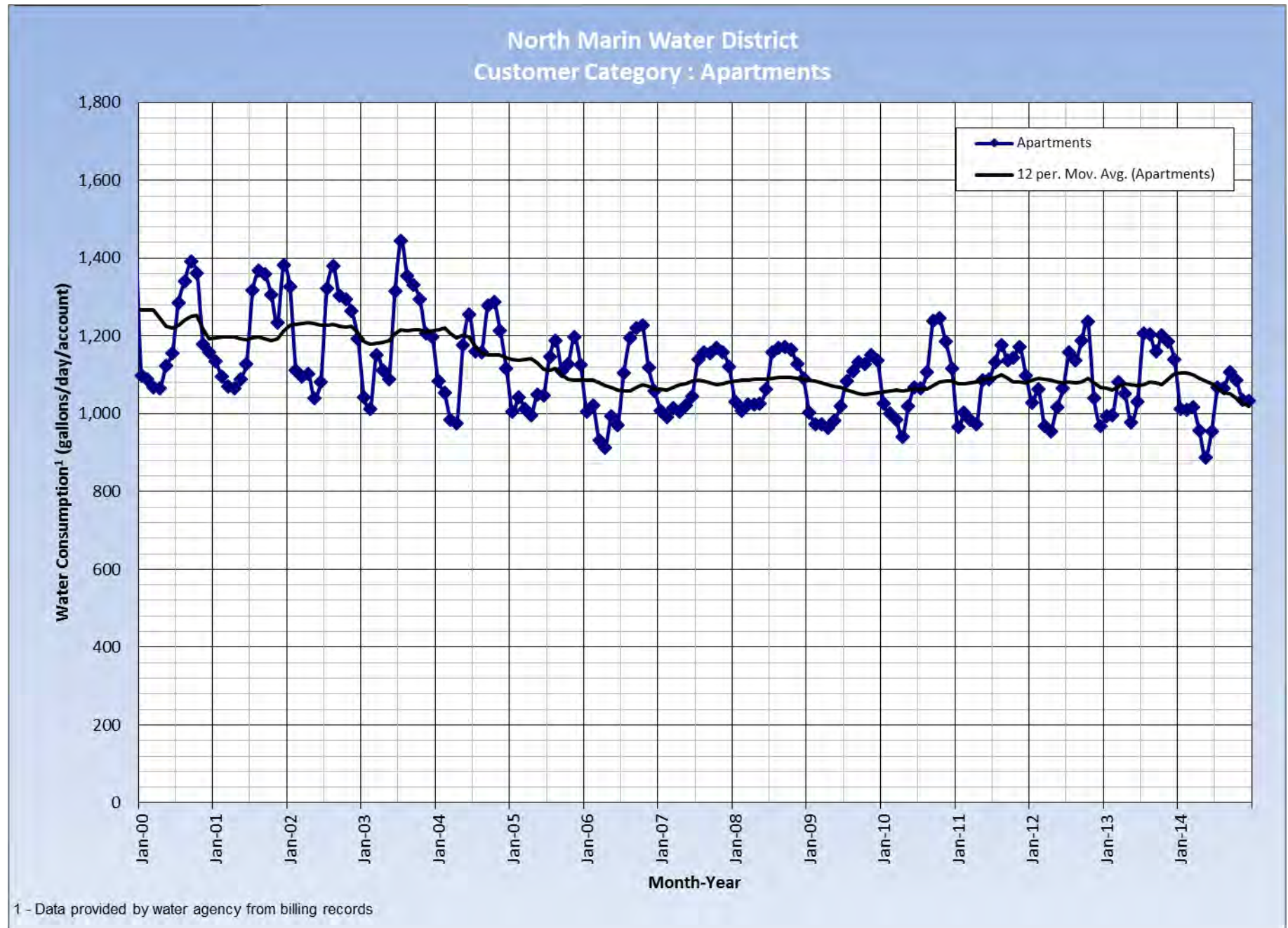
Data necessary to forecast water savings of measures include specific data on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur three to seven years after the start of implementation, depending upon the implementation schedule. For every water use efficiency activity or replacement with more efficient devices, there is a useful life. The useful life is called the “Measure Life” and is defined to be how long water use efficiency measures stay in place and continue to save water. It is assumed that measures implemented because of codes, standards or ordinances, like toilets for example, would be “permanent” and not revert to an old inefficient level of water use if the device needed to be replaced. However, some measures that are primarily behavioral based, such as residential surveys, are assumed to need to be repeated on an ongoing basis to retain the water savings (e.g., homeowners move away and new homeowners may have less efficient water using practices around the home). Surveys typically have a measure life on the order of five years.

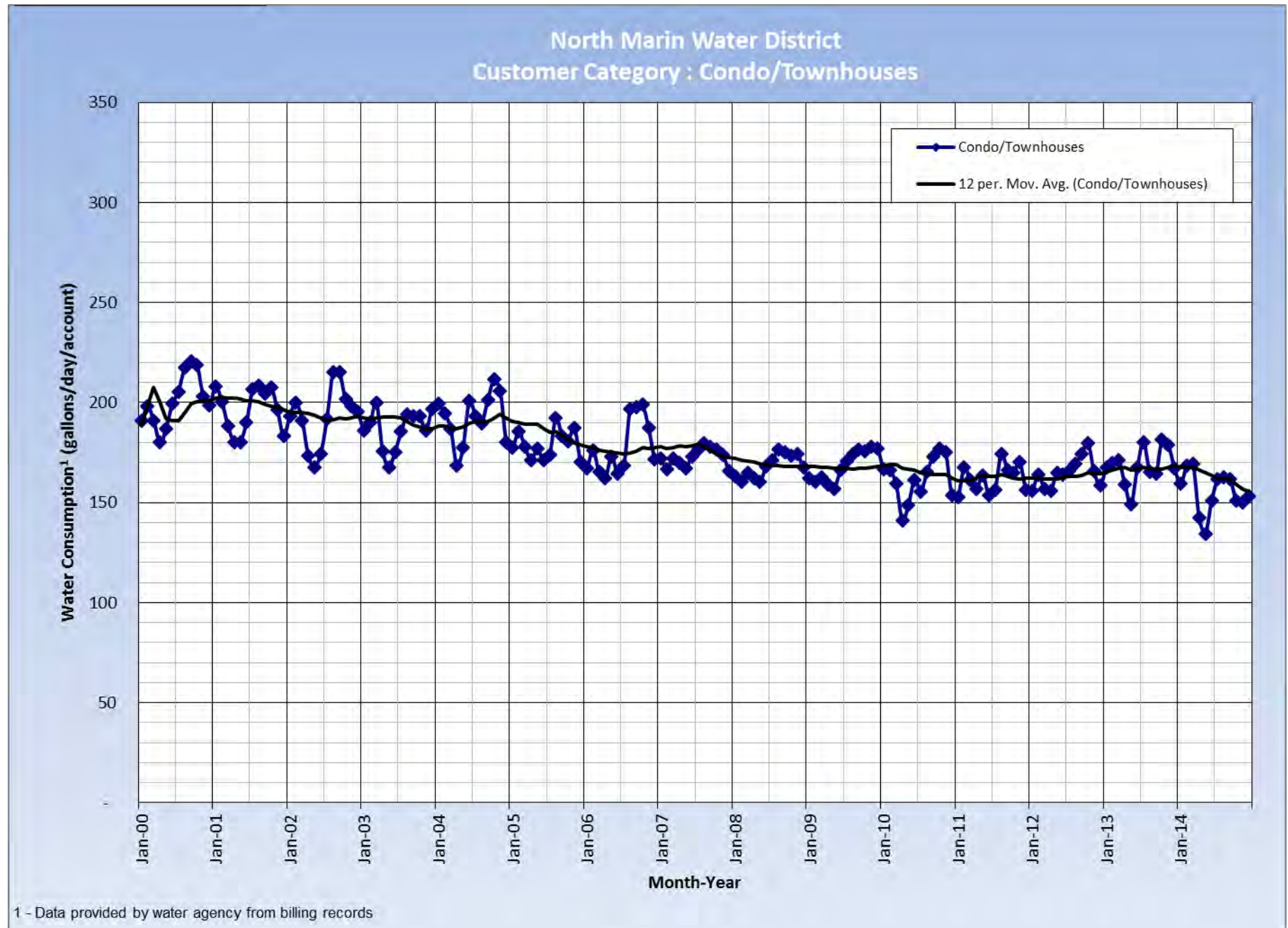
APPENDIX B - WATER USE GRAPHS FOR PRODUCTION AND CUSTOMER CATEGORIES

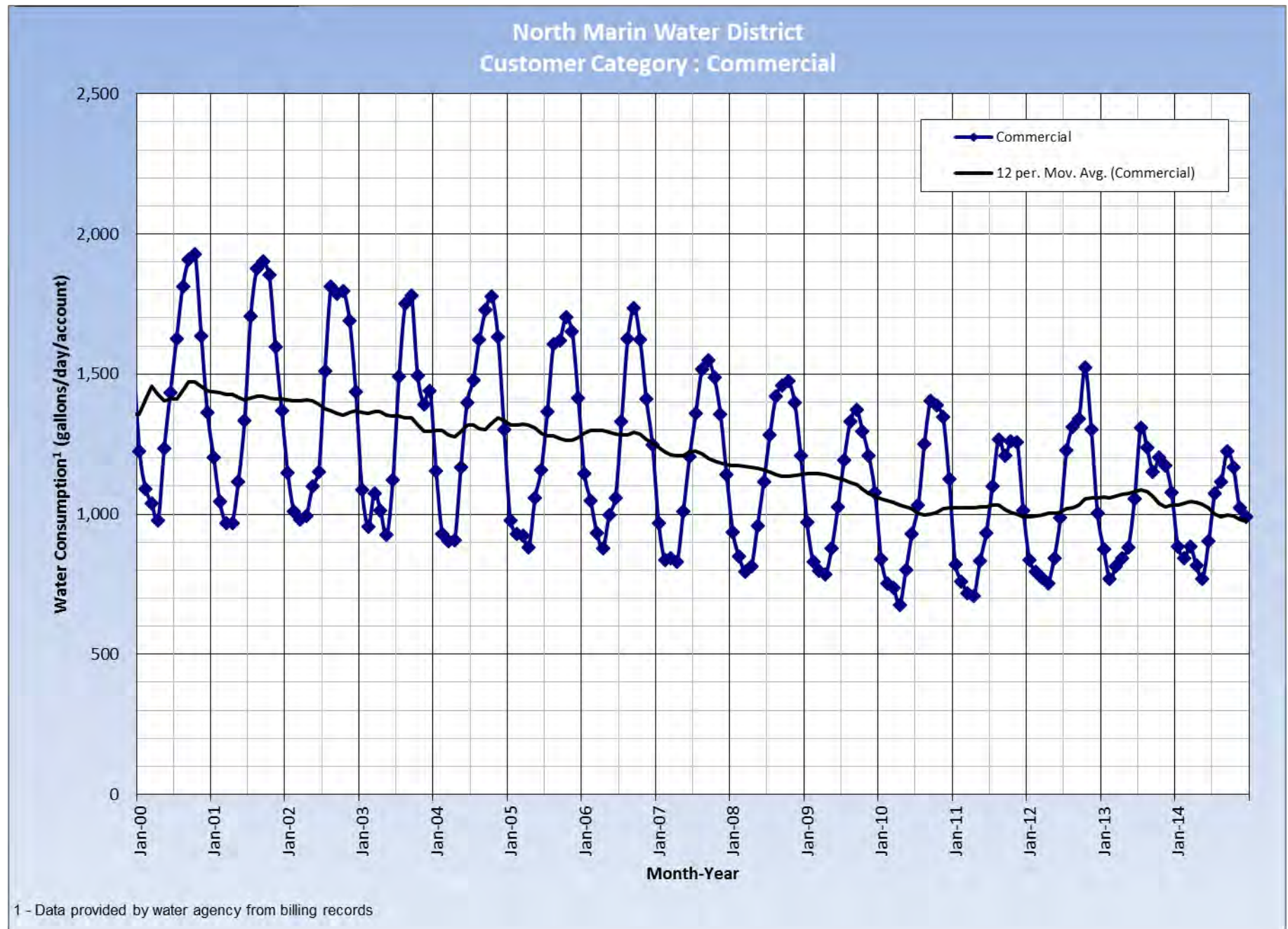
As initially presented in Section 3 of this report, this appendix presents historical customer category water use graphs. Units shown are average gallons of water per account per day. These graphs were reviewed to better identify outlier data points and years so that a representative baseline water use value (of average account water use by category) could be determined. The effects of drought, economic recessions, service line failures, and meter inaccuracies are typically evident in these figures.

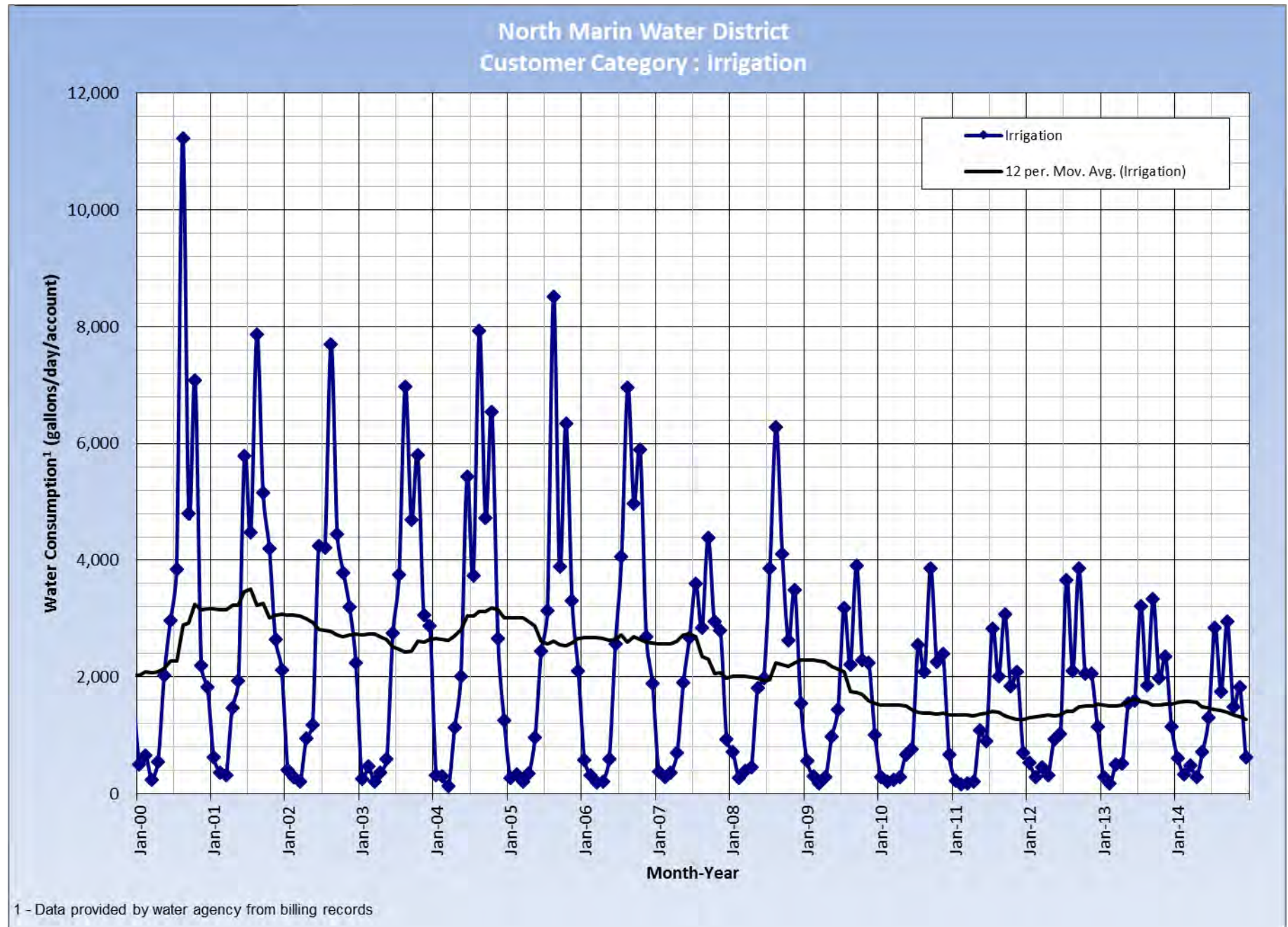


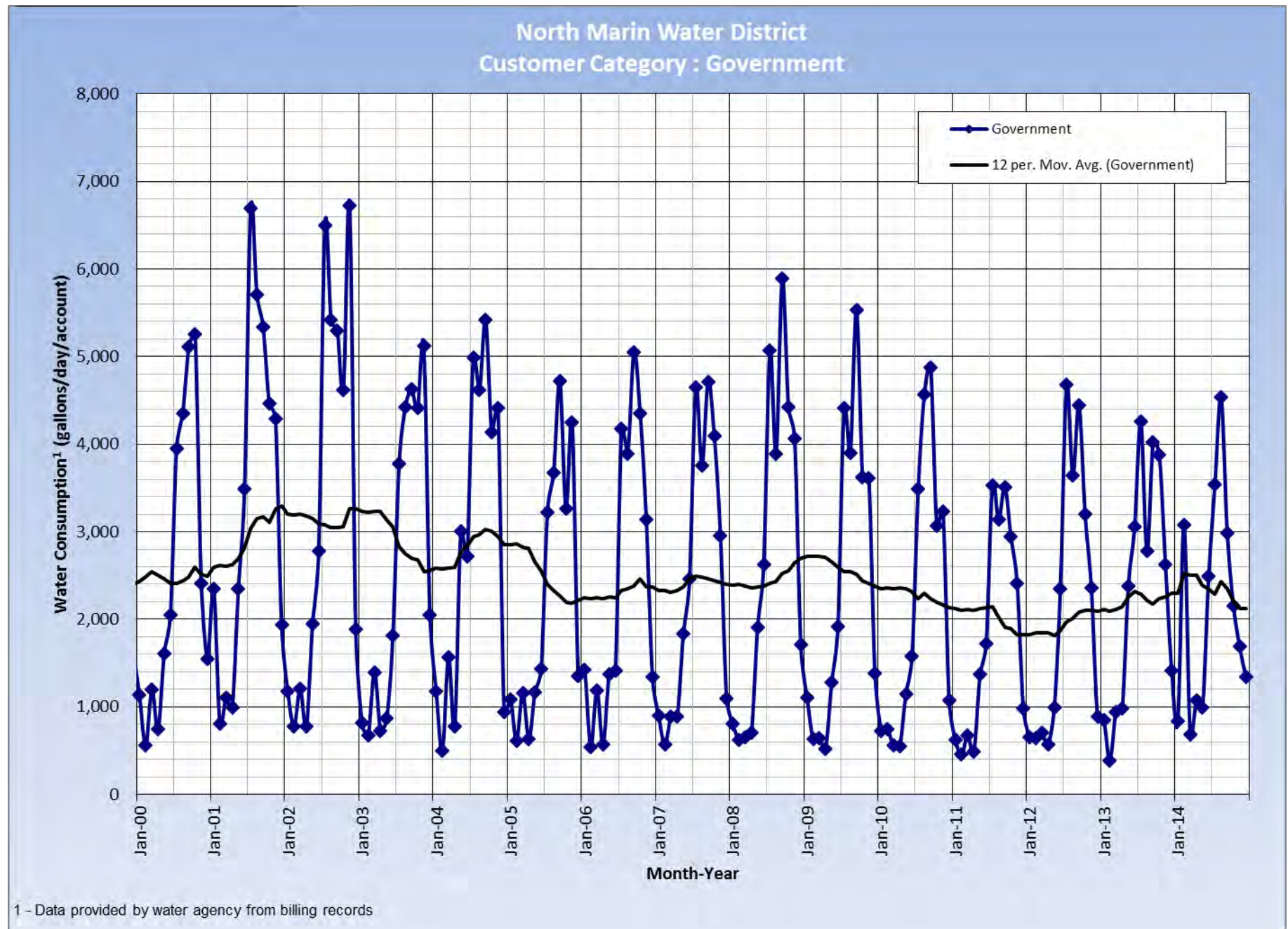


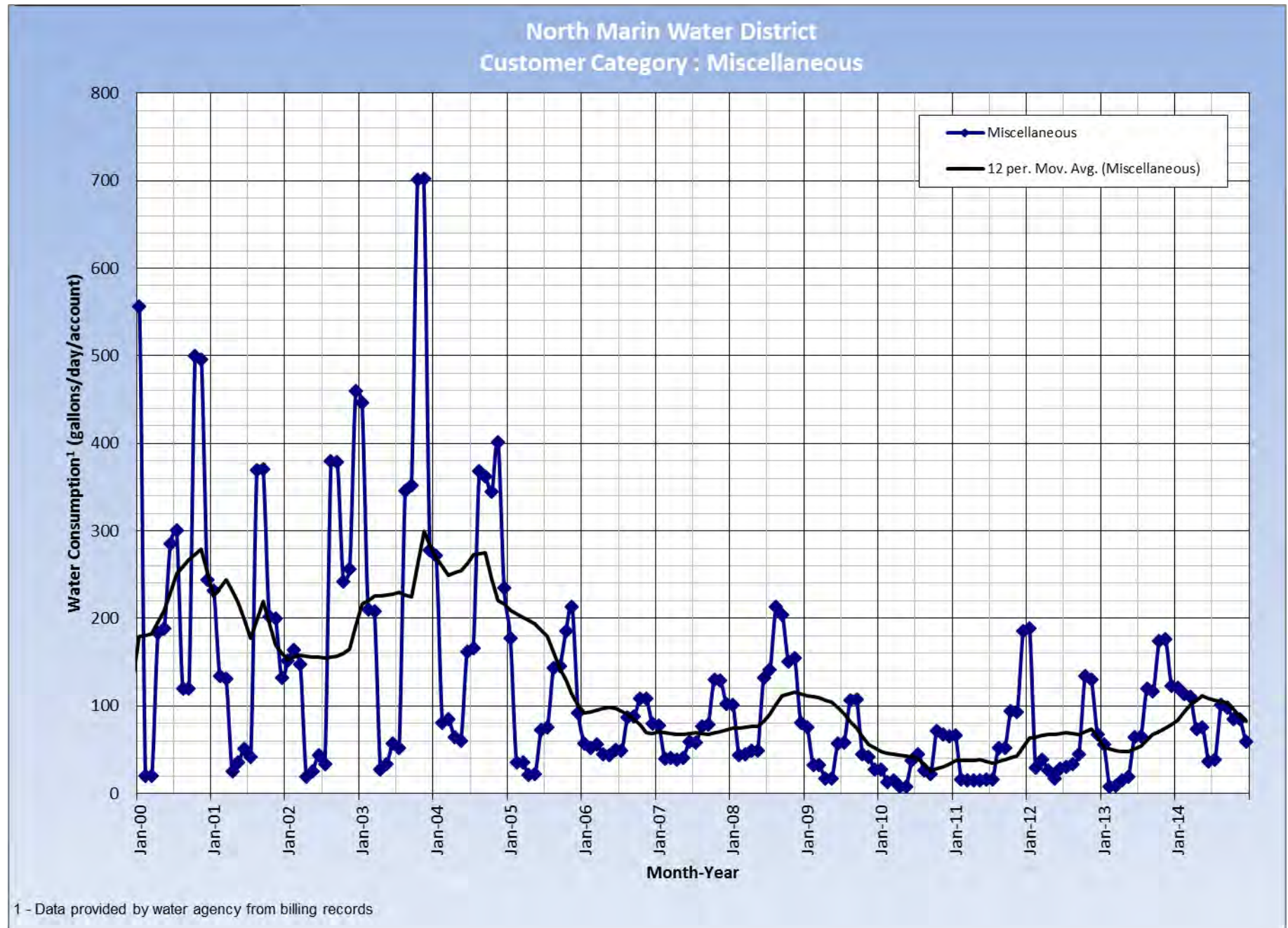


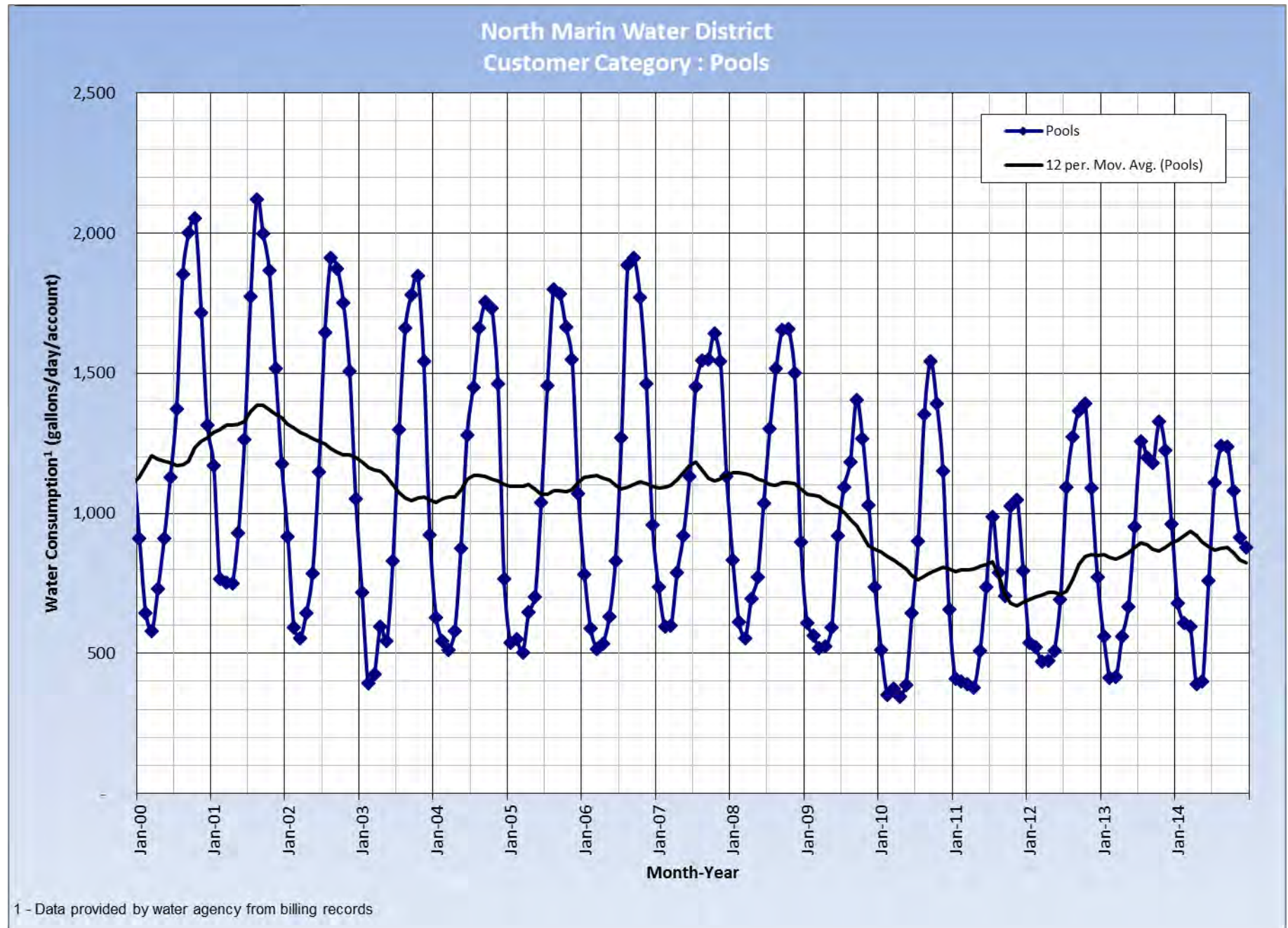


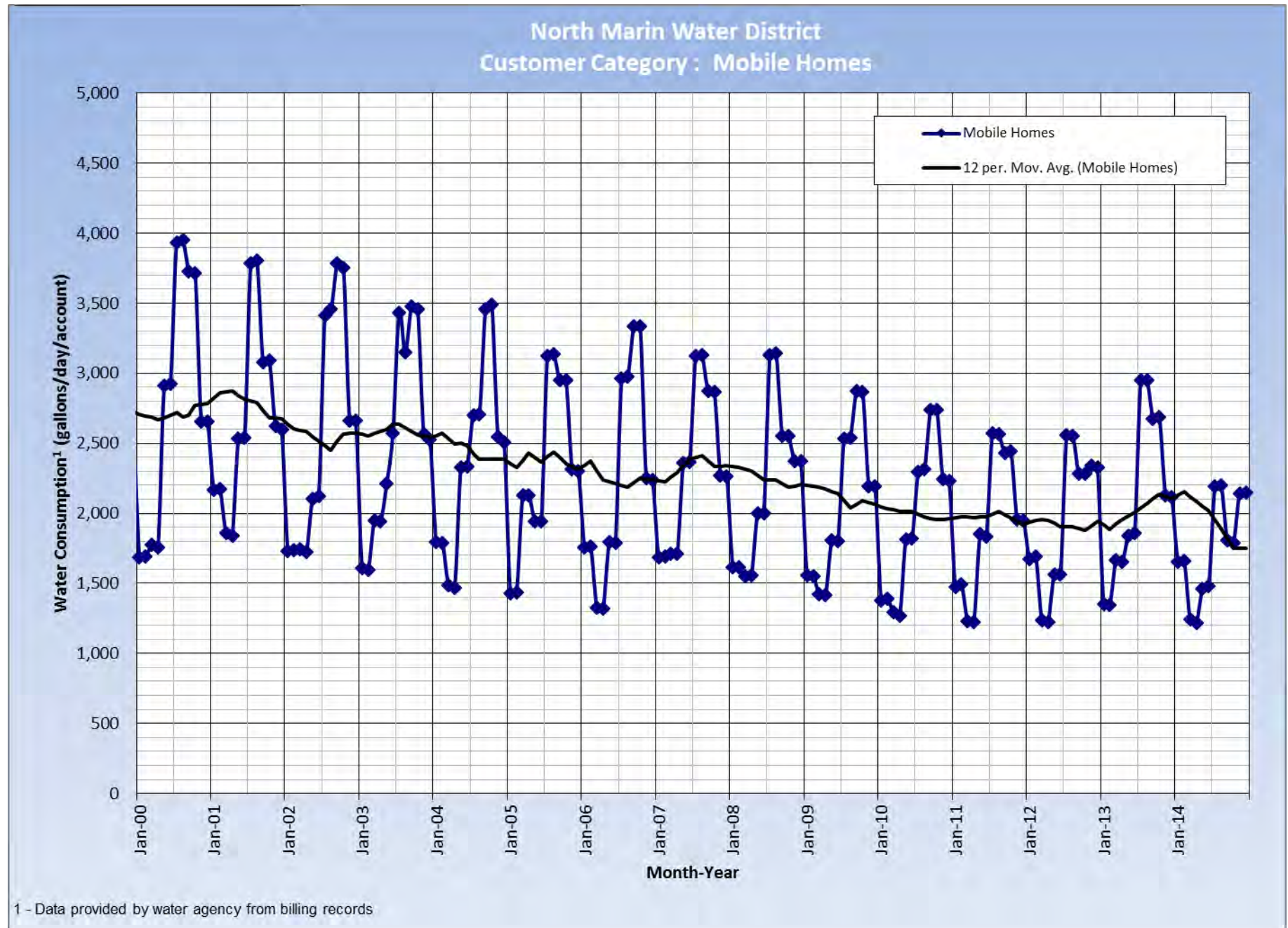












APPENDIX C - MEASURE SCREENING PROCESS AND RESULTS

In order to start the cost effectiveness analysis and build a water use efficiency model for each Water Contractor, the SMSWP Water Contractors decided on the list of conservation measures to be analyzed that, once modeled, would serve as the menu to build conservation program scenarios. To this end, two web-based webinars were conducted in February and March 2015 to review and select conservation measures together with staff representatives from each Water Contractor. The library of conservation measure opportunities had more than 50 measures and various implementation strategies (having different unit costs, participation levels and/or unit water savings which must be modeled individually). In order to maximize efficiency and productivity at the workshop, each Water Contractor developed two “top 10” lists of active conservation measures that they wanted to evaluate in order to eventually decide if their Water Contractor would include the measure in their DSS Model:

1. *Regional “Top 10” list* – a suite of measures each Water Contractor wanted to be analyzed for the SMSWP to implement.
2. *Water Contractor “Top 10” list* – a suite of measures that each Water Contractor representative selected for their own Water Contractor to possibly implement individually without SMSWP support.

Furthermore, to help facilitate input and combine results most easily, each Water Contractor completed an online survey to help identify their ideal “top 10” potential conservation measures for both the regional and Water Contractor programs. Water Contractors collaborated internally with others in their Water Contractor as necessary. The results of the survey were treated as the input from each Water Contractor’s perspective.

Based on this initial Water Contractor input, subsequent workshop calls were structured to focus on a discussion of measures that received mixed interest from the group, rather than those measures that the group already had consensus on. This approach led to a decision on which measures should initially be included in the DSS Models. Additionally, each Water Contractor also had the ability to add unique measures for their individual DSS Model.

Once finalized, the selected measures on both the SMSWP-led and Water Contractor-led lists were inserted into each Water Contractor’s DSS Model, along with the standard utility operations (e.g., water loss control programs) and education measures in order to have a complete standard menu of 25 measures in each Water Contractor’s DSS Model. Next, the Project Team worked with each Water Contractor to more specifically analyze measures (participation rates, Water Contractor unit costs and unit water savings, etc.), and build conservation program scenarios. The number of measures, twenty-five, comes from the consultant’s past experience on having enough measures to choose from to (a) build program scenarios that are able to meet SB X7-7 water use targets, and (b) still be feasible to be successfully implemented between SMSWP and Water Contractor combined efforts.

The following figures present the regional and Water Contractor measure rankings resulting from this screening process. Measures with the highest priority for being included in the cost effectiveness analysis were ranked with number 1 representing the most important. Note that selections for the top 1-5 measures likely “passed” the screening; measures showing ranking 5-10 received the most debate at the workshop.

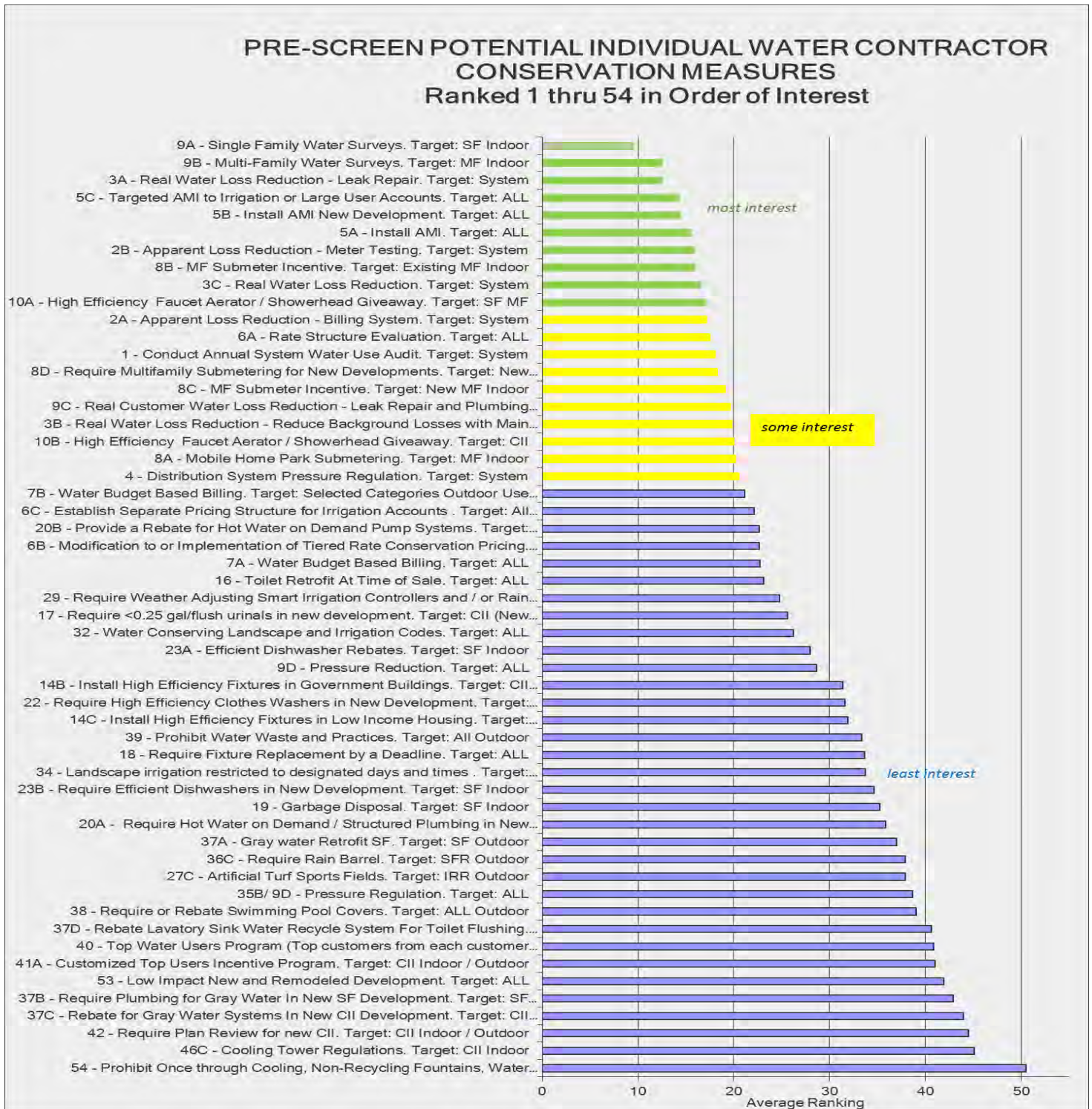
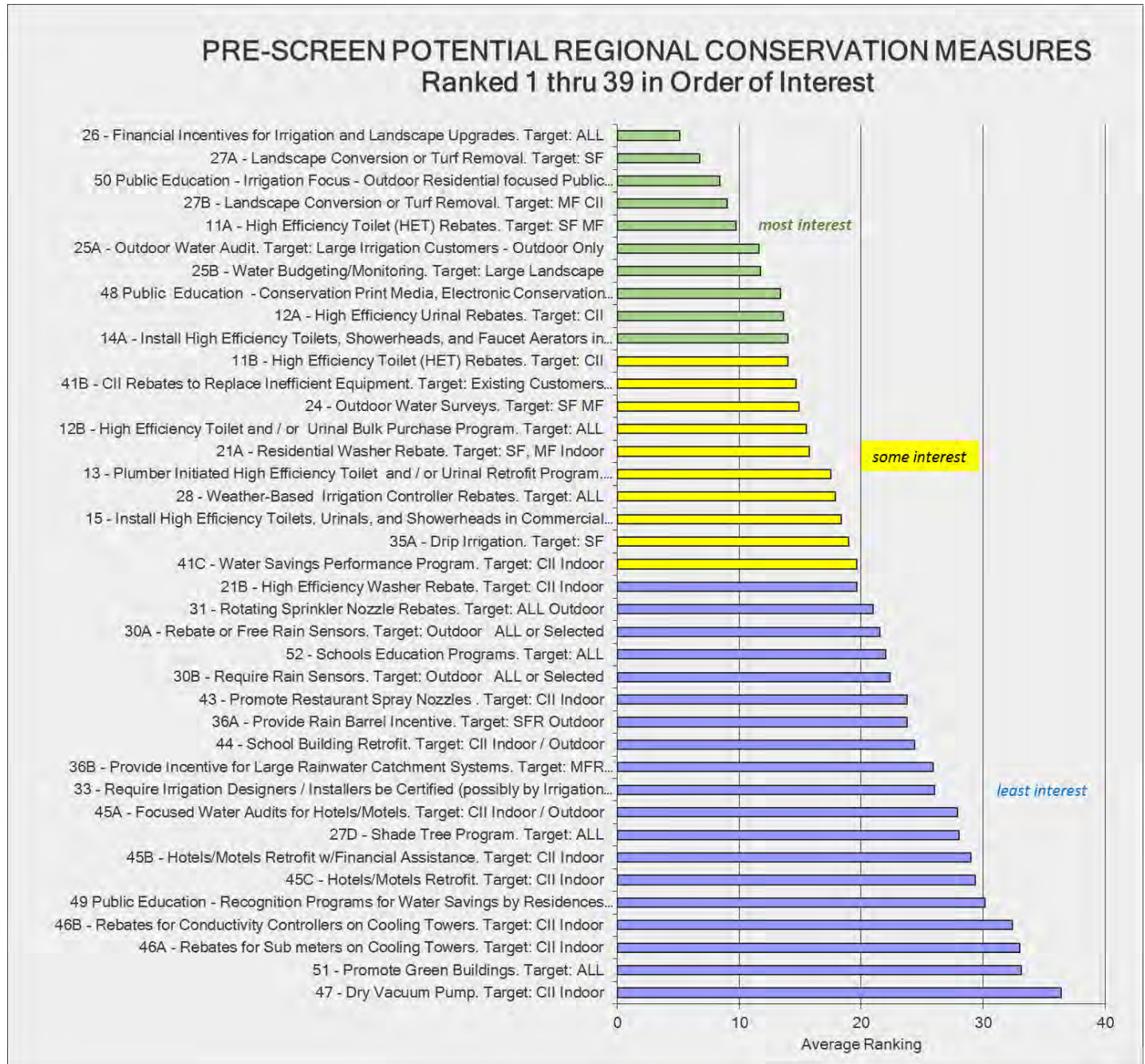
Figure C-1. Water Contractor-Only Measures Screening Ranking

Figure C-2. Regional Measures Screening Ranking

The general discussion screening criteria included:

- **Technology/Market Maturity** – Refers to whether the technology needed to implement the water use efficiency measure, such as an irrigation control device, is commercially available and supported by the local service industry. A measure was more likely to be included if the technology was widely available in the service area and less likely to be included if the technology was not commercially available or not supported by the local service industry.
- **Service Area Match** – Refers to whether the measure or related technology is appropriate for the area's climate, building stock, and lifestyle. For example, promoting native and/or water efficient landscaping may not be appropriate where water use analysis indicates little outdoor irrigation. Thus, a measure was not included if it

was not well suited for the area's characteristics and could not save water; and was more highly considered to be included if it was well suited for the area and could save water.

- **Customer Acceptance/Equity** – Refers to whether retail customers within the service area would be willing to implement and accept the water use efficiency measures. For example, would retail customers attend homeowner irrigation classes and implement lessons learned from these classes? If not, then the water savings associated with this measure would not be achieved and a measure with this characteristic would score low for this criterion. This criterion also considers retail customer equity where one category of retail customers receives benefit while another pays the costs without receiving benefits. Retail customer acceptance may be based on convenience, economics, perceived fairness, and/or aesthetics.


Based on the survey results and previously listed criteria, MWM and Water Contractor staff decided if a measure was a “Yes” or “No”. Measures with a “No” were eliminated from further consideration, while those with a “Yes” passed into the next evaluation phase: cost-effectiveness analysis using the DSS Model.


Below was the schedule of measure screening tasks:

- January 2015 - Survey Monkey survey #1 distributed
- February 2015 – Screening web-based workshop with Water Contractors and SMSWP and SCWA representatives
- February 2015 - Survey Monkey survey #2 distributed
- March 2015 – Screening web-based workshop call with Water Contractors and SMSWP and SCWA representatives
- March 2015 – Measure list finalized

APPENDIX D - ASSUMPTIONS FOR WATER CONSERVATION MEASURES EVALUATED IN THE DSS MODEL

This appendix presents various parameter inputs as well as cost and savings results for the conservation measures evaluated in the Water Contractor's DSS Model. Annual utility costs, targets, and water savings were provided for each individual measure for the first 5 years to the year 2020. The actual DSS Model runs measures to the year 2040.

 Water Loss	Overview		Description		Results	
	Name	Water Loss	CONTRACTOR MEASURE: Maintain a thorough annual accounting of water production, sales by customer class and quantity of water produced and billed consumption (to define non-revenue water). In conjunction with system accounting, include water system audits that identify and quantify known legitimate uses of non-revenue water in order to determine remaining potential for reducing real (physical) water losses. Goal would be to lower the Infrastructure Leakage Index (ILI) and real water losses water every year by a pre-determined amount based on cost-effectiveness. These programs typically pay for themselves based on savings in operational costs (and saved rate revenue can be directed more to system repairs/replacement and other costs) and recovered revenue through addressing apparent losses. Specific goals and methods to be developed by Utility. May include accelerated main and service line replacement. Enhanced real loss reduction may include more ambitious main replacement and active leak detection. Capture water from water main flushing and hydrant flow testing for reuse.		Average Water Savings (mgd)	
	Abbr	1			0.064424	
	Category				Lifetime Savings - Present Value (\$)	
	Measure Type	Water Loss Measure			Utility \$1,886,575 Community \$1,886,575	
	Time Period				Lifetime Costs - Present Value (\$)	
	First Year	2015			Utility \$919,716 Community \$919,716	
	Backlog Costs				Benefit to Cost Ratio	
	Total Backlog Work Costs	\$0			Utility 2.05 Community 2.05	
	Years to Complete Backlog	0			Cost of Savings per Unit Volume (\$/mg)	
Maintenance Costs				Utility \$1,503		
Annual Maintenance Costs	\$50,000					
Target				Comments		
Total GPCD Reduction	1.0			Savings is calculated over the life of the program which is tied to the Contractor's current Non Revenue Water percentage which can be found in the GREEN "Non Revenue Water" portion of the DSS Model. All programs are advised to have "Annual Maintenance Costs" inputted to allow for budget estimates for complete program. Additional water savings of "Non-Revenue Water" real water losses may be available when technically feasible. Typical target is minimum system losses based on percent of water system input volume down to approximately 6% (as defined as the difference between production and consumption or alternatively as a percent of System Input Volume using AWWA Water System Audit definitions). For NRW below 6% (which can be found in the GREEN "Non Revenue Water" portion of the DSS Model), input "0%" for new real water savings and "\$0" in the Backlog Cost section. For NRW above 6%, a GPCD savings input volume can be computed (an estimate of annual savings volume divided by total population). For example a 4.0 GPCD is equivalent to a 2% reduction for the system with a 150 GPCD water use. Additional Water Loss Control Program budget to achieve these water savings is inputted into the "Backlog Cost" section along with the duration of the years to accomplish the estimated reduction. In other words, \$250,000 over 5 years would add \$50,000 per year to assist with meeting NRW reduction goals.		
Costs		Targets		Water Savings		
	Utility		Projected NRW Percent		Total Savings	
2015	\$50,000	2015	5.9%	2015	0.061150	
2016	\$50,000	2016	5.9%	2016	0.061451	
2017	\$50,000	2017	5.9%	2017	0.061752	
2018	\$50,000	2018	5.9%	2018	0.062054	
2019	\$50,000	2019	5.9%	2019	0.062355	
2020	\$50,000	2020	5.9%	2020	0.062656	



AMI

Overview			
Name	AMI		
Abbr	2		
Category			
Measure Type	Standard Measure		

Time Period	Measure Life
First Year	2017
Last Year	2018
Measure Length	2

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$400.00	\$0.00	1
APT	\$400.00	\$0.00	2
CND	\$400.00	\$0.00	2
COM	\$400.00	\$0.00	3
IRR	\$400.00	\$0.00	3
MH	\$400.00	\$0.00	2

Administration Costs	
Markup Percentage	40%

Description
CONTRACTOR MEASURE: Retrofit system with AMI meters and associated network capable of providing continuous consumption data to Utility offices. Improved identification of system and customer leaks is a major conservation benefit. Some costs of these systems are offset by operational efficiencies and reduced staffing, as regular meter reading and opening and closing accounts are accomplished without the need for a site visit. Also enables enhanced billing options and ability to monitor unauthorized usage, such as use/tampering with closed accounts or irrigation when time of day or days per week are regulated. Customer service is improved as staff can quickly access continuous usage records to address customer inquiries. Optional features include online customer access to their usage, which has been shown to improve accountability and reduce water use. A three-year change-out would be a reasonable objective and may take longer if coupled with a full meter replacement program (on the order of 10 years). Require that new, larger or irrigation customers install such AMI meters as described above and possibly purchase means of viewing daily consumption inside their home, business, or by their landscape/property managers, either through the Internet (if available) or separate device. The AMI system would, on demand, indicate to the customer and Utility where and how their water is used, facilitating water use reduction and prompt leak identification. This would require Utility to install an AMI system.

Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC

End Uses									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets									
Urinals									
Faucets									
Showers									
Dishwashers									
Clothes Washers									
Process									
Kitchen Spray Rinse									
Internal Leakage									
Baths									
Other									
Irrigation									
Pools									
Wash Down									
Car Washing									
External Leakage									
Outdoor									
Cooling									

Comments
Basis for the starting value cost estimate is \$3 million for 21,000 meters in NMWD which will be installed from 2016-2018. The savings are assumed in 2017 and 2018 to be conservative and not assume savings in the first year of 2016, where assumes (a) does not include any partial % cost share for the "Utility" of estimated AMI (automatic meter infrastructure) for meter replacement with other water utility departments responsible for the Capital Improvement Plan (CIP) such as engineering and/or operations; and (b) Cost estimate does not include service leak repair (assume included in Water Loss Control program). Program and Costs include provisions to act on "continuous flow" reading that indicate presence of a potential leak including contacting customer, plumber, referral, etc.

Results	
Average Water Savings (mgd)	
0.063496	
Lifetime Savings - Present Value (\$)	
Utility	\$1,795,352
Community	\$1,795,352
Lifetime Costs - Present Value (\$)	
Utility	\$2,761,202
Community	\$2,761,202
Benefit to Cost Ratio	
Utility	0.65
Community	0.65
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$4,579


Savings Per Replacement	
	% Savings per Account
SF Internal Leakage	20.0%
SF Irrigation	5.0%
SF External Leakage	20.0%
APT Internal Leakage	20.0%
APT Irrigation	5.0%
APT External Leakage	20.0%
CND Internal Leakage	20.0%
CND Irrigation	5.0%
CND External Leakage	20.0%
MH Internal Leakage	20.0%
MH Irrigation	5.0%
MH External Leakage	20.0%
COM Internal Leakage	20.0%
COM Irrigation	5.0%
COM External Leakage	20.0%
IRR Internal Leakage	20.0%
IRR Irrigation	5.0%
IRR External Leakage	20.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	10.000%
Only Effects New Accts	

Costs			
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$1,482,634	\$0	\$1,482,634
2018	\$1,490,836	\$0	\$1,490,836
2019	\$0	\$0	\$0
2020	\$0	\$0	\$0

Targets							
	SF	APT	CND	MH	COM	IRR	Total
2015	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0
2017	1,505	119	633	21	249	121	2,648
2018	1,512	120	636	21	251	122	2,662
2019	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0

Water Savings (mgd)	
Total Savings (mgd)	
2015	0.000000
2016	0.000000
2017	0.035026
2018	0.070255
2019	0.070255
2020	0.070255



Pricing

Overview	
Name	Pricing
Abbr	3
Category	<div></div>
Measure Type	Pricing Measure <div></div>

Customer Class	
Customer Class	Single Family <div></div>

Time Period	
First Year	2015

Description
CONTRACTOR MEASURE: Assumes average annual price increase of 5% for the next 25 years. Measure converts price increases to real price increases net of inflation; Annual increase must be above user set threshold (such as assuming a 2% inflation) to trigger a demand reduction.

Comments
A conservative industry estimate for 5-year rate studies and price elasticities are assumed. The pricing measure only addresses SF customers.

Planned Rate Increases			
Add Rate Increase			
Change Year	Price Incr (%)	Price Incr Adjusting for Inflation	
2015	5.0%	2.0%	Delete
2016	5.0%	2.0%	Delete
2017	5.0%	2.0%	Delete
2018	5.0%	2.0%	Delete
2019	5.0%	2.0%	Delete
2020	5.0%	2.0%	Delete
2021	5.0%	2.0%	Delete
2022	5.0%	2.0%	Delete
2023	5.0%	2.0%	Delete
2024	5.0%	2.0%	Delete
2025	5.0%	2.0%	Delete
2026	5.0%	2.0%	Delete
2027	5.0%	2.0%	Delete
2028	5.0%	2.0%	Delete
2029	5.0%	2.0%	Delete
2030	5.0%	2.0%	Delete

Results	
Average Water Savings (mgd)	
0.147878	
Lifetime Savings - Present Value (\$)	
Utility	\$329,363
Community	\$329,363
Lifetime Costs - Present Value (\$)	
Utility	\$319,813
Community	\$319,813
Benefit to Cost Ratio	
Utility	1.03
Community	1.03
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$228

Price Elasticity		
Overall	Indoor	Outdoor
-0.12	-0.05	-0.19


Utility Costs	
Rate Study Cost	\$50,000
Rate Study Frequency (every # yrs)	5
First Year of Rate Study	2021
Annual Maintenance Cost	\$10,000


Consumer Price Index	
First Year Index	100.0
Annual Increase	3%

Costs			
	Utility	Customer	Total (Community)
2015	\$10,000	\$0	\$10,000
2016	\$10,000	\$0	\$10,000
2017	\$10,000	\$0	\$10,000
2018	\$10,000	\$0	\$10,000
2019	\$10,000	\$0	\$10,000
2020	\$10,000	\$0	\$10,000

Projected Price Index		
	Price Index	Cummulative Index Increase
2015	100.0	0%
2016	103.0	3%
2017	106.1	6%
2018	109.3	9%
2019	112.6	13%
2020	115.9	16%


Water Savings	
	Total Savings (mgd)
2015	0.012720
2016	0.025491
2017	0.038312
2018	0.051182
2019	0.064102
2020	0.077070

 Public Info & School Education -	Overview								
	Name	Public Info & School Education							
	Abbr	4							
	Category	▼							
	Measure Type	Standard Measure ▼							
	Time Period		Measure Life						
	First Year	2015	Permanent	<input type="checkbox"/>					
	Last Year	2040	Years	2					
	Measure Length	26	Repeat	<input type="checkbox"/>					
	Fixture Costs								
	Utility	Customer	Fix/Acct						
SF	\$3.00	\$0.00	1						
Administration Costs									
Markup Percentage		15%							
Description									
<p>REGIONAL MEASURE: Continue with regional public information and school education campaign. School education includes: school assembly program, classroom presentations, other options for school education.</p> <p>NMWD does a lot of Public Information but SCWA handles 100% of the school education.</p>									
Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
End Uses									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pools	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments									
<p>Cost assumes SF category but impacts all customer classes. SMWSP public info budget of \$160,000 annually for all water contractors is spent on QWEL, Water Wise Gardening Online, Garden Sense, and the Eco-Friendly Garden Tour. Based on 153,770 single family accounts for water contractors in 2014, the expenditures per SF account is approximately \$1.00. SMWSP school education is \$300,000 per year for all the water contractors which equates to \$2.00 per account. The education annual budget is for 20,000 students and 24,000 curriculum materials distributed. In summary, the total cost of \$3.00 per SF account includes \$1.00 for public information and \$2.00 per SF account for school education.</p>									
Results									
Average Water Savings (mgd)									
0.025229									
Lifetime Savings - Present Value (\$)									
Utility	\$735,440								
Community	\$1,049,953								
Lifetime Costs - Present Value (\$)									
Utility	\$494,902								
Community	\$494,902								
Benefit to Cost Ratio									
Utility	1.49								
Community	2.12								
Cost of Savings per Unit Volume (\$/mg)									
Utility	\$2,066								
Savings Per Replacement									
	% Savings per Account								
SF Toilets	0.5%								
SF Faucets	0.5%								
SF Showers	0.5%								
SF Dishwashers	0.5%								
SF Clothes Washers	0.5%								
SF Baths	0.5%								
SF Internal Leakage	0.5%								
SF Irrigation	0.5%								
SF Pools	0.5%								
SF Wash Down	0.5%								
SF Car Washing	0.5%								
SF External Leakage	0.5%								
Targets									
Target Method		Percentage ▼							
% of Accts Targeted / yr		50.000%							
Only Effects New Accts		<input type="checkbox"/>							
Costs									
Measure	Summary ▼								
	Utility	Customer	Total						
2015	\$25,700	\$0	\$25,700						
2016	\$25,826	\$0	\$25,826						
2017	\$25,953	\$0	\$25,953						
2018	\$26,079	\$0	\$26,079						
2019	\$26,206	\$0	\$26,206						
2020	\$26,333	\$0	\$26,333						
Targets									
Measure	Accounts ▼								
	SF	Total							
2015	7,449	7,449							
2016	7,486	7,486							
2017	7,523	7,523							
2018	7,559	7,559							
2019	7,596	7,596							
2020	7,633	7,633							
Water Savings (mgd)									
	Total Savings (mgd)								
2015	0.012515								
2016	0.025055								
2017	0.025141								
2018	0.025229								
2019	0.025317								
2020	0.025407								



Public Info & School Education -

Overview				Customer Classes										Results									
Name		Public Info & School Education		SF		APT		CND		COM		GOV		IRR		POOL		MH		MISC		Average Water Savings (mgd)	
Abbr		5																				0.012614	
Category				<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		Lifetime Savings - Present Value (\$)	
Measure Type		Standard Measure																				Utility	
Time Period		Measure Life		<input checked="" type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		Community	
First Year		2015																				Permanent	
Last Year		2040		Years		2		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		Lifetime Costs - Present Value (\$)	
Measure Length		26		Repeat		<input type="checkbox"/>																Utility	
				<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		Community	
																						Benefit to Cost Ratio	
Fixture Costs				<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		Cost of Savings per Unit Volume (\$/mg)	
Utility		Customer																				Fix/Acct	
SF		\$2.00		\$0.00		1		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
				<input type="checkbox"/>		<input type="checkbox"/>																<input type="checkbox"/>	
Administration Costs								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
Markup Percentage		15%		<input type="checkbox"/>		<input type="checkbox"/>																<input type="checkbox"/>	
Description								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
CONTRACTOR MEASURE: Public information initiatives beyond those conducted by SMWSP. NMWD does a lot of Public Information but SCWA handles 100% of the school education.				<input type="checkbox"/>		<input type="checkbox"/>																<input type="checkbox"/>	
								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
				<input type="checkbox"/>		<input type="checkbox"/>																<input type="checkbox"/>	
								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
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								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
				<input type="checkbox"/>		<input type="checkbox"/>																<input type="checkbox"/>	
								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
				<input type="checkbox"/>		<input type="checkbox"/>																<input type="checkbox"/>	
								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
				<input type="checkbox"/>		<input type="checkbox"/>																<input type="checkbox"/>	
								<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>			
				<input type="checkbox"/>		<input type="checkbox"/>																<input type="checkbox"/>	



Prohibit Water Waste

Overview			
Name	Prohibit Water Waste		
Abbr	6		
Category			
Measure Type	Standard Measure		

Time Period		Measure Life	
First Year	2016	Permanent	<input type="checkbox"/>
Last Year	2040	Years	5
Measure Length	25	Repeat	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$50.00	\$50.00	1
APT	\$100.00	\$100.00	1
CND	\$100.00	\$100.00	1
COM	\$100.00	\$100.00	1
GOV	\$100.00	\$100.00	1
IRR	\$100.00	\$100.00	1
MH	\$100.00	\$100.00	1

Administration Costs	
Markup Percentage	50%

Description
CONTRACTOR OR REGIONAL MEASURE: Adopt or modify ordinance that prohibits the waste of water defined as gutter flooding, restrictions on watering days and failure to repair leaks in a timely manner.

Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

End Uses									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Urinals	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Faucets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Showers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dishwashers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Clothes Washers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Process	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Kitchen Spray Rinse	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Internal Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Baths	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Other	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pools	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wash Down	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Car Washing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
External Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Outdoor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Cooling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments
Utility costs based on 1 hour of staff time for residential contact and 2 hours for MF and CIL enforcement. Assume \$50 customer cost to fix irrigation water waste/leak. most visible water waste is irrigation.
Savings assumes 6% of accounts have a leak of 33 gallons per day. Assumed 1% water savings per account to be conservative. Administration cost is to cover staff to help find and investigate the water waste calls / leaks.

Results	
Average Water Savings (mgd)	
0.002023	
Lifetime Savings - Present Value (\$)	
Utility	\$56,462
Community	\$56,462
Lifetime Costs - Present Value (\$)	
Utility	\$346,659
Community	\$577,765
Benefit to Cost Ratio	
Utility	0.16
Community	0.10
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$18,041


Savings Per Replacement	
	% Savings per Account
SF Internal Leakage	1.0%
SF Irrigation	1.0%
SF External Leakage	1.0%
APT Internal Leakage	1.0%
APT Irrigation	1.0%
APT External Leakage	1.0%
CND Internal Leakage	1.0%
CND Irrigation	1.0%
CND External Leakage	1.0%
MH Internal Leakage	1.0%
MH Irrigation	1.0%
MH External Leakage	1.0%
COM Internal Leakage	1.0%
COM Irrigation	1.0%
COM External Leakage	1.0%
GOV Internal Leakage	1.0%
GOV Irrigation	1.0%
GOV External Leakage	1.0%
IRR Internal Leakage	1.0%
IRR Irrigation	1.0%
IRR External Leakage	1.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	<input type="checkbox"/>

Costs			
Year	Summary		
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$18,984	\$12,656	\$31,639
2017	\$19,085	\$12,724	\$31,809
2018	\$19,187	\$12,791	\$31,978
2019	\$19,289	\$12,859	\$32,148
2020	\$19,391	\$12,927	\$32,318

Targets									
Year	Accounts	SF	APT	CND	MH	COM	GOV	IRR	Total
2015	0	0	0	0	0	0	0	0	0
2016	150	6	31	1	8	1	4	201	
2017	150	6	32	1	8	1	4	202	
2018	151	6	32	1	8	1	4	204	
2019	152	6	32	1	8	1	4	205	
2020	153	6	32	1	9	1	4	206	

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.000000
2016	0.000431
2017	0.000865
2018	0.001302
2019	0.001741
2020	0.002183



Indoor and Outdoor Surveys - CII

Overview			
Name	Indoor and Outdoor Surveys - CII		
Abbr	7		
Category	Standard Measure		
Measure Type	Standard Measure		
Time Period		Measure Life	
First Year	2015	Permanent	<input type="checkbox"/>
Last Year	2040	Years	5
Measure Length	26	Repeat	<input type="checkbox"/>
Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$3,000.00	\$2,500.00	1
GOV	\$3,000.00	\$2,500.00	1
Administration Costs			
Markup Percentage		25%	
Description			
<p>CONTRACTOR OR REGIONAL MEASURE: Top water customers from each CI category would be offered a professional water survey that would evaluate ways for the business to save water and money. The surveys would be for targeted to large users (accounts that use more than 5,000 gallons of water per day) such as hotels, restaurants, stores and schools. Emphasis will be on supporting the top users in each customer category.</p> <p>After the free water use survey has been completed at site, SMWSP will analyze the recommendations on the provided findings report and determine if the site qualifies for a financial incentive.</p>			

Customer Classes									
	SE	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End Uses									
	SE	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Urinals				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Faucets				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Showers				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Dishwashers				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Clothes Washers				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Process				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Kitchen Spray Rinse				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Internal Leakage				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Baths				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Other				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Irrigation				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Pools				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Wash Down				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Car Washing				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
External Leakage				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Outdoor				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Cooling				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				

Results	
Average Water Savings (mgd)	0.003663
Lifetime Savings - Present Value (\$)	
Utility	\$103,629
Community	\$191,673
Lifetime Costs - Present Value (\$)	
Utility	\$173,554
Community	\$289,257
Benefit to Cost Ratio	
Utility	0.60
Community	0.66
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$4,989

Savings Per Replacement	
	% Savings per Account
COM Toilets	25.0%
COM Urinals	25.0%
COM Faucets	25.0%
COM Showers	25.0%
COM Dishwashers	25.0%
COM Clothes Washers	25.0%
COM Process	25.0%
COM Kitchen Spray Rinse	25.0%
COM Internal Leakage	25.0%
COM Other	25.0%
COM Cooling	25.0%
COM Irrigation	25.0%
COM External Leakage	25.0%
GOV Toilets	25.0%
GOV Urinals	25.0%
GOV Faucets	25.0%
GOV Showers	25.0%
GOV Dishwashers	25.0%
GOV Clothes Washers	25.0%
GOV Kitchen Spray Rinse	25.0%
GOV Internal Leakage	25.0%
GOV Other	25.0%
GOV Cooling	25.0%
GOV Irrigation	25.0%
GOV Pools	25.0%
GOV External Leakage	25.0%


Comments	
<p>Utility costs represent staff site survey time and reporting. Customer costs estimate any costs to implement survey recommendations. Overall average savings for the targeted large customers are per end use since fixture and appliance recommendations will vary. It is recommended target this program to start with the top users in the service area. (an helps to explain why the target percentage is only 1% since targeting the largest users).</p>	

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.250%
Only Effects New Accts	<input type="checkbox"/>

Costs			
	Utility	Customer	Total
2015	\$8,591	\$5,727	\$14,318
2016	\$8,670	\$5,780	\$14,450
2017	\$8,749	\$5,833	\$14,581
2018	\$8,828	\$5,885	\$14,713
2019	\$8,907	\$5,938	\$14,845
2020	\$8,986	\$5,991	\$14,977

Targets			
	COM	GOV	Total
2015	2	0	2
2016	2	0	2
2017	2	0	2
2018	2	0	2
2019	2	0	2
2020	2	0	2

Water Savings (mgd)	
Total Savings (mgd)	
2015	0.000736
2016	0.001475
2017	0.002219
2018	0.002968
2019	0.003720
2020	0.003747



Replace CII Inefficient Equipment

Overview			
Name	Replace CII Inefficient Equipment		
Abbr	8		
Category	▼		
Measure Type	Standard Measure ▼		
Time Period		Measure Life	
First Year	2018	Permanent	<input checked="" type="checkbox"/>
Last Year	2022		
Measure Length	5		
Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$3,000.00	\$3,000.00	1
GOV	\$3,000.00	\$3,000.00	1
Administration Costs			
Markup Percentage	30%		
Description			
<p>CONTRACTOR OR REGIONAL MEASURE: After undergoing a free water use survey, SMWSP will analyze the recommendations on the provided findings report and determine if the site qualifies for a financial incentive. Financial incentives will be provided after analyzing the cost benefit ratio of each proposed project. Incentives are tailored to each individual site as each site has varying water savings potentials. Incentives will be granted at the sole discretion of SMWSP while funding lasts. Program to provide rebates for a standard list of water efficient equipment. Included would be x-ray machines, icemakers, air-cooled ice machines, steamers, washers, spray valves, efficient dishwashers, replacing once through cooling, and adding conductivity controller on cooling towers.</p>			
Costs			
View:	Summary ▼		
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$18,362	\$14,125	\$32,487
2019	\$18,527	\$14,251	\$32,778
2020	\$18,691	\$14,378	\$33,069

Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End Uses									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Urinals				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Faucets				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Showers				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Dishwashers				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Clothes Washers				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Process				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Kitchen Spray Rinse				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
Internal Leakage				<input type="checkbox"/>	<input type="checkbox"/>				
Baths									
Other				<input type="checkbox"/>	<input type="checkbox"/>				
Irrigation				<input type="checkbox"/>	<input type="checkbox"/>				
Pools					<input type="checkbox"/>				
Wash Down									
Car Washing									
External Leakage				<input type="checkbox"/>	<input type="checkbox"/>				
Outdoor									
Cooling				<input type="checkbox"/>	<input type="checkbox"/>				

Comments
Estimated Utility/Customer 50/50 cost sharing. Ice machines and food steamers are new and just getting started. Limited on any water-cooled ice machines. This measure can be adjusted to incorporate any CII technology that is deemed appropriate by the program participants to allow flexibility to adapt to new technology advancements.


Results	
Average Water Savings (mgd)	0.003149
Lifetime Savings - Present Value (\$)	
Utility	\$85,797
Community	\$218,248
Lifetime Costs - Present Value (\$)	
Utility	\$80,576
Community	\$142,558
Benefit to Cost Ratio	
Utility	1.06
Community	1.53
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$2,694

Savings Per Replacement	
	% Savings per Account
COM Toilets	25.0%
COM Urinals	25.0%
COM Faucets	25.0%
COM Showers	25.0%
COM Dishwashers	25.0%
COM Clothes Washers	25.0%
COM Process	25.0%
COM Kitchen Spray Rinse	25.0%
GOV Toilets	25.0%
GOV Urinals	25.0%
GOV Faucets	25.0%
GOV Showers	25.0%
GOV Dishwashers	25.0%
GOV Clothes Washers	25.0%
GOV Kitchen Spray Rinse	25.0%

Targets	
Target Method	Percentage ▼
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Targets			
View:	Accounts ▼		
	COM	GOV	Total
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	4	1	5
2019	4	1	5
2020	4	1	5

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000000
2016	0.000000
2017	0.000000
2018	0.000789
2019	0.001580
2020	0.002375



Efficient Toilet Replacement Program - CII

Overview			
Name	Efficient Toilet Replacement P		
Abbr	9		
Category	▼		
Measure Type	Standard Measure ▼		
Time Period		Measure Life	
First Year	2015	Permanent	<input checked="" type="checkbox"/>
Last Year	2019		
Measure Length	5		
Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$150.00	\$150.00	10
GOV	\$150.00	\$150.00	10
Administration Costs			
Markup Percentage		30%	
Description			
<p>CONTRACTOR MEASURE: Efficient Toilet Replacement Program - CII. Provide a rebate or voucher for the installation of a high efficiency flushometer toilet - toilets flushing 1.28 gpf or less. Rebate amounts reflect the incremental purchase cost.</p>			
End Uses			
	SF	APT	CND
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments			
<p>Current outreach is regional and these costs are included in the public outreach measure. Form processing and check cutting are managed by the water contractor. Rebate for contractor is \$150 premium (less than 1.0 gpf) toilet purchase. The \$150 customer cost is for installation. Assumes 10 toilets per CII account. Savings are conservative and assume 50% of replaced toilets using 1.6 gpf and 50% using 3.5 gpf or more are replaced with 1.28 gpf fixtures.</p>			

Costs			
	Utility	Customer	Total
2015	\$35,737	\$27,490	\$63,227
2016	\$36,066	\$27,743	\$63,809
2017	\$36,395	\$27,996	\$64,392
2018	\$36,724	\$28,249	\$64,974
2019	\$37,053	\$28,503	\$65,556
2020	\$0	\$0	\$0


Targets			
	COM	GOV	Total
2015	16	2	18
2016	16	2	18
2017	17	2	19
2018	17	2	19
2019	17	2	19
2020	0	0	0

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.001166
2016	0.002326
2017	0.003481
2018	0.004632
2019	0.005777
2020	0.005740

Results	
Average Water Savings (mgd)	
0.005040	
Lifetime Savings - Present Value (\$)	
Utility	\$145,126
Community	\$145,126
Lifetime Costs - Present Value (\$)	
Utility	\$171,556
Community	\$303,523
Benefit to Cost Ratio	
Utility	0.85
Community	0.48
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$3,584

Savings Per Replacement	
	% Savings per Account
COM Toilets	42.0%
GOV Toilets	42.0%

Targets	
Target Method	Percentage ▼
% of Accts Targeted / yr	2.000%
Only Effects New Accts	<input type="checkbox"/>



**Urinal Rebates
- CII**


Overview			
Name	Urinal Rebates - CII		
Abbr	10		
Category	<div style="border: 1px solid black; padding: 2px;">Standard Measure</div>		
Measure Type	<div style="border: 1px solid black; padding: 2px;">Standard Measure</div>		
Time Period		Measure Life	
First Year	2016	Permanent	<input checked="" type="checkbox"/>
Last Year	2020		
Measure Length	5		
Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$150.00	\$100.00	10
GOV	\$150.00	\$100.00	10
Administration Costs			
Markup Percentage		25%	
Description			
<p>CONTRACTOR MEASURE: Provide a rebate or voucher for the installation of a high efficiency urinals. WaterSense standard is 0.5 gpf or less, though models flushing as low as 0.125 gpf (1 pint) are available and function well, so could be specified. Rebate amounts would reflect the incremental purchase cost.</p>			
End Uses			
	SF	APT	CND
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments			
<p>Rebate amount is up to \$150 per urinal. Water savings of 75% is based on replacing a 1.0 gpf or more urinal and a 0.25 gpf to 0.125 gpf (1 pint) urinal. Assumes 10 urinals per CII account. Customer cost reflects installation and fixture costs.</p>			

Results	
Average Water Savings (mgd)	0.000058
Lifetime Savings - Present Value (\$)	
Utility	\$1,669
Community	\$1,669
Lifetime Costs - Present Value (\$)	
Utility	\$4,040
Community	\$6,194
Benefit to Cost Ratio	
Utility	0.41
Community	0.27
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$7,319
Savings Per Replacement	
	% Savings per Account
COM Urinals	75.0%
GOV Urinals	75.0%
Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.050%
Only Effects New Accts	<input type="checkbox"/>

Costs			
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$867	\$462	\$1,329
2017	\$875	\$467	\$1,341
2018	\$883	\$471	\$1,354
2019	\$891	\$475	\$1,366
2020	\$899	\$479	\$1,378

Targets			
	COM	GOV	Total
2015	0	0	0
2016	4	1	5
2017	4	1	5
2018	4	1	5
2019	4	1	5
2020	4	1	5

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000000
2016	0.000016
2017	0.000032
2018	0.000047
2019	0.000062
2020	0.000076




**Plumber
Initiated UHET
& HEU Retrofit**

Overview			
Name	Plumber Initiated UHET & HEU		
Abbr	11		
Category	▼		
Measure Type	Standard Measure ▼		
Time Period		Measure Life	
First Year	2019	Permanent	<input checked="" type="checkbox"/>
Last Year	2023		
Measure Length	5		
Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$325.00	\$100.00	10
GOV	\$325.00	\$100.00	10
Administration Costs			
Markup Percentage		30%	
Description			
<p>CONTRACTOR MEASURE: Plumber Initiated High Efficiency Toilet and / or Urinal Retrofit Program. SMWSP would subsidize installation cost of a new UHET/ HEU purchased by SMWSP. Licensed plumbers, pre-qualified by SMWSP would solicit customers directly. Customers would get a new UHET and HEU installed at a discounted price.</p>			
End Uses			
	TO	APT	CND
Toilets			<input checked="" type="checkbox"/>
Urinals			<input checked="" type="checkbox"/>
Faucets			<input checked="" type="checkbox"/>
Showers			<input checked="" type="checkbox"/>
Dishwashers			<input checked="" type="checkbox"/>
Clothes Washers			<input checked="" type="checkbox"/>
Process			<input checked="" type="checkbox"/>
Kitchen Spray Rinse			<input checked="" type="checkbox"/>
Internal Leakage			<input checked="" type="checkbox"/>
Baths			<input checked="" type="checkbox"/>
Other			<input checked="" type="checkbox"/>
Irrigation			<input checked="" type="checkbox"/>
Pools			<input checked="" type="checkbox"/>
Wash Down			<input checked="" type="checkbox"/>
Car Washing			<input checked="" type="checkbox"/>
External Leakage			<input checked="" type="checkbox"/>
Outdoor			<input checked="" type="checkbox"/>
Cooling			<input checked="" type="checkbox"/>
Comments			
<p>Utility cost based on installation cost of \$325 per Carrie Pollard at SCWA provided costs. Customer cost based on the fixture cost plus reduced installation cost.</p> <p>Water savings based on the average difference between 1.0 gpf urinal and a 0.25 gpf to 0.125 gpf (1 pint) urinal and a 1.6 gpf toilet and 1.0 gpf toilet. Assumes 10 urinals or toilets per CII account.</p>			

Costs			
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$0	\$0	\$0
2019	\$40,141	\$9,501	\$49,642
2020	\$40,498	\$9,585	\$50,083


Targets		
	COM	GOV
2015	0	0
2016	0	0
2017	0	0
2018	0	0
2019	8	1
2020	9	1

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000000
2016	0.000000
2017	0.000000
2018	0.000000
2019	0.000902
2020	0.001793




Require <0.125 gal/flush Urinals in New


Overview			
Name	Require <0.125 gal/flush Urinals in		
Abbr	12		
Category	▼		
Measure Type	Standard Measure ▼		
Time Period		Measure Life	
First Year	2015	Permanent	<input checked="" type="checkbox"/>
Last Year	2040		
Measure Length	26		
Fixture Costs			
	Utility	Customer	Fix/Acct
COM	\$75.00	\$300.00	10
GOV	\$75.00	\$300.00	10
Administration Costs			
Markup Percentage	10%		
Description			
CONTRACTOR MEASURE: Require that new buildings be fitted with .125 gpf (1 pint) or less urinals rather than the current standard of 0.5 gal/flush models.			
End Uses			
	SF	APT	CND
Toilets			<input checked="" type="checkbox"/>
Urinals			<input checked="" type="checkbox"/>
Faucets			
Showers			
Dishwashers			
Clothes Washers			
Process			
Kitchen Spray Rinse			
Internal Leakage			
Baths			
Other			
Irrigation			
Pools			
Wash Down			
Car Washing			
External Leakage			
Outdoor			
Cooling			
Comments			
Utility costs of \$75 reflects inspection costs. Customer costs represent the incremental cost of the more efficient fixture.			
Savings assumes 0.5 gpf urinals are being replaced with .125 gpf urinals. Assume 10 fixtures per CII account.			
Results			
Average Water Savings (mgd)			
0.002969			
Lifetime Savings - Present Value (\$)			
Utility	\$78,450		
Community	\$78,450		
Lifetime Costs - Present Value (\$)			
Utility	\$126,879		
Community	\$588,259		
Benefit to Cost Ratio			
Utility	0.62		
Community	0.13		
Cost of Savings per Unit Volume (\$/mg)			
Utility	\$4,499		
Savings Per Replacement			
	% Savings per Account		
COM Urinals	75.0%		
GOV Urinals	75.0%		
Targets			
Target Method	Percentage ▼		
% of Accts Targeted / yr	100.000%		
Only Effects New Accts	<input checked="" type="checkbox"/>		
Costs			
View:	Summary ▼		
	Utility	Customer	Total
2015	\$6,962	\$25,316	\$32,278
2016	\$6,962	\$25,316	\$32,278
2017	\$6,962	\$25,316	\$32,278
2018	\$6,962	\$25,316	\$32,278
2019	\$6,962	\$25,316	\$32,278
2020	\$6,962	\$25,316	\$32,278
Targets			
View:	Accounts ▼		
	COM	GOV	Total
2015	8	1	8
2016	8	1	8
2017	8	1	8
2018	8	1	8
2019	8	1	8
2020	8	1	8
Water Savings (mgd)			
	Total Savings (mgd)		
2015	0.000304		
2016	0.000596		
2017	0.000876		
2018	0.001144		
2019	0.001402		
2020	0.001649		



HE Faucet Aerator / Showerhead

Overview				Customer Classes										Results	
Name		HE Faucet Aerator / Showerhead												Average Water Savings (mgd)	
Abbr		13												0.000572	
Category														Lifetime Savings - Present Value (\$)	
Measure Type		Standard Measure												Utility \$21,182	
Time Period		Measure Life												Community \$54,445	
First Year 2015		Permanent <input type="checkbox"/>												Lifetime Costs - Present Value (\$)	
Last Year 2019		Years 5												Utility \$32,992	
Measure Length 5		Repeat <input type="checkbox"/>												Community \$87,978	
Fixture Costs				End Uses										Benefit to Cost Ratio	
	Utility	Customer	Fix/Acct											Utility 0.64	
COM	\$12.00	\$25.00	10											Community 0.62	
GOV	\$12.00	\$25.00	10											Cost of Savings per Unit Volume (\$/mg)	
Administration Costs														Utility \$6,075	
Markup Percentage 25%															
Description														Savings Per Replacement	
CONTRACTOR MEASURE: High Efficiency Faucet Aerator / Showerhead Giveaway – CII. Utility would buy showerheads and faucet aerators in bulk and give them away at Utility office or community events.														% Savings per Account	
														COM Faucets 6.9%	
														COM Showers 6.9%	
														GOV Faucets 6.9%	
														GOV Showers 6.9%	
														Targets	
														Target Method Percentage	
														% of Accts Targeted / yr 5.000%	
														Only Effects New Accts <input type="checkbox"/>	
				Comments											
				Assumes 10 bathrooms per CII account. Utility cost for 1.8gpm showerhead and 1.5 gpm aerator kit is \$12. Customer cost \$25 is to repair leaks or other minor costs. Assume kits save 27.6% (reduced to be conservative) by assuming only 25% of kits are actually installed in the businesses and yield water savings. Petaluma provided actual cost data: 2.0GPM SH, 1.0 and 0.5 GPM FA. Unit cost per 1.0GPM FA - \$0.78 per 2.0GPM SH - \$3.51. Or just over \$4 per kit. The \$12 per kit cost assumes that only 25% are actually installed. (\$4 times 4 kits to obtain one installation).											
Costs				Targets						Water Savings (mgd)					
Summary				Accounts						Total Savings (mgd)					
	Utility	Customer	Total		COM	GOV	Total								
2015	\$6,873	\$11,454	\$18,327	2015	41	5	46	2015	0.000584						
2016	\$6,936	\$11,560	\$18,495	2016	41	5	46	2016	0.001173						
2017	\$6,999	\$11,665	\$18,664	2017	42	5	47	2017	0.001768						
2018	\$7,062	\$11,771	\$18,833	2018	42	5	47	2018	0.002368						
2019	\$7,126	\$11,876	\$19,002	2019	42	5	48	2019	0.002974						
2020	\$0	\$0	\$0	2020	0	0	0	2020	0.002390						

 HE Faucet Aerator / Showerhead	Overview							
	Name	HE Faucet Aerator / Showerhead Giveaway						
	Abbr	14						
	Category							
	Measure Type	Standard Measure						
	Time Period		Measure Life					
	First Year	2015	Permanent	<input type="checkbox"/>				
	Last Year	2019	Years	5				
	Measure Length	5	Repeat	<input type="checkbox"/>				
	Fixture Costs							
	Utility	Customer	Fix/Acct					
SF	\$12.00	\$25.00	2					
APT	\$12.00	\$25.00	8					
CND	\$12.00	\$25.00	8					
MH	\$12.00	\$25.00	8					
Administration Costs								
Markup Percentage		25%						
Description								
CONTRACTOR MEASURE: High Efficiency Faucet Aerator / Showerhead Giveaway - SF, MF. Utility would buy showerheads and faucet aerators in bulk and give them away at Utility office or community events. Need to coordinate this program with the School Education measure on retrofit kit giveaways to the same customer categories.								
End Uses								
	SF	APT	CND	GOV	IRR	POOL	MH	MISC
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Showers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments								
Assumes minimum 2 bathrooms per SF account and 4 units or 8 bathrooms per MF account. Utility cost for 1.8gpm showerhead and 1.5gpm aerator kit is \$12. Customer cost \$25 is to repair leaks or other minor costs. Assume kits save 27.6% (reduced to be conservative) by assuming only 25% of kits are actually installed in the homes and yield water savings.								
Results								
Average Water Savings (mgd)								
0.002147								
Lifetime Savings - Present Value (\$)								
Utility	\$79,595							
Community	\$168,469							
Lifetime Costs - Present Value (\$)								
Utility	\$86,284							
Community	\$230,090							
Benefit to Cost Ratio								
Utility	0.92							
Community	0.73							
Cost of Savings per Unit Volume (\$/mg)								
Utility	\$4,231							
Savings Per Replacement								
	% Savings per Account							
SF Faucets	6.9%							
SF Showers	6.9%							
APT Faucets	6.9%							
APT Showers	6.9%							
CND Faucets	6.9%							
CND Showers	6.9%							
MH Faucets	6.9%							
MH Showers	6.9%							
Targets								
Target Method		Percentage						
% of Accts Targeted / yr		2.000%						
Only Effects New Accts		<input type="checkbox"/>						
Costs								
	Summary							
	Utility	Customer	Total					
2015	\$18,122	\$30,203	\$48,325					
2016	\$18,211	\$30,352	\$48,563					
2017	\$18,300	\$30,501	\$48,801					
2018	\$18,390	\$30,649	\$49,039					
2019	\$18,479	\$30,798	\$49,277					
2020	\$0	\$0	\$0					
Targets								
	Accounts							
	SF	APT	CND	MH	Total			
2015	298	12	63	2	374			
2016	299	12	63	2	376			
2017	301	12	63	2	378			
2018	302	12	64	2	380			
2019	304	12	64	2	382			
2020	0	0	0	0	0			
Water Savings (mgd)								
	Total Savings (mgd)							
2015	0.002247							
2016	0.004486							
2017	0.006717							
2018	0.008943							
2019	0.011163							
2020	0.008919							



Indoor and Outdoor Surveys - SF

Overview			
Name	Indoor and Outdoor Surveys - SF, MF		
Abbr	15		
Category	<div style="border: 1px solid black; padding: 2px;"> <div style="background-color: #ccc; width: 100%;"></div> </div>		
Measure Type	Standard Measure		
Time Period		Measure Life	
First Year	2015	Permanent	<input type="checkbox"/>
Last Year	2040	Years	5
Measure Length	26	Repeat	<input type="checkbox"/>
Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$162.00	\$50.00	1
APT	\$534.00	\$50.00	1
CND	\$534.00	\$50.00	1
MH	\$534.00	\$50.00	1
Administration Costs			
Markup Percentage		30%	
Description			
<p>REGIONAL OR CONTRACTOR MEASURE: Indoor and outdoor water surveys for existing residential customers. Target those with high water use and provide a customized report to owner. May include give-away of efficient shower heads, aerators, and toilet devices. Customer leaks can go uncorrected at properties where owners are least able to pay costs of repair. These programs may require that customer leaks be repaired, with either part of the repair subsidized and/or the cost paid with revolving funds paid back with water bills over time. May also include an option to replace inefficient plumbing fixtures at low-income residences. May include adjustments to irrigation schedules on automatic irrigation controllers. Provide incentive to install pressure regulating valve on existing properties with pressure exceeding 80 psi.</p>			

Customer Classes										
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC	
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

End Uses										
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC	
Toilets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Urinals	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Faucets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Showers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Dishwashers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Clothes Washers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Process	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Kitchen Spray Rinse	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Internal Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Baths	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Other	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Pools	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Wash Down	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Car Washing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
External Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Outdoor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Cooling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Comments
<p>Utility costs for staff survey time and any giveaway devices. Customer cost reflects Utility costs for staff survey time and any giveaway devices. Customer cost reflects average cost to address report recommendations. Includes \$12 per unit for kit giveaways. Assumes 1 kit for SF and 4 kits for MF units (1 per unit not one per bathroom). Assume 5% savings for indoor suggestions and 10% savings for outdoor suggestions. Savings reflect average values since survey suggestions, device distribution and fixture and appliance recommendations and upgrades will vary.</p>

Results	
Average Water Savings (mgd)	
0.011515	
Lifetime Savings - Present Value (\$)	
Utility	\$327,964
Community	\$431,132
Lifetime Costs - Present Value (\$)	
Utility	\$557,852
Community	\$647,997
Benefit to Cost Ratio	
Utility	0.59
Community	0.67
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$5,101


Savings Per Replacement	
	% Savings per Account
SF Toilets	5.0%
SF Faucets	5.0%
SF Showers	5.0%
SF Dishwashers	5.0%
SF Clothes Washers	5.0%
SF Baths	5.0%
SF Internal Leakage	5.0%
SF Other	5.0%
SF Irrigation	10.0%
SF Pools	10.0%
SF Wash Down	10.0%
SF Car Washing	10.0%
SF External Leakage	10.0%
APT Toilets	5.0%
APT Faucets	5.0%
APT Showers	5.0%
APT Dishwashers	5.0%
APT Clothes Washers	5.0%
APT Baths	5.0%
APT Internal Leakage	5.0%
APT Other	5.0%
APT Irrigation	10.0%
APT Pools	10.0%
APT Wash Down	10.0%
APT Car Washing	10.0%
APT External Leakage	10.0%
CND Toilets	5.0%
CND Faucets	5.0%
CND Showers	5.0%
CND Dishwashers	5.0%
CND Clothes Washers	5.0%
CND Baths	5.0%
CND Internal Leakage	5.0%
CND Other	5.0%
CND Irrigation	10.0%
CND Pools	10.0%
CND Wash Down	10.0%
CND Car Washing	10.0%
CND External Leakage	10.0%
MH Toilets	5.0%
MH Faucets	5.0%
MH Showers	5.0%
MH Dishwashers	5.0%
MH Clothes Washers	5.0%
MH Internal Leakage	5.0%
MH Other	5.0%
MH Irrigation	10.0%
MH Pools	10.0%
MH Wash Down	10.0%
MH Car Washing	10.0%
MH External Leakage	10.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Costs			
Summary	Utility	Customer	Total
2015	\$28,969	\$4,681	\$33,650
2016	\$29,111	\$4,704	\$33,815
2017	\$29,254	\$4,727	\$33,981
2018	\$29,397	\$4,750	\$34,147
2019	\$29,539	\$4,773	\$34,313
2020	\$29,682	\$4,796	\$34,478


Targets					
Accounts	SF	APT	CND	MH	Total
2015	74	3	16	1	94
2016	75	3	16	1	94
2017	75	3	16	1	95
2018	76	3	16	1	95
2019	76	3	16	1	95
2020	76	3	16	1	96

Water Savings (mgd)	
Total Savings (mgd)	
2015	0.002435
2016	0.004876
2017	0.007321
2018	0.009772
2019	0.012227
2020	0.012269



Efficient Toilet Replacement Program – SF

Overview			
Name	Efficient Toilet Replacement P		
Abbr	16		
Category	<div style="border: 1px solid black; padding: 2px;"> <div></div> </div>		
Measure Type	Standard Measure		
Time Period		Measure Life	
First Year	2015		Permanent <input checked="" type="checkbox"/>
Last Year	2019		
Measure Length	5		
Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$150.00	\$150.00	2
Administration Costs			
Markup Percentage		25%	
Description			
<p>CONTRACTOR MEASURE: Provide a rebate or voucher for the installation of a ultra high efficiency toilet (UHET). UHET toilets flush 1.28 gpf or less and include dual flush technology. Rebate amounts would reflect the incremental purchase cost. Replacement program can be either a direct install or rebate program. Includes replacement of 1.6 gpf that are not well functioning.</p>			
End Uses			
	SF	APT	CND
Toilets	<input checked="" type="checkbox"/>		
Urinals			
Faucets			
Showers			
Dishwashers			
Clothes Washers			
Process			
Kitchen Spray Rinse			
Internal Leakage			
Baths			
Other			
Irrigation			
Pools			
Wash Down			
Car Washing			
External Leakage			
Outdoor			
Cooling			
Comments			
<p>Rebate for utility is \$150 premium (less than 1.0 gpf) toilet purchase. The \$150 customer cost is for installation. Assumes 2 toilets per SF account. Model water savings of 42% and cost/benefits based on MMWD provided data using an average toilet flush volume of 2.2 gpf for existing toilets (weighted average of field measured toilets Sample size=638 toilets.</p>			
Results			
Average Water Savings (mgd)			
0.003770			
Lifetime Savings - Present Value (\$)			
Utility	\$108,659		
Community	\$108,659		
Lifetime Costs - Present Value (\$)			
Utility	\$146,305		
Community	\$263,349		
Benefit to Cost Ratio			
Utility	0.74		
Community	0.41		
Cost of Savings per Unit Volume (\$/mg)			
Utility	\$4,086		
Savings Per Replacement			
		% Savings per Account	
SF Toilets	41.8%		
Targets			
Target Method		Percentage	
% of Accts Targeted / yr		0.500%	
Only Effects New Accts		<input type="checkbox"/>	
Costs			
Measure	Summary		
	Utility	Customer	Total
2015	\$30,728	\$24,582	\$55,310
2016	\$30,879	\$24,703	\$55,582
2017	\$31,031	\$24,824	\$55,855
2018	\$31,182	\$24,945	\$56,127
2019	\$31,333	\$25,067	\$56,400
2020	\$0	\$0	\$0
Targets			
Measure	Accounts		
	SF	Total	
2015	74	74	
2016	75	75	
2017	75	75	
2018	76	76	
2019	76	76	
2020	0	0	
Water Savings (mgd)			
		Total Savings (mgd)	
2015	0.000887		
2016	0.001765		
2017	0.002634		
2018	0.003494		
2019	0.004346		
2020	0.004314		



**Direct Install
UHET,
Showerheads,
and Faucet
Aerators**

Overview			
Name	Direct Install UHET, Showerheads, and Faucet Aerators		
Abbr	17		
Category	Water Conservation		
Measure Type	Standard Measure		
Time Period		Measure Life	
First Year	2019	Permanent	<input checked="" type="checkbox"/>
Last Year	2025		
Measure Length	7		
Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$325.00	\$100.00	2
APT	\$325.00	\$100.00	4
CND	\$325.00	\$100.00	4
MH	\$325.00	\$100.00	4
Administration Costs			
Markup Percentage	25%		
Description			
<p>CONTRACTOR OR REGIONAL MEASURE: Direct Install High Efficiency Toilets, Showerheads, and Faucet Aerators in Residential Buildings. Utility would subsidize installation cost of a new UHET purchased by the utility. Licensed plumbers, pre-qualified by the utility would solicit customers directly. Customers would get a new UHET and showerheads and faucet aerators installed at a discounted price.</p>			

Customer Classes										
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC	
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

End Uses										
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC	
Toilets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Urinals	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Faucets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Showers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Dishwashers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Clothes Washers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Process	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Kitchen Spray Rinse	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Internal Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Baths	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Other	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Pools	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Wash Down	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Car Washing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
External Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Outdoor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Cooling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Comments
<p>Utility cost of current "on bill payment" direct installation program From Santa Rosa costs: \$375 for one package and \$649 for two. Research for new grant direct install program costs \$530 each package. Assume one unit package includes:</p> <ul style="list-style-type: none"> • 1 UHET (0.8 gpf) Includes tank, bowl, seat, wax ring, brass bolts. • 1 Showerhead (1.5 gpm) • Bathroom aerator (up to 2) (1.5 gpm) • 1 Kitchen aerator (1.5 gpm) <p>Assume 2 units per SF acct and 4 per MF acct. Customer cost based on incremental fixture and installation costs (\$100). Toilet water savings is based on 1.6 gpf and 3.5 gpf toilets being replaced with 1.0 gpf toilets. Showerhead and faucet aerator savings based on the replacement of 2.0 gpm or more showerheads with 1.5 gpm showerheads; and 3.0 gpm or greater faucets with 1.0 gpm faucet aerators.</p>

Results	
Average Water Savings (mgd)	0.030090
Lifetime Savings - Present Value (\$)	
Utility	\$796,729
Community	\$1,386,726
Lifetime Costs - Present Value (\$)	
Utility	\$538,879
Community	\$671,526
Benefit to Cost Ratio	
Utility	1.48
Community	2.07
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,886


Savings Per Replacement	
	% Savings per Account
SF Toilets	60.0%
SF Faucets	50.0%
SF Showers	50.0%
APT Toilets	60.0%
APT Faucets	50.0%
APT Showers	50.0%
CND Toilets	60.0%
CND Faucets	50.0%
CND Showers	50.0%
MH Toilets	60.0%
MH Faucets	50.0%
MH Showers	50.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Costs			
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$0	\$0	\$0
2019	\$93,417	\$22,995	\$116,412
2020	\$93,868	\$23,106	\$116,974

Targets					
	SF	APT	CND	MH	Total
2015	0	0	0	0	0
2016	0	0	0	0	0
2017	0	0	0	0	0
2018	0	0	0	0	0
2019	76	3	16	1	95
2020	76	3	16	1	96

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000000
2016	0.000000
2017	0.000000
2018	0.000000
2019	0.006148
2020	0.012260



Overview			
Name	HE Clothes Washer Rebate - SF, MF		
Abbr	18		
Category			
Measure Type	Standard Measure		

Time Period	
First Year	2015
Last Year	2019
Measure Length	5

Measure Life	
Permanent	<input checked="" type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$125.00	\$675.00	1
APT	\$125.00	\$675.00	1
CND	\$125.00	\$675.00	1
MH	\$125.00	\$675.00	1

Administration Costs	
Markup Percentage	25%

Description
CONTRACTOR MEASURE: Provide a rebate for efficient washing machines to residential customers. It is assumed that the rebates would remain consistent with relevant state and federal regulations (Department of Energy, Energy Star) and only offer the best available technology.

Costs			
Year	Utility	Customer	Total
2015	\$29,257	\$126,390	\$155,647
2016	\$29,401	\$127,013	\$156,414
2017	\$29,545	\$127,635	\$157,181
2018	\$29,689	\$128,258	\$157,947
2019	\$29,833	\$128,881	\$158,714
2020	\$0	\$0	\$0

Targets					
Year	SF	APT	CND	MH	Total
2015	149	6	31	1	187
2016	150	6	31	1	188
2017	150	6	32	1	189
2018	151	6	32	1	190
2019	152	6	32	1	191
2020	0	0	0	0	0

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.003347
2016	0.006705
2017	0.010067
2018	0.013423
2019	0.016768
2020	0.016705

Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>


End Uses									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments
Current outreach is regional and these costs are included in the public outreach measure. Form processing and check cutting are managed by the water contractor. Water savings is based on difference between a 34 gallon per load machine compared to a 12 gallon per load CEE Tier 3 machine. Rebate of \$125/unit based on current average rebate amount among water contractors. Customer costs include installation.

Results	
Average Water Savings (mgd)	
0.013044	
Lifetime Savings - Present Value (\$)	
Utility	\$383,374
Community	\$954,245
Lifetime Costs - Present Value (\$)	
Utility	\$139,302
Community	\$741,087
Benefit to Cost Ratio	
Utility	2.75
Community	1.29
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,125


Savings Per Replacement	
	% Savings per Account
SF Clothes Washers	64.7%
APT Clothes Washers	64.7%
CND Clothes Washers	64.7%
MH Clothes Washers	64.7%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	<input type="checkbox"/>



Submeters Incentive

Overview			
Name	Submeters Incentive		
Abbr	19		
Category	▼		
Measure Type	Standard Measure ▼		
Time Period		Measure Life	
First Year	2020	Permanent	<input checked="" type="checkbox"/>
Last Year	2040		
Measure Length	21		
Fixture Costs			
	Utility	Customer	Fix/Acct
APT	\$150.00	\$50.00	100
CND	\$150.00	\$50.00	100
MH	\$150.00	\$50.00	100
Administration Costs			
Markup Percentage		25%	
Description			
<p>CONTRACTOR MEASURE: Require or provide a partial cost rebate to meter all remaining mobile home parks that are currently master metered but not separately metered.</p> <p>Provide a rebate (per unit) to assist MF building owners installing submeters on each existing individual apartment or condominium unit.</p> <p>Provide a rebate (per unit) to assist MF building owners installing submeters on each new individual apartment unit.</p> <p>Require the submetering of individual units in new multi-family, condos, townhouses, and mobile-home parks.</p>			
Customer Classes			
	SF	APT	CND
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	COM	GOV	IRR
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	POOL	MH	MISC
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
End Uses			
	Toilets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Urinals	<input type="checkbox"/>	<input type="checkbox"/>
	Faucets	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Showers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Dishwashers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Clothes Washers	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Process	<input type="checkbox"/>	<input type="checkbox"/>
	Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>
	Internal Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Baths	<input type="checkbox"/>	<input type="checkbox"/>
	Other	<input type="checkbox"/>	<input type="checkbox"/>
	Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Pools	<input type="checkbox"/>	<input type="checkbox"/>
	Wash Down	<input type="checkbox"/>	<input type="checkbox"/>
	Car Washing	<input type="checkbox"/>	<input type="checkbox"/>
	External Leakage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Outdoor	<input type="checkbox"/>	<input type="checkbox"/>
	Cooling	<input type="checkbox"/>	<input type="checkbox"/>
Comments			
<p>Estimated \$150 utility cost and \$50 customer cost per meter. Assume 100 dwelling units (mobile homes) per account. DU = dwelling unit (i.e., mobile home). The target/participation rate of 0.1% assumes 1 property per 1,000 MF accounts. This is up to \$15,000 per customer.</p> <p>Consider patterning after Santa Clara Valley Water District program. http://www.valleywater.org/Programs/SubmeterRebateProgram.aspx</p>			
Results			
Average Water Savings (mgd)			
0.001705			
Lifetime Savings - Present Value (\$)			
Utility	\$41,865		
Community	\$70,082		
Lifetime Costs - Present Value (\$)			
Utility	\$1,039,940		
Community	\$1,317,257		
Benefit to Cost Ratio			
Utility	0.04		
Community	0.05		
Cost of Savings per Unit Volume (\$/mg)			
Utility	\$64,223		
Savings Per Replacement			
	% Savings per Account		
APT Toilets	15.0%		
APT Faucets	15.0%		
APT Showers	15.0%		
APT Dishwashers	15.0%		
APT Clothes Washers	15.0%		
APT Internal Leakage	15.0%		
APT Irrigation	15.0%		
APT External Leakage	15.0%		
CND Toilets	15.0%		
CND Faucets	15.0%		
CND Showers	15.0%		
CND Dishwashers	15.0%		
CND Clothes Washers	15.0%		
CND Internal Leakage	15.0%		
CND Irrigation	15.0%		
CND External Leakage	15.0%		
MH Toilets	15.0%		
MH Faucets	15.0%		
MH Showers	15.0%		
MH Dishwashers	15.0%		
MH Clothes Washers	15.0%		
MH Internal Leakage	15.0%		
MH Irrigation	15.0%		
MH External Leakage	15.0%		
Targets			
Target Method		Percentage ▼	
% of Accts Targeted / yr		0.100%	
Only Effects New Accts		<input type="checkbox"/>	
Costs			
Measure	Summary ▼		
	Utility	Customer	Total
2015	\$0	\$0	\$0
2016	\$0	\$0	\$0
2017	\$0	\$0	\$0
2018	\$0	\$0	\$0
2019	\$0	\$0	\$0
2020	\$73,507	\$19,602	\$93,109
Targets			
Measure	Accounts ▼		
	APT	CND	MH
2015	0	0	0
2016	0	0	0
2017	0	0	0
2018	0	0	0
2019	0	0	0
2020	1	3	0
Water Savings (mgd)			
	Total Savings (mgd)		
2015	0.000000		
2016	0.000000		
2017	0.000000		
2018	0.000000		
2019	0.000000		
2020	0.000205		



Landscape Rebates and Incentives for

Overview			
Name	Landscape Rebates and Incentives for Equipment Upgrade		
Abbr	21		
Category			
Measure Type	Standard Measure		

Time Period	Measure Life
First Year	2015
Last Year	2019
Measure Length	5

Permanent	Years	Repeat
<input type="checkbox"/>	10	<input type="checkbox"/>

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$250.00	\$250.00	1
APT	\$250.00	\$250.00	1
CND	\$250.00	\$250.00	1
COM	\$1,000.00	\$500.00	1
GOV	\$1,000.00	\$500.00	1
IRR	\$1,000.00	\$500.00	1
MH	\$250.00	\$250.00	1

Administration Costs	
Markup Percentage	25%

Description
CONTRACTOR MEASURE: For SF, MF, CII, and IRR customers with landscape, provide a Smart Landscape Rebate Program with rebates for substantive landscape retrofits or installation of water efficient upgrades; Rebates contribute towards the purchase and installation of water-wise plants, compost, mulch and selected types of irrigation equipment upgrades including: Large Rainwater Catchment Systems, Rain Barrels, Rain Sensors, Rotating Sprinkler Nozzles, Drip Irrigation Equipment, Weather Based Irrigation Controllers and Gray Water Systems.

Costs			
Year	Utility	Customer	Total
2015	\$74,920	\$53,374	\$128,294
2016	\$75,362	\$53,666	\$129,028
2017	\$75,804	\$53,958	\$129,762
2018	\$76,246	\$54,250	\$130,496
2019	\$76,688	\$54,542	\$131,230
2020	\$0	\$0	\$0

Customer Classes										
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

End Uses										
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC	
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Comments
Rebate amounts based on Santa Rosa's current rebate program. Customer costs assume average installation costs and incremental equipment purchase costs. Average savings of 15% assumed since savings can range from 5%-25% per equipment upgrade. This program can potentially be modified to just target the larger accounts.


Targets									
Year	SF	APT	CND	MH	COM	GOV	IRR	Total	
2015	149	6	31	1	8	1	4	200	
2016	150	6	31	1	8	1	4	201	
2017	150	6	32	1	8	1	4	202	
2018	151	6	32	1	8	1	4	204	
2019	152	6	32	1	8	1	4	205	
2020	0	0	0	0	0	0	0	0	

Results	
Average Water Savings (mgd)	
0.009756	
Lifetime Savings - Present Value (\$)	
Utility	\$336,527
Community	\$336,527
Lifetime Costs - Present Value (\$)	
Utility	\$357,387
Community	\$611,784
Benefit to Cost Ratio	
Utility	0.94
Community	0.55
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$3,857

Savings Per Replacement	
	% Savings per Account
SF Irrigation	15.0%
APT Irrigation	15.0%
CND Irrigation	15.0%
MH Irrigation	15.0%
COM Irrigation	15.0%
GOV Irrigation	15.0%
IRR Irrigation	15.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	1.000%
Only Effects New Accts	<input type="checkbox"/>

Water Savings (mgd)	
Year	Total Savings (mgd)
2015	0.005011
2016	0.010053
2017	0.015126
2018	0.020230
2019	0.025366
2020	0.025366



**Turf Removal -
MF, CII**

Overview			
Name	Turf Removal - MF, CII		
Abbr	22		
Category			
Measure Type	Standard Measure		

Time Period		Measure Life	
First Year	2015	Permanent	<input checked="" type="checkbox"/>
Last Year	2024		
Measure Length	10		

Fixture Costs			
	Utility	Customer	Fix/Acct
APT	\$2,500.00	\$20,000.00	1
CND	\$2,500.00	\$20,000.00	1
COM	\$2,500.00	\$20,000.00	1
GOV	\$2,500.00	\$20,000.00	1
IRR	\$2,500.00	\$20,000.00	1
MH	\$2,500.00	\$20,000.00	1

Administration Costs	
Markup Percentage	30%

Description
CONTRACTOR MEASURE: Provide a per square foot incentive to remove turf and replace with low water use plants or hardscape. Rebate is based on price per square foot removed, and capped at an upper limit for multi-family or commercial residence.

Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

End Uses									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments
Utility costs assumes \$0.5 per sf per site with an max of 5,000 square-feet replacement reimbursement (per Santa Rosa's current program). Customer costs include incremental landscape square-footage development costs and installation costs. Possible allow permeable landscape.
Savings assume more than 50% of turf replaced with low water-using plants.

Results	
Average Water Savings (mgd)	
0.004995	
Lifetime Savings - Present Value (\$)	
Utility	\$137,549
Community	\$137,549
Lifetime Costs - Present Value (\$)	
Utility	\$300,720
Community	\$2,151,306
Benefit to Cost Ratio	
Utility	0.46
Community	0.06
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$6,339


Savings Per Replacement	
	% Savings per Account
APT Irrigation	25.0%
CND Irrigation	25.0%
MH Irrigation	25.0%
COM Irrigation	25.0%
GOV Irrigation	25.0%
IRR Irrigation	25.0%

Targets	
Target Method	Percentage
% of Accts Targeted / yr	0.200%
Only Effects New Accts	<input type="checkbox"/>

Costs			
	Utility	Customer	Total
2015	\$33,401	\$205,547	\$238,948
2016	\$33,604	\$206,792	\$240,396
2017	\$33,806	\$208,038	\$241,845
2018	\$34,009	\$209,284	\$243,293
2019	\$34,211	\$210,530	\$244,741
2020	\$34,414	\$211,776	\$246,189

Targets							
	APT	CND	MH	COM	GOV	IRR	Total
2015	1	6	0	2	0	1	10
2016	1	6	0	2	0	1	10
2017	1	6	0	2	0	1	10
2018	1	6	0	2	0	1	10
2019	1	6	0	2	0	1	11
2020	1	6	0	2	0	1	11

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.000584
2016	0.001173
2017	0.001767
2018	0.002366
2019	0.002970
2020	0.003578



Turf Removal - SF

Overview			
Name	Turf Removal - SF		
Abbr	23		
Category	▼		
Measure Type	Standard Measure ▼		

Time Period		Measure Life	
First Year	2015	Permanent	<input checked="" type="checkbox"/>
Last Year	2024		
Measure Length	10		

Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$250.00	\$2,000.00	1

Administration Costs	
Markup Percentage	30%

Description
CONTRACTOR MEASURE: Provide a per square foot incentive to remove turf and replace with low water use plants or permeable hardscape. Rebate based on dollars per square foot removed and capped at an upper limit for single family residences.

Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

End Uses									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets	<input type="checkbox"/>								
Urinals	<input type="checkbox"/>								
Faucets	<input type="checkbox"/>								
Show ers	<input type="checkbox"/>								
Dishw ashers	<input type="checkbox"/>								
Clothes Washers	<input type="checkbox"/>								
Process	<input type="checkbox"/>								
itchen Spray Rinse	<input type="checkbox"/>								
Internal Leakage	<input type="checkbox"/>								
Baths	<input type="checkbox"/>								
Other	<input type="checkbox"/>								
Irrigation	<input checked="" type="checkbox"/>								
Pools	<input type="checkbox"/>								
Wash Down	<input type="checkbox"/>								
Car Washing	<input type="checkbox"/>								
External Leakage	<input type="checkbox"/>								
Outdoor	<input type="checkbox"/>								
Cooling	<input type="checkbox"/>								

Comments
Utility costs assume based on Santa Rosa program, rebate is \$.50 per sf, max is \$250 and 500 sf. replacement reimbursement per Santa Rosa's current program. Santa Rosa assumes: 75% removed for residential. Customer costs include incremental landscape square-footage development costs and installation costs. Possible allow permeable landscape.
Savings assume more than 100% of turf replaced with low water-using plants.

Results	
Average Water Savings (mgd)	0.013740
Lifetime Savings - Present Value (\$)	
Utility	\$378,524
Community	\$378,524
Lifetime Costs - Present Value (\$)	
Utility	\$216,936
Community	\$1,551,927
Benefit to Cost Ratio	
Utility	1.74
Community	0.24
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$1,663


Savings Per Replacement	
	% Savings per Account
SF Irrigation	15.0%

Targets	
Target Method	Percentage ▼
% of Accts Targeted / yr	0.500%
Only Effects New Accts	<input type="checkbox"/>

Costs			
	Utility	Customer	Total
2015	\$24,210	\$148,983	\$173,193
2016	\$24,329	\$149,717	\$174,046
2017	\$24,448	\$150,451	\$174,899
2018	\$24,568	\$151,185	\$175,752
2019	\$24,687	\$151,919	\$176,605
2020	\$24,806	\$152,652	\$177,459

Targets		
	SF	Total
2015	74	74
2016	75	75
2017	75	75
2018	76	76
2019	76	76
2020	76	76

Water Savings (mgd)	
	Total Savings (mgd)
2015	0.001630
2016	0.003267
2017	0.004913
2018	0.006567
2019	0.008228
2020	0.009898



Water Conserving Landscape

Overview			
Name	Water Conserving Landscape and Irrigation Codes		
Abbr	24		
Category			
Measure Type	Standard Measure		
Time Period	Measure Life		
First Year	2015		
Last Year	2040		
Measure Length	26		
Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$100.00	\$500.00	1
APT	\$100.00	\$1,000.00	1
CND	\$100.00	\$1,000.00	1
COM	\$100.00	\$1,000.00	1
GOV	\$100.00	\$1,000.00	1
IRR	\$100.00	\$1,000.00	1
MH	\$100.00	\$1,000.00	1
Administration Costs			
Markup Percentage	25%		
Description			
CONTRACTOR MEASURE: Develop and enforce Water Efficient Landscape Design Standards. Standards specify that development projects subject to design review be landscaped according to climate appropriate principals, with appropriate turf ratios, plant selection, efficient irrigation systems and smart irrigation controllers. The ordinance could require certification of landscape professionals.			
Costs			
Summary	Utility	Customer	Total
2015	\$13,066	\$67,837	\$80,903
2016	\$13,066	\$67,837	\$80,903
2017	\$13,066	\$67,837	\$80,903
2018	\$13,066	\$67,837	\$80,903
2019	\$13,066	\$67,837	\$80,903
2020	\$13,066	\$67,837	\$80,903

Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

End Uses									
	%	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets	1								
Urinals									
Faucets	1								
Showers	1								
Dishwashers	1								
Clothes Washers	1								
Process									
Kitchen Spray Rinse									
Internal Leakage	1								
Baths	1								
Other	1								
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pools	1								
Wash Down	1								
Car Washing	1								
External Leakage	1								
Outdoor	1								
Cooling									


Comments
All new accounts apply and those that require a landscape permit. Utility cost is an inspection cost. Customer cost assumes incremental cost to comply versus install typical all-turf landscape.

Targets	
Target Method	Percentage
% of Accts Targeted / yr	100.000%
Only Effects New Accts	<input checked="" type="checkbox"/>

Results	
Average Water Savings (mgd)	
0.038724	
Lifetime Savings - Present Value (\$)	
Utility	\$1,006,375
Community	\$1,006,375
Lifetime Costs - Present Value (\$)	
Utility	\$210,732
Community	\$1,315,311
Benefit to Cost Ratio	
Utility	4.78
Community	0.77
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$573

Savings Per Replacement	
% Savings per Account	
APT Irrigation	15.0%
CND Irrigation	15.0%
MH Irrigation	15.0%
COM Irrigation	15.0%
GOV Irrigation	15.0%
IRR Irrigation	15.0%
SF Irrigation	15.0%

Water Savings (mgd)	
Total Savings (mgd)	
2015	0.003097
2016	0.006194
2017	0.009292
2018	0.012389
2019	0.015486
2020	0.018583



Require Smart Irrigation Controllers

Overview			
Name	Require Smart Irrigation Controllers and Rain Sensors in New Development		
Abbr	25		
Category			
Measure Type	Standard Measure		
Time Period		Measure Life	
First Year	2015	Permanent	<input checked="" type="checkbox"/>
Last Year	2040		
Measure Length	26		
Fixture Costs			
	Utility	Customer	Fix/Acct
SF	\$100.00	\$750.00	1
APT	\$100.00	\$750.00	1
CND	\$100.00	\$750.00	1
COM	\$100.00	\$750.00	3
GOV	\$100.00	\$750.00	3
MH	\$100.00	\$750.00	1
Administration Costs			
Markup Percentage	10%		
Description			
<p>CONTRACTOR MEASURE: Require Weather Adjusting Smart Irrigation Controllers per Cal Green on New Development. It is optional to require Rain Sensors in Cal Green for New Development. Require developers for all properties of greater than four residential units and all commercial development to install the weather based irrigation controllers. May require landscaper training.</p>			
Costs			
Year	Utility	Customer	Total
2015	\$12,930	\$88,159	\$101,089
2016	\$12,930	\$88,159	\$101,089
2017	\$12,930	\$88,159	\$101,089
2018	\$12,930	\$88,159	\$101,089
2019	\$12,930	\$88,159	\$101,089
2020	\$12,930	\$88,159	\$101,089

Customer Classes									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
End Uses									
	SF	APT	CND	COM	GOV	IRR	POOL	MH	MISC
Toilets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Urinals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faucets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Showers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dishwashers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clothes Washers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kitchen Spray Rinse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internal Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash Down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Car Washing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
External Leakage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Outdoor Cooling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comments									
<p>Customer cost assumes \$700 device unit cost (per RainBird ITC-LX) and \$50 unit installation cost per controller with 3 controllers needed for large sites. Utility cost reflects inspection costs.</p> <p>Savings used in BAWSCA analysis. Valencia Water Company weather-based irrigation controller pilot study in 2014 concluded 15% irrigation savings.</p>									
Targets									
Year	SF	APT	CND	MH	COM	GOV	Total		
2015	73	3	15	1	8	1	101		
2016	73	3	15	1	8	1	101		
2017	73	3	15	1	8	1	101		
2018	73	3	15	1	8	1	101		
2019	73	3	15	1	8	1	101		
2020	73	3	15	1	8	1	101		

Results	
Average Water Savings (mgd)	0.025848
Lifetime Savings - Present Value (\$)	
Utility	\$674,045
Community	\$674,045
Lifetime Costs - Present Value (\$)	
Utility	\$211,476
Community	\$1,653,355
Benefit to Cost Ratio	
Utility	3.19
Community	0.41
Cost of Savings per Unit Volume (\$/mg)	
Utility	\$862
Savings Per Replacement	
	% Savings per Account
SF Irrigation	15.0%
APT Irrigation	15.0%
CND Irrigation	15.0%
MH Irrigation	15.0%
COM Irrigation	15.0%
GOV Irrigation	15.0%
Targets	
Target Method	Percentage
% of Accts Targeted / yr	100.000%
Only Effects New Accts	<input checked="" type="checkbox"/>
Water Savings (mgd)	
Total Savings (mgd)	
2015	0.002137
2016	0.004275
2017	0.006412
2018	0.008549
2019	0.010686
2020	0.012824

APPENDIX E - LIST OF CONTACTS

The following table presents each Water Contractor's contact information.

Water Contractor	Name	Phone Number	E-mail	Role
City of Cotati	Damien O'Bid	707-665-3620	dobid@cotaticity.org	City Engineer/Public Works Director
City of Petaluma	Nick Crump	707-778-4487	ncrump@ci.petaluma.ca.us	Environmental Services Technician
	Leah Walker	707-778-4583	lwalker@ci.petaluma.ca.us	Environmental Services Manager
City of Rohnert Park	Mary Grace Pawson	707-588-2234	mpawson@rpcity.org	City Engineer
City of Santa Rosa	Rocky Vogler	707-543-3938	rvogler@srcity.org	Senior Water Resources Planner
	Teresa Gudino	707-543-3942	tgudino@srcity.org	Water Resources Analyst
City of Sonoma	Dan Takasugi	707-933-2230	dtakasugi@sonomacity.org	City Engineer/Public Works Director
	Steve MacCarthy	707-933-2231	steve@sonomacity.org	Water System Supervisor
	Mike Brett	707-933-2247	mbrett@sonomacity.org	Water Conservation Specialist
Marin Municipal Water District	Carl Gowan	415-945-1577	cgowan@marinwater.org	Principal Engineer
	Mike Ban	415-945-1435	mban@marinwater.org	Environmental & Engineering Services Manager
	Oreen Delgado	415-945-1425	odelgado@marinwater.org	Finance Manager
	Dan Carney	415-945-1522	dcarney@marinwater.org	Water Conservation Manager
	Alex Anaya	415-945-1588	aanaya@marinwater.org	Engineering Technician
	Lucy Croy	415-945-1590	lcroy@marinwater.org	Assistant Engineer
North Marin Water District	Chris DeGabriele	415-761-8905	cdegrabriele@nmwd.com	General Manager
	Ryan Grisso	415-761-8933	rgrisso@nmwd.com	Water Conservation Coordinator
	Drew McIntyre	415-761-8912	drewm@nmwd.com	Chief Engineer
Town of Windsor	James M Smith	707-838-5343	jmsmith@Townofwindsor.com	Senior Civil Engineer
	Paul Piazza	707-838-5357	ppiazza@Townofwindsor.com	Management Analyst/ Water Conservation Analyst
	Toni Bertolero	707-838-5978	tbertolero@townofwindsor.com	Town Engineer/Public Works Director
	Mike Cave	707-838-5329	mcave@townofwindsor.com	Utility Systems Superintendent

Water Contractor	Name	Phone Number	E-mail	Role
Valley of the Moon Water District	Daniel Muelrath	707-996-1037	dmuelrath@vomwd.com	General Manager
	Shari Walk	707-996-1037	swalk@vomwd.com	Admin & Finance Manager
Maddaus Water Management	Michelle Maddaus	925-831-0194	michelle@maddauswater.com	MWM Project Manager

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All legal boundaries and names are as of January 1, 2010. The boundaries shown on this map are for Census Bureau statistical data collection and tabulation purposes only; their depiction and designation for statistical purposes does not constitute a determination of jurisdictional authority or rights of ownership by or for the State.

Geographic Vantage 2010 Census Inference date: January 1, 2010
Data Source: U.S. Census Bureau's MAINTENANCE database (TIGER/Line)
Map Created by Geographic Division April 02, 2011

U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau

PARENT SHEET 11

6	7
10	11
16	17

Key to Shading

- Total Sheets: 44
- Index Sheets: 1
- Parent Sheets: 38
- Inset Sheets: 5

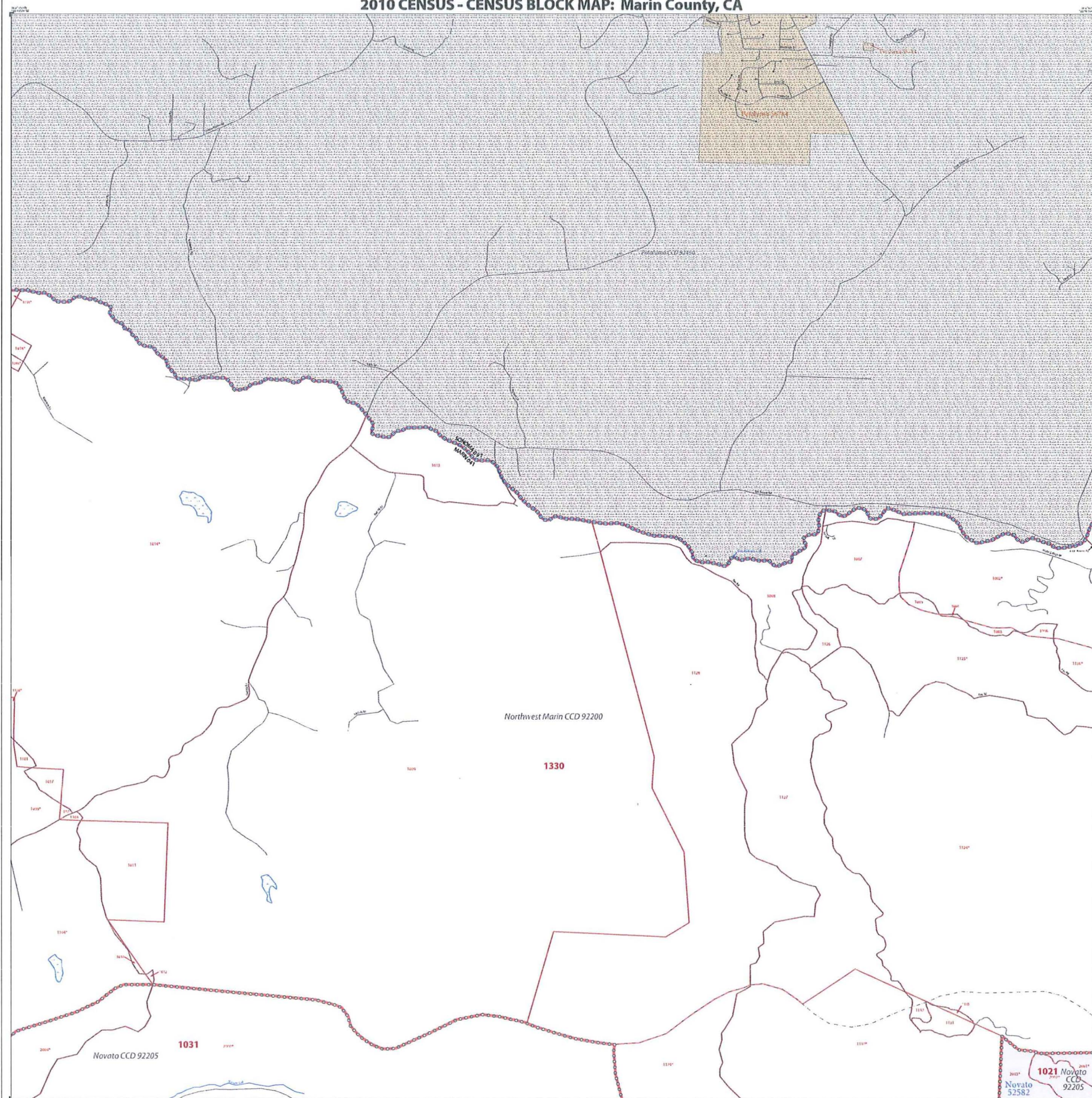
NAME: Marin County (041)

ENTITY TYPE: County not statistically equivalent entity

ST: California (06)

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2010 CENSUS - CENSUS BLOCK MAP: Marin County, CA



LEGEND

SYMBOL DESCRIPTION	SYMBOL	SYMBOL DESCRIPTION	SYMBOL
International	*****	CANADA	
Federal American Indian Reservation	*****	L'ANSE RESVN 1880	
Off Reservation Trust Land (Marine Reserve Land)	*****	T1880	
Alaska Native Village (Native Village)	*****	NGW OTSA 2690	
American Indian Tribal (Native Village)	*****	EAGLE NEST DIST 200	
State American Indian Reservation	*****	Tama Resvn 5400	
State Designated Tribal (Native Village)	*****	Lumbee SDISA 9815	
Alaska Native Regional Corporation	*****	NANA ANRC 52120	
State (or statistically equivalent area)	*****	NEW YORK 36	
County (or statistically equivalent area)	*****	MONTGOMERY 031	
Minor Civil Division (MCD)	*****	Bristol town 07485	
County (or statistically equivalent area)	*****	Hanna CCD 91650	
Consolidated City	*****	MILFORD 47500	
Incorporated Place	*****	Davis 18100	
Census Designated Place (CDP)	*****	Indian Village 43400	
Census Tract	*****	33.07	
Census Block	*****	33.07	

DESCRIPTION SYMBOL

Interstate	*****
U.S. Highway	*****
State Highway	*****
Other Road	*****
Waterway	*****
Canal	*****
Waterway (or other)	*****
Railroad	*****
Power Line	*****
Edge of Forest	*****
Property Line	*****
Political Boundary	*****
Political Boundary (or other)	*****

DESCRIPTION SYMBOL

Geographic Label (or other)	*****
Water Body	*****
Geographic Label (or other)	*****
Geographic Label (or other)	*****
Geographic Label (or other)	*****
Geographic Label (or other)	*****
Geographic Label (or other)	*****
Geographic Label (or other)	*****
Geographic Label (or other)	*****
Geographic Label (or other)	*****
Geographic Label (or other)	*****

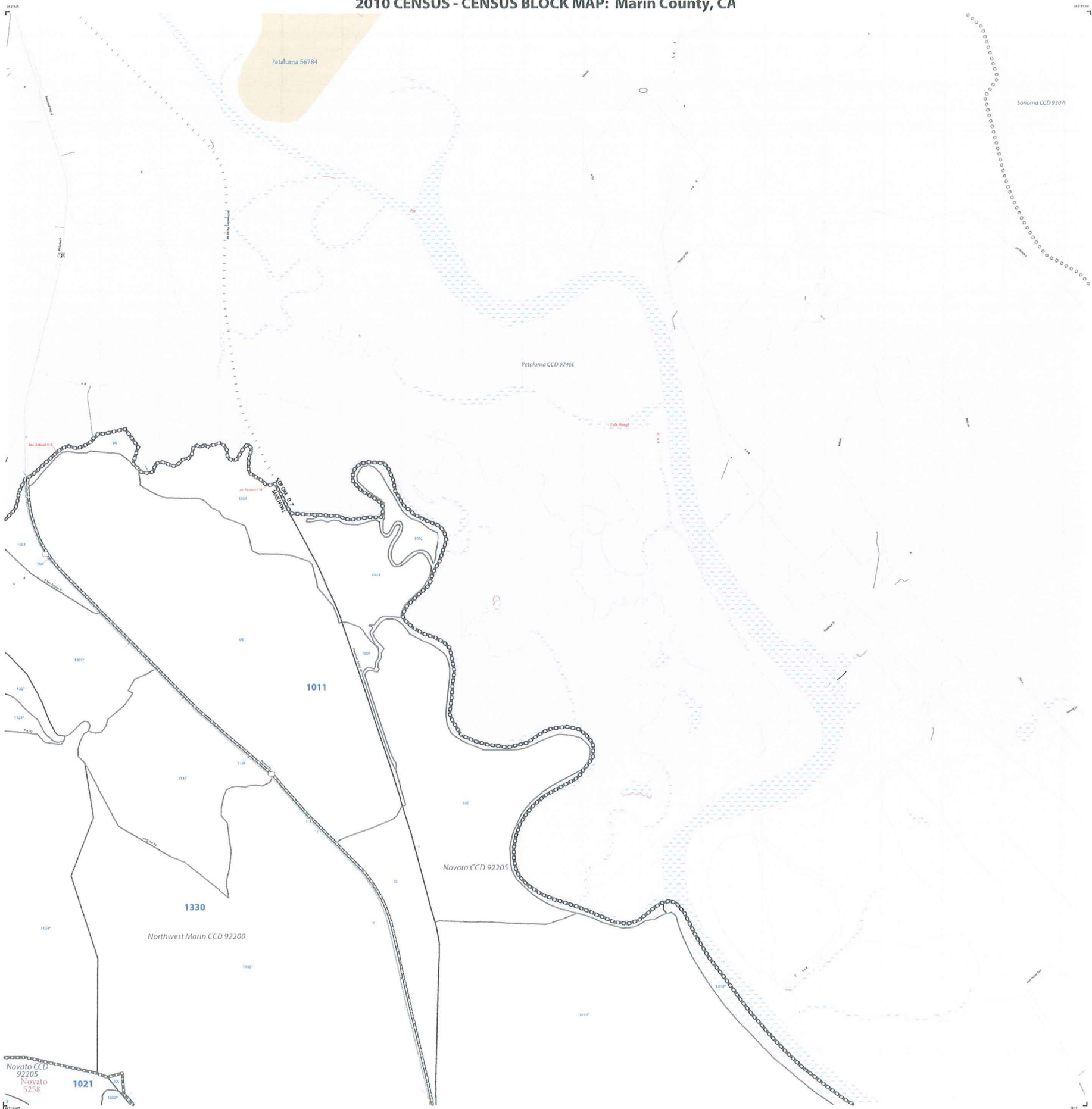
Where state, county, and/or MCD/VCD boundaries coincide, the map shows the boundary symbol for only the highest ranking of these boundaries. Where American Indian reservation and American Indian tribal subreservation boundaries coincide, the map shows only the American Indian reservation boundary. Where Oklahoma tribal statistical area boundaries and American Indian tribal subreservation boundaries coincide, the map shows only the Oklahoma tribal statistical area boundaries.

1 A " " following an MCD name denotes a false MCD. A " " following a place name indicates that a false MCD exists with the same name and FIPS code as the place; the false MCD has the next choice.

2 Place label color correlates to the place fill color.

3 A " " following a block number indicates that the block number is repeated elsewhere in the block.

2010 CENSUS - CENSUS BLOCK MAP: Marin County, CA



SYMBOL	ENTITY
International	CANADA
Federal American Indian reservation	L'ANSE RESVN 1880
Old Reservation Trust Land, Reservation Trust Land	T1880
County of the National Area, County of the National Area, Total Designated Area	CAW OFSA 5690
American Indian Tribal Subdivision	JAGLENEST DIST 200
Reservation	Tama Resvn 9400
State Designated Tribal	umbee SDTSA 9815
Alaska Native Regional Corporation	NANA ANRC 52120
State (or statistically equivalent entity)	NEW YORK 36
County (or statistically equivalent entity)	MONTGOMERY 031
Mass County Library (MCD)	Bristol town 07485
Mass County Library (MCD)	Hanna CCD 91650
Consolidated City	MILFORD 47500
Incorporated Place	Davis 18100
Consolidated Place (CDP) 2	Indiana Village 35100
Census Tr	33.07
Census Block	3012

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
Interstate		Water Body	
U.S. Highway		Transportation	
State Highway		Transportation	
Local Road		Transportation	
Circle		Transportation	
Highway		Transportation	
Pipeline		Transportation	
Property Line		Transportation	
Perennial Stream		Transportation	
Seasonal Stream		Transportation	
Interstate Boundary		Transportation	

Where state, county, and/or MCD boundaries outside the map show the boundary symbol for only the highest ranking of these boundaries. Where American Indian reservation and American Indian tribal subdivision boundaries coincide, the map shows only the American Indian reservation boundaries. Where Oklahoma tribal statistical area boundaries and American Indian tribal subdivision boundaries coincide, the map shows only the Oklahoma tribal statistical area boundaries.

1. A " " following an MCD name denotes a false MCD. A " " following a place name indicates that a true MCD exists with the same name and is not shown as the place, the false MCD label is not shown.

2. Place label color correlates to the place fill color.

3. A " " following a block number indicates that the block number is repeated elsewhere in the block.

All legal boundaries and names are as of January 1, 2010. The boundaries shown on this map are for Census Bureau statistical data collection and tabulation purposes only; their depiction and designation for statistical purposes does not constitute a determination of jurisdictional authority or rights of ownership or entitlement.

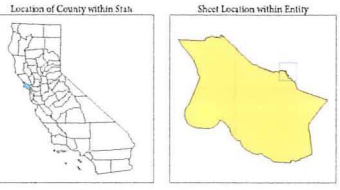
Geographic features: civil features (reference only); January 1, 2010
Data Source: U.S. Census Bureau's TIGER/Line database (TIGER/Line)
Map Created by: Geography Division, April 12, 2011
U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau

Section: Marin Local Area Geo's
Origin: 101010
Type: 101010
1st Standard Parallel: 34 06 27
2nd Standard Parallel: 42 23 23
Central Meridian: 114 18 20
Latitude of Projection Origin: 32 31 43
False Easting: 0
False Northing: 0



Key to Sheet
14
15
16
17

PARENT S
Total Sheets: 41
Index Sheets: 38
Inset Sheets: 5



NAME: Marin County (041)
ENTITY TYPE: County or statistically equivalent entity
ST: California (06)

Geographic Information System
CENSUS BLOCK MAP PARENT: CA
2011

[illegible]

Figure 1 consists of two maps. The left map, titled 'Location of County within State', shows the state of California with its county boundaries. San Diego County is highlighted in the southern part of the state. The right map, titled 'Shet Location within Entity', shows the San Diego County area with its internal divisions. A small square region within the county is highlighted, representing the Shet location.

Geographic Unit: 100 Block Map Series
2014 CENSUS BLOCK MAP (PARENT) - Core
7/1/2014 11:17

Projection: Albers Equal Area Conic
Datum: NAD 83
Spheroid: GRS 80
1st Standard Parallel: 34 06 27
2nd Standard Parallel: 40 25 20
Central Meridian: -119 18 20
Latitude of Projection's Origin: 32 30
False Easting: 0
False Northing: 0

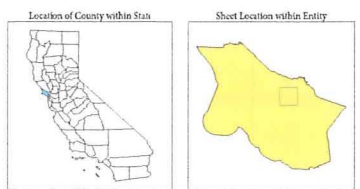
VSCENSBUREAU

10	11	12
16	17	18
23	24	25

PARENT SHEET 17
Total Sheets: 48
- Index Sheets: 1
- Parent Sheets: 38
- Inset Sheets: 9

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
Interstate		Geographic Data	
US Highway		Water Body	
State Highway		Swamp Marsh, or Forest FQA wet	
Unim. road		Glacier	
Circle		Military	
AVD, Dev. Street			
Typical or Typical		A3	
Edge of Ec.		Individual Mountain Range	
Property Id.		MA	
Personal Branch		Individual Mountain Range	
Intermittent Stream		Dev. Area	
Stream, tributary of Intermittent		Cultivated Subst Area	

- 1 A "*" following an MCD name denotes a false MCD. A "*" following a place name indicates that a true MCD exists with the same name and FIPS code as the place; the false MCD label is not shown.
- 2 Place label color correlates to the place fill color.
- 3 A "*" following a block number indicates that the block number is repeated elsewhere in the block.



NAME: Marin County (041)
ENTITY TYPE: County or statistically equivalent entity
ST: California (06)

Geographic Unit (GU), Block Map Set
CROSS BLOCK MAP (PAINT) - Cua
1038

All legal boundaries and names are as of January 1, 2010. The boundaries shown on this map are for Census Bureau statistical data collection and tabulation purposes only; their depiction and designation for statistical purposes does not constitute a determination of jurisdictional authority or rights of ownership or entitlement.

Geographic source: 2010 census reference area, January 1, 2010.
Data Source: U.S. Census Bureau's MAP/TIGER database (TIGER010105)
Map Created by Geography Division, April 02, 2011

U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau

Projection: Albers Equal Area Conic
 Datum: NAD 83
 Spheroid: GRS 80
 1st Standard Parallel: 34 06 27
 2nd Standard Parallel: 40 25 2
 Central Meridian: 119 18 29
 Longitude of Projection's Origin: 123 31 43
 False Easting: 0
 False Northing: 0



		13
17	18	19
	25	

PARENT SHEET 18
Total Sheets: 48
Index Sheets:
Parent Sheets: 38
Inset Sheets: 9

This is a detailed 2010 Census Block Map of Marin County, California. The map displays the following features:

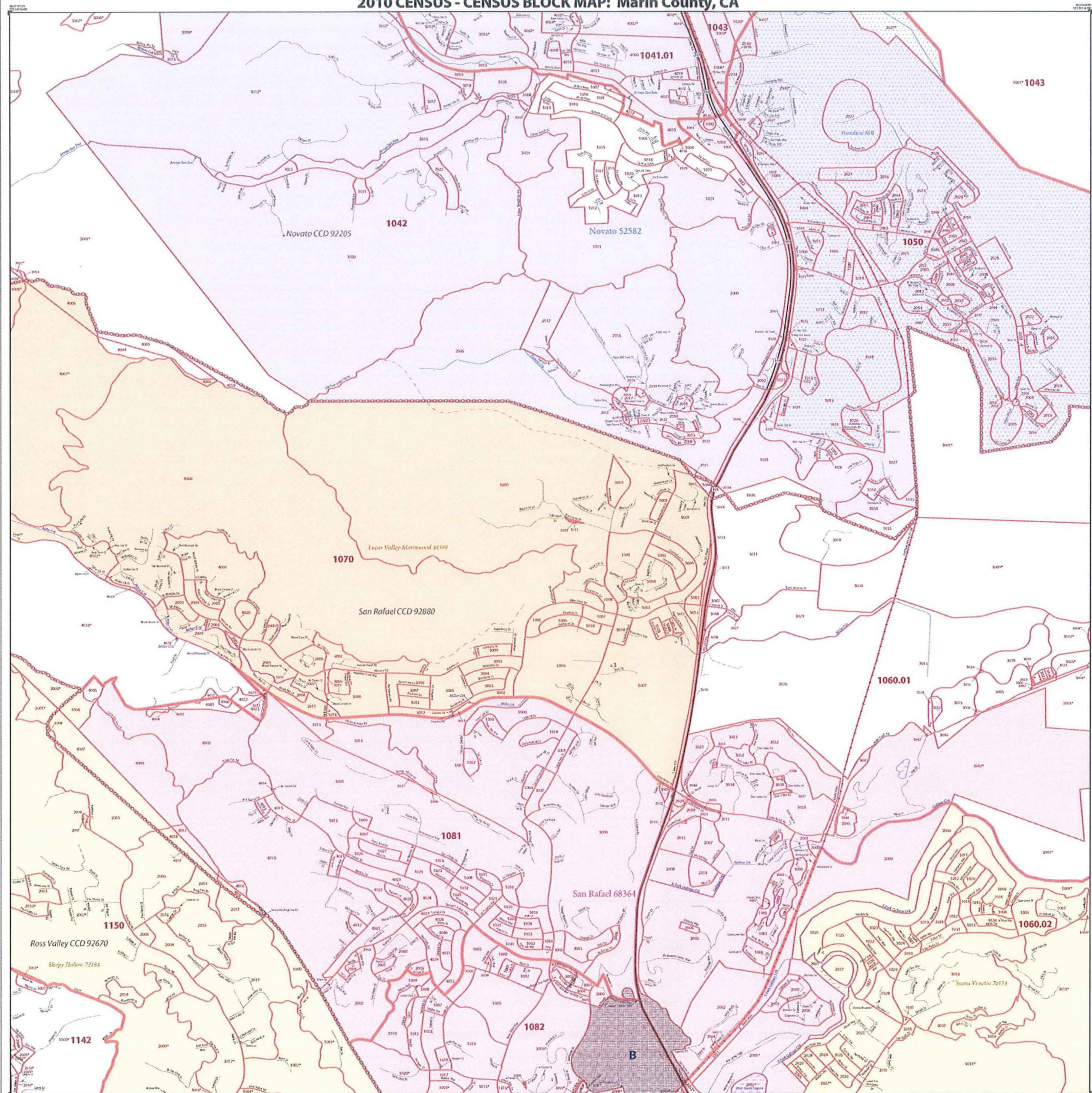
- Census Tracts:** Labeled with four-digit numbers including 1021, 1022.02, 1022.03, 1031, 1032, 1041.01, 1041.02, 1042, 1043, 1330, 1011, 1012, and 1050.
- Census Blocks:** Numerous five-digit numbers are scattered throughout the map, representing individual blocks within the tracts.
- Geographic Labels:**
 - Northwest Marin CCD 92200 (top left)
 - Novato CCD 92205 (center right)
 - Novato 52582 (bottom center)
 - Black Point Green Point 00002 (right side)
 - Humboldt AFB 2000 1050 (bottom right)
- Infrastructure:** A major highway (likely SR 101) runs vertically through the center of the map. Other roads and water bodies are also visible.
- Map Style:** The map uses a light pink background with red lines to delineate census boundaries. A small black dot labeled 'A' is located within the 1022.03 tract.

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
Interstate		Geographic Offset at Corners	
U.S. Highway		Water Body	
State Highway		Swamp, Marsh, or Other Wet, Squenny	
Other Local		Glacier	
Co. or Loc.		Military	
Circle		Fortified or Iron Lark, Road or International Area	
400 Feet (Therm)		Airport	
400 Wetway or Paved		Scheduled Maintenance Pk.	
Pipeline or Power Line		Exact Name	
Edge or Fence		Island Name	
Property Line		Island Area	
Perennial Stream		Island Area	
Intermittent Stream		Island Area	
Nonnavigable Boundary or Feature		Island Area	
Island Offset		Island Area	

NAME: Marin County (041)
ENTITY TYPE: County or statistically equivalent entity
ST: California (06)

Geographic Unit (GUA) Block Map Series
2010 CENSUS BLOCK MAP (PARENTS)- County
21 00 04243119

2010 CENSUS - CENSUS BLOCK MAP: Marin County, CA



SYMBOL DESCRIPTION		SYMBOL	LABEL STYLE
International		*****	CANADA
Federal American Indian Reservation		*****	L'ANSE RESVN 1880
Off Reservation Trust Land, Hawaiian Home Land		*****	T1880
Offshore of the United States, Alaska Native Village, Indian Reservation, Total Designated Federal Area		*****	KAW OTSA 5690
American Indian Tribal Subdivision		*****	EAGLE NEST EAST 250
State American Indian Reservation		*****	Tama Resvn 9400
State Designated Tribal Statistical Area		*****	Lumbee SOTSA 9815
Alaska Native Regional Corporation		*****	NANA ANRC 52120
State (or statistically equivalent entity)		*****	NEW YORK 36
County (or statistically equivalent entity)		*****	MONTGOMERY 031
Minor Civil Division (MCD)		*****	Bristol town 07485
Census County Division (CCD)		*****	Hanna CCD 91650
Consolidated City		*****	MILFORD 47500
Incorporated Place ^{1,2}		*****	Davis 18100
Census Designated Place (CDP) ²		*****	Incline Village 33100
Census Tract		*****	33.07
Census Block ³		*****	3017

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
Interstate	—	Geographic Offset or Corridor	—
U.S. Highway	—	Water Body	—
State Highway	—	Swamp, Marsh, or Coastal Wetland	—
Other Road	—	Glacier	—
Canal or Aqueduct	—	Military	—
Creek	—	Port of Call or Port of Call	—
Artificial Drainage	—	Port of Call or Port of Call	—
Alley, Waterway, or Ferry	—	Port of Call or Port of Call	—
Railroad	—	Port of Call or Port of Call	—
Public or Private Line	—	Port of Call or Port of Call	—
Ridge or Fence	—	Port of Call or Port of Call	—
Property Line	—	Port of Call or Port of Call	—
Personal Street	—	Port of Call or Port of Call	—
International Boundary	—	Port of Call or Port of Call	—
Future Not Boundary Classified	—	Port of Call or Port of Call	—

Where state, county, and/or MCD/CCD boundaries coincide, the map shows the boundary symbol for only the highest ranking of these boundaries. Where American Indian reservation and American Indian tribal subdivision boundaries coincide, the map shows only the American Indian reservation boundaries. Where Oklahoma tribal statistical area boundaries and American Indian tribal subdivision boundaries coincide, the map shows only the Oklahoma tribal statistical area boundaries.

1 A " " following an MCD name denotes a false MCD. A " " following a place name indicates that a false MCD exists with the same name and FIPS code as the place; the false MCD label is not shown.

2 Place label color correlates to the place fill color.

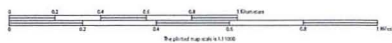
3 A " " following a block number indicates that the block number is repeated elsewhere in the block.

All legal boundaries and names are as of January 1, 2010. The boundaries shown on this map are for Census Bureau statistical data collection and tabulation purposes only; their depiction and designation for statistical purposes does not constitute a determination of jurisdictional authority or rights of ownership or entitlement.

Geographic Vintage: 2010 Census Reference date: January 1, 2010
Data Source: U.S. Census Bureau's TIGER database (TIGER/Line 2010)
Map Created by: Geography Division, April 02, 2011

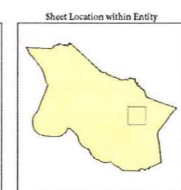
U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration U.S. Census Bureau

Projection: Albers Equal Area Conic
Datum: NAD 83
Spheroid: GRS 80
1st Standard Parallel: 34° 06' 37"
2nd Standard Parallel: 40° 23' 29"
Central Meridian: 119° 18' 29"
Latitude of Projection Origin: 32° 31' 41"
False Easting: 0
False Northing: 0



Key to Sheet		
18	19	20
25	26	27
30	31	32

PARENT SHEET 26
Total Sheets: 48
Index Sheets: 1
Parent Sheets: 38
Inset Sheets: 9



NAME: Marin County (041)
ENTITY TYPE: County or statistically equivalent entity
ST: California (06)

Geographic Unit: 041 Block Map Set
2010 Census of the U.S. MAP PRODUCT: County
2010/04/02

2010 CENSUS - CENSUS BLOCK MAP: Marin County, CA

1043

1050

Novato 52582

Novato CCD 92205

1060.01

9901

San Rafael CCD 92880

1060.02

Santa Venetia 70154

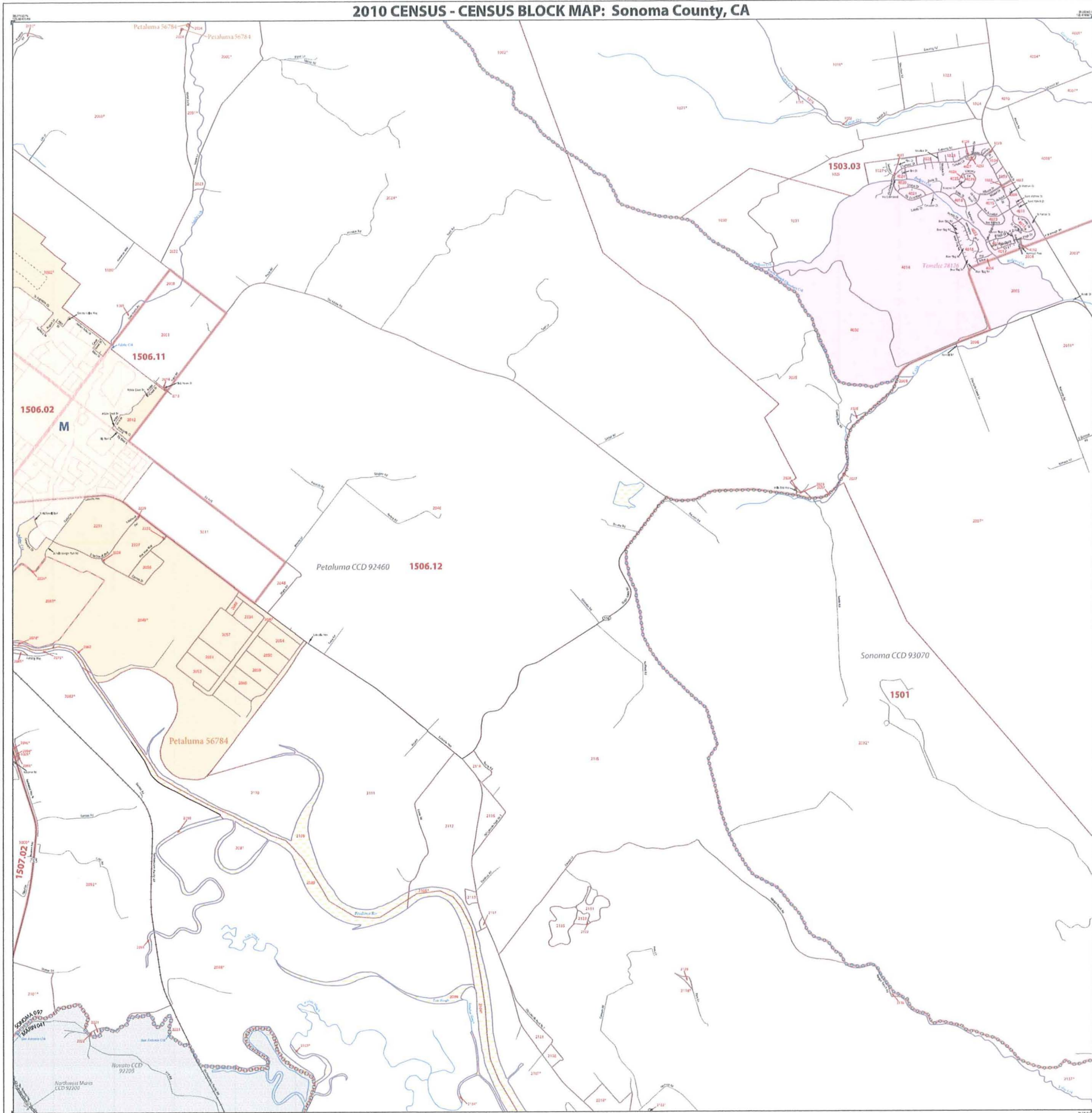
San Rafael River

San Francisco Bay

[illegible]

Geography Unit K&L Black Map Series
2014 GENUS 5 BLACK MAP (PARENT) • Cover
17919641127

2010 CENSUS - CENSUS BLOCK MAP: Sonoma County, CA



LEGEND

SYMBOL/DESCRIPTION	SYMBOL	LABEL/STYLE
International	□ □ □ □ □	CANADA
Federal American Indian Reservation	*****	L'ANSE RESVN 1880
Oil Reserving Trust Land, Hawaiian Home Land	*****	T1880
California Indian National Area, Indian Reservation, Tribal Designated Statistical Area	*****	KAWOTSA 5690
American Indian Tribal Subdivision	*****	EAGLE NEST 203
State American Indian Reservation	*****	Tama Resvn 9400
State Designated Tribal Statistical Area	*****	Lumbee SDTSA 9815
Alaska Native Regional Corporation	*****	NANA ANRC 52120
State (or statistically equivalent) county	□ □ □ □ □	NEW YORK 36
County (or statistically equivalent) tract	□ □ □ □ □	MONTGOMERY 031
Minor Civil Division (MCD)	□ □ □ □ □	Bristol town 07485
Consolidated City	□ □ □ □ □	Hanna CCD 91650
Incorporated Place ^{1,2}	□ □ □ □ □	MILFORD 47500
County Designated Place (CDP)	□ □ □ □ □	Davis 18100
Census Tract	33.07	Indian Village 35100
Census Block ³	33.07	

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
Interstate	—	Geographic Office or Center	—
U.S. Highway	—	Water Body	—
State Highway	—	Swamp, Marsh, or Great Ponds	—
Other Road	—	Glacier	—
Cell-tower	—	Military	—
Circle	—	Monument or Monument	—
City and County	—	Airport	—
Railroad	—	Isolated Mountain Peak	—
Population or River Line	—	Island Name	—
Edge of Forest	—	Island Area	—
Property Line	—	Island Area	—
Neighborhood Boundary or District Line	—	Outside District Area	—

Where state, county, and/or MCD/CDP boundaries coincide, the map shows the boundary symbol for only the highest-ranking of these boundaries. Where American Indian reservation and American Indian tribal subdivision boundaries coincide, the map shows only the American Indian reservation boundaries. Where Oklahoma tribal statistical area boundaries and American Indian tribal subdivision boundaries coincide, the map shows only the Oklahoma tribal statistical area boundaries.

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2. Place label color correlates to the place label.

3. A " " following a block number indicates that the block number is repeated elsewhere in the block.

Key to Sheets

41	42	43
45	46	47
49	50	

PARENT SHEET 46

Total Sheets: 77
Index Sheets: 1
Parent Sheets: 50
Inset Sheets: 26

Location of County within State

Sheet Location within Entity

NAME: Sonoma County (097)

ENTITY TYPE: County or statistically equivalent entity

STATE: California (06)

Geographic Unit: 2010 Census Block Map Series
2010 Census Block Map Series
2010 Census

DISCUSSION	SYMBOL	DISCUSSION	SYMBOL
Incentive		Geographic Object or Center	
U.S. Highway		Water Body	
State Highway		Southern Mark or Good Property	
Other Road			
Cell of use		Climate	
Creek		Military	
400 ft. (120 m) or less		Plotted or Item List	
400 ft. (120 m) or more		Airport or Airfield Area	
Railroad			
Psychic or Power Line			
Ridge or Axis			
Property Line			
Perennial Stream			
Intermittent Stream			
Nonwater Boundary or Feature Not Elsewhere Classified			

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- 2 Place label color correlates to the place fill color.
- 3 A "*" following a block number indicates that the block number is repeated elsewhere in the block.

Geographic Unit (G.U.) Block Map Series
2010 CENSUS BLOCK MAP (PARENT)- County
21 0000007045

Projection: Albers Equal Area Conic
 Datum: NAD 83
 Spheroid: GRS 80
 1st Standard Parallel: 34 06 27
 2nd Standard Parallel: 40 25 20
 Central Meridian: -119 18 20
 Latitude of Projection's Origin: 32 31 43
 False Easting: 0
 False Northing: 0

The plotted map scale is 1:12200



40	41	42
44	45	46
		49

PARENT SHEET 45
Total Sheets: 77
 - Index Sheets: 1
 - Parent Sheets: 50
 - Inset Sheets: 26

USCENSUSBUREAU

APPENDIX C

**NORTH MARIN WATER DISTRICT
WATER SHORTAGE CONTINGENCY PLAN
FOR GREATER NOVATO AREA**

April 2016

Customer Notification

1. NMWD notifies customers by bill message and on the website
 - A. Dry water supply conditions exist. Please reduce your water use by ____%. Consult the NMWD website for water saving tips and the latest news on water supply status.
 - B. Critical dry water supply conditions exist. A mandatory ____% reduction in water use is required. Consult the NMWD website for more information.
 - C. A temporary impairment of the water supply delivery system exists. A mandatory ____% reduction in water use is required. Consult the NMWD website for more information.
2. Special issue of NMWD WaterLine will be mailed to all customers stipulating requirements.

Specific Triggers

Stage 1 Trigger: When the NMWD Board of Directors determines that Dry Conditions¹ prevail based on advice from NMWD staff, Sonoma County Water Agency or the State Water Resources Control Board.

Stage 2 Trigger: When the NMWD Board of Directors determines that Critical Dry Conditions or a Temporary Impairment of the water supply delivery system prevails based on advice from NMWD staff, Sonoma County Water Agency or the State Water Resources Control Board or Sonoma County Water Agency enacts its' water shortage allocation methodology provided that storage is not projected to fall below 100,000-acre feet in Lake Sonoma.

Stage 3 Trigger: When the NMWD Board determines that storage in Lake Sonoma is projected to fall below 100,000 acre feet based on advice from Sonoma County Water Agency, or NMWD staff or State Water Resources Control Board advise that mandatory reductions in water use are required.

¹ Dry Conditions on the Russian River are defined in State Water Resources Control Board Decision 1610 as follows:

Date	Cumulative Inflow to Lake Pillsbury
January 1	8,000 acre feet
February 1	39,200 acre feet
March 1	65,700 acre feet
April 1	114,500 acre feet
May 1	145,000 acre feet
June 1	160,000 acre feet

Local Dry Conditions may occur from time to time at Stafford Lake depending on annual rainfall less than 20 inches per water year.

Statewide Dry Conditions may occur from time to time as determined by the State Water Resources Control Board.

Consumption Limits (do not apply where private well or recycled water supply is used)

Stage 1: (Request for up to _____% voluntary reduction)

Residential: _____% voluntary reduction in water use from a prior year for similar billing period to be determined by the NMWD Board of Directors depending on circumstances in place at the time of enactment.

Commercial and Industrial: _____% voluntary reduction in water use from a prior year for similar billing period (exceptions may be granted in order to preserve jobs) to be determined by the NMWD Board of Directors depending on circumstances in place at time of enactment.

Stage 2: (Mandatory water use restrictions (to enable reduction in water use up to _____%))

Residential: Water use for certain purposes are restricted as determined by the NMWD Board of Directors depending on circumstances in place at time of enactment.

Commercial and Industrial: Water use for certain purposes are restricted as determined by the NMWD Board of Directors depending on circumstances in place at time of enactment (exceptions may be granted in order to preserve jobs).

Stage 3: (Up to 50% mandatory reduction)

Residential: _____% mandatory reduction in water use from a prior year for similar billing period to be determined by the NMWD Board of Directors depending on circumstances in place at time of enactment.

Commercial and Industrial: _____% mandatory reduction in water use from a prior year for similar billing period to be determined by the NMWD Board of Directors depending on circumstances in place at time of enactment (exceptions may be granted to preserve jobs).

Stages of Action

Stage 1 Voluntary - achieve _____% reduction² in water use by implementation of any of the following

- a. Encourage voluntary rationing;
- b. Pursue vigorous enforcement of water wasting regulations and provisions of District's Water Conservation Regulation 15 which requires water saving devices in new construction, prohibits installation of certain wasteful types of turf configurations, and encourages turf avoidance;
- c. Request customers to make conscious efforts to conserve water;
- d. Request other governmental agencies to demonstrate leadership and implement restrictive water use programs;

²Exact amount and Districtwide measurement of goal and method of achievement to be established by Board of Directors after examining projected supplies from SCWA, Stafford Lake and treatment plant and other emergency sources and after holding water shortage emergency public hearing.

- e. Distribute water saving kits upon customer request, to assure availability to existing and new customers (Note: Similar kits were distributed system wide to all customers during the 1976-77 California drought);
- f. Encourage private sector to use alternate water sources such as recycled water or use of private wells;
- g. Encourage the non-commercial washing of privately owned motor vehicles, trailers and boats only from a bucket and except that a hose equipped with a shut-off nozzle may be used for a quick rinse.;
- h. Encourage nighttime irrigation;
- i. Request restaurants, hotels, cafes, cafeterias, bars or other public places where food or drink are served/purchased to serve water only upon request;
- j. Implement detailed measures from other stages to meet desired objective;
- k. Any use of potable water from a fire hydrant except for fighting fire, human consumption, essential construction needs or use in connection with animals;
- l. Navy style showering will be promoted (e.g., turn on water to wet person or persons, turn off water, lather up, scrub, then turn on water for a quick rinse, then turn off shower with free push button showerhead control valves available to customers upon request);
- m. Customers will be urged not to regularly flush their toilets for disposal of urine only;
- n. Request hotel and motel operators to provide guests with the option of choosing not to have towels and linens laundered daily;
- o. Use of potable water for dust control at construction sites or other locations;

Stage 2 Mandatory - achieve a ____% reduction² in water use by declaring a water shortage emergency and implementing Stage 1 (voluntary) and Stage 2 (mandatory) restrictions on water use for the following certain purposes

- a. Washing sidewalks, driveways, parking areas, tennis courts, patios or other exterior paved areas except by the Novato Fire Protection District or other public agency for the purpose of public safety;
- b. Refilling a completely drained swimming pool and/or initial filling of any swimming pool;
- c. Non-commercial washing of privately-owned motor vehicles, trailers and boats except from a bucket and except that a hose equipped with a shut-off nozzle may be used for a quick rinse;
- d. Watering of any lawn, garden, landscaped area, tree, shrub or other plant except from a hand-held hose or container or drip irrigation system except sprinklers can be used if customer maintains the volume or percent reduction pursuant to the NMWD Board of Directors determination compared to a prior year's use in same billing period;
- e. Watering any portion of a golf course except the tees and greens;
- f. Any non-residential use by a vehicle washing facility in excess of the volume percent or reduction pursuant to the NMWD Board of Directors determination;
- g. Irrigating landscape other than between the hours of 7pm and 9am the following day;
- h. Irrigating landscape more than _____ days per week;

- i. Irrigating landscape during or within 48 hours of measureable precipitation;
- j. Irrigating with potable water of lawn area on public street medians.

Stage 3 Mandatory - achieve up to a _____%² reduction in water use by declaring a water emergency and implementing Stage 1 (Voluntary), Stage 2 (Mandatory) and the following additional Stage 3 (Mandatory) requirements.

- a. Watering any residential lawn, or any commercial or industrial area lawn maintained for aesthetic purposes, at any time day or night during the period of March 1, through September 30. (These designated lawns will be allowed to dry up for the summer). Affected customers will be advised on tested methods for re-greening the lawns at minimum expense beginning on October 1, during a Stage 3 mandatory period if operating conditions permit. By following the prescribed instructions, the affected customers will likely avoid the cost of replacing lawns.)
- b. Planting any new landscaping, except for designated drought resistant landscaping authorized by NMWD.
- c. Public agencies may apply to the General Manager for exemptions for watering specific public lawns used extensively for community wide recreation. Such public area lawn watering shall only be done under methods and time periods prescribed by the General Manager. Such exemptions will only be given by the General Manager, if the mandatory _____% reduction in water can otherwise be achieved on a service area basis.
- d. Golf courses may only use private well or recycled water for general irrigation. Golf courses may apply to the General Manager for specific exemptions to water greens only, and then only under methods and time periods prescribed by the General Manager. Such exemptions will only be given by the General Manager, if the mandatory _____% reduction in water use can otherwise be achieved on a service area basis.
- e. All day and nighttime sprinkling will be discontinued. Any and all outside watering will be done only with a hand held nozzle. An exception will be made to permit drip irrigation for established perennial plants and trees using manual or automatic time controlled water application sufficient only for assured plant survival.
- f. No new annual plants, vegetables, flowers or vines may be planted until the Stage 3 mandatory period is over. An exception will be considered on a case by case basis for customers who are eliminating existing thirsty landscaping and replacing same with drought resisting landscaping prescribed by NMWD, as in b. above.
- g. Limit deliveries of water to outside service area customers to that needed for human consumption, sanitation and public safety only or as stipulated in outside service agreements.

Plan Preparation

This plan has been coordinated with the Sonoma County Water Agency and the other regular contractors which utilize the Sonoma County Water Agency Aqueduct System and the City of Novato, and County, State and Federal Emergency Services Offices.

Adoption of Plan

The Stage of Action will be enacted after public hearing required by the District's Emergency Water Conservation Ordinance and a determination by the District's Board of Directors that a Water Shortage Emergency exists.

Monitoring of Actual
Water Use

Monitoring of water use will be by meters with data analysis using the District's computers.

Mandatory Prohibitions

Wasting of water is prohibited by Regulation 15 of the North Marin Water District.

Stage 2 and Stage 3 of the Water Shortage Contingency Plan contain specific mandatory provisions.

Revenue and
Expenditure Analysis

Temporary Drought Revenue Recovery Surcharge

In the event that mandatory water use restrictions or mandatory reduction in water use is triggered (Stage 2 or Stage 3 herein), a Temporary Drought Revenue Recovery Surcharge may be implemented. The Temporary Drought Revenue Recovery Surcharge will serve to mitigate the revenue loss resulting from a reduction in water use, as well as the liquidated damages assessed by the Sonoma County Water Agency pursuant to the water shortage and apportionment provisions of the Restructured Agreement for Water Supply. The Temporary Drought Revenue Recovery Surcharge shall be a quantity charge for each 1,000 gallons as specified in District Regulation 54.

**NORTH MARIN WATER DISTRICT
NOVATO SERVICE AREA
EMERGENCY WATER CONSERVATION ORDINANCE NO. 28**

APRIL 1, 2014

Section 1. Declaration of a Water Shortage Emergency	1
Section 2. Purpose and Authority	1
Section 3. Effect of Ordinance	2
Section 4. Suspension of New Connections to the District's Water System	2
Section 5. Waste of Water Prohibited	2
Section 6. Prohibition of Non-Essential Use of Water.....	3
Stage 1 - Introductory Stage	3
Stage 2 - Moderate Mandatory Rationing (30% reduction)	3
Stage 3 - Severe Mandatory Rationing (50% reduction)	4
Section 7. Variances.....	4
Section 8. Violations	4
Section 9. Signs on Lands Supplied from Private Wells or Recycled Water.....	5
Section 10. Drought Surcharge	5

EMERGENCY WATER CONSERVATION ORDINANCE

ORDINANCE NO. 28

AN ORDINANCE OF NORTH MARIN WATER DISTRICT DECLARING THE EXISTENCE OF A WATER SHORTAGE EMERGENCY CONDITION WITHIN THE NOVATO SERVICE AREA OF THE DISTRICT, PROHIBITING THE WASTE AND NON-ESSENTIAL USE OF WATER, AND PROVIDING FOR THE CONSERVATION OF THE WATER SUPPLY OF THE DISTRICT

BE IT ORDAINED by the Board of Directors of North Marin Water District as follows:

Section 1. Declaration of a Water Shortage Emergency

This Board of Directors does hereby find and declare as follows:

(a) A public hearing was held on April 1, 2014, on the matter of whether this Board of Directors should declare a water shortage emergency condition exists within the water service area of this District which is served by Stafford Lake and the North Marin Aqueduct.

(b) Notice of said hearing was published in the Novato Advance and Marin Independent Journal, newspapers of general circulation printed and published within said water service area of the District.

(c) At said hearing all persons present at said hearing were given an opportunity to be heard and all persons desiring to be heard were heard.

(d) Said hearing was called, noticed and held in all respects as required by law.

(e) This Board heard and has considered each protest against the declaration and all evidence presented at said hearing.

(f) A water shortage emergency condition exists and prevails within the portion of the territory of this District served by Stafford Lake and the North Marin Aqueduct. Said portion of this District is hereinafter referred to as the Novato Service Area and consists in all the territory of this District except the portions hereof in the western part of Marin County denominated Annexations 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15 and 16 generally known as Point Reyes Station, Inverness Park, Olema, Oceana Marin, and territories on the east shore of Tomales Bay. Said water shortage exists by reason of the fact that the ordinary demands and requirements of the water consumers in the Novato area cannot be met and satisfied by the water supplies available to this District in the Novato Service Area without depleting the water supply to the extent that there would be insufficient water for human consumption, sanitation and fire protection.

(g) On April 1, 2014 the Board of Directors enacted the North Marin Water District Water Shortage Contingency Plan for the Greater Novato Area (Plan) and said Plan defines specific triggers for stages of action applicable to District customers, and pursuant to this ordinance. The specific triggers for stages of action vary and are determined based on advice and action of Sonoma County Water Agency regarding water supply conditions on the Russian River and in Lake Sonoma from which approximately eighty percent of the District's water supply for the Novato Service Area is delivered through the North Marin Aqueduct.

Section 2. Purpose and Authority

The purpose of this ordinance is to conserve the water supply of the District for the greatest public benefit with particular regard to public health, fire protection and domestic use, to conserve water by reducing waste, and to the extent necessary by reason of drought and the existing water

shortage emergency condition to reduce water use fairly and equitably. This ordinance is adopted pursuant to Water Code Section 350 to and including 358, and Sections 31026 to and including 31029.

Section 3. Effect of Ordinance

This ordinance shall take effect on April 1, 2014, shall be effective only in the Novato Service Area, shall supersede and control over any other ordinance or regulation of the District in conflict herewith, and shall remain in effect until the Board of Directors declares that the water shortage emergency has ended.

Section 4. Suspension of New Connections to the District's Water System

(a) From the date the Board of Directors, by resolution, determines that Stage 2, Moderate Mandatory actions are to be implemented, until, the Board of Directors by resolution declares that the water shortage has ended, which period is hereinafter referred to as the suspension period, no new or enlarged connection shall be made to the District's water system except the following:

- (1) connection pursuant to the terms of connection agreements which prior to the date Stage 2, mandatory actions are implemented, had been executed or had been authorized by the Board of Directors to be executed;
- (2) connections of fire hydrants;
- (3) connections of property previously supplied with water from a well which runs dry.
- (4) connection of property for which the Applicant agrees to defer landscape installation until after the suspension period.
- (5) Recycled Water connections.

(b) During the suspension period applications for water service will be processed only if the Applicant acknowledges in writing that such processing shall be at the risk and expense of the Applicant and that if the application is approved in accordance with the District's regulations, such approval shall confer no right upon the Applicant or anyone else until the suspension period has expired, and that the Applicant releases the District from all claims of damage arising out of or in any manner connected with the suspension of connections.

(c) Upon the expiration of the suspension period, the District will make connections to its water system in accordance with its regulations and the terms of connection agreements for all said applications approved during the suspension period. The water supply then available to the District will be apportioned equitably among all the customers then being served by the District without discrimination against services approved during the suspension period.

(d) Nothing herein shall prohibit or restrict any modification, relocation or replacement of a connection to the District's system if the General Manager determines that the demand upon the District's water supply will not be increased thereby.

Section 5. Waste of Water Prohibited

No water furnished by the District shall be wasted. Waste of water includes, but is not limited to, the following:

- (a) permitting water to escape down a gutter, ditch or other surface drain;
- (b) failure to repair a controllable leak of water;

- (c) failure to put to reasonable beneficial use any water withdrawn from the District's system.

Section 6. Prohibition of Non-Essential Use of Water

(a) No water furnished by the District shall be used for any purpose declared to be non-essential by this ordinance for the following stages of action as determined by the Board of Directors after considering specific triggers consistent with the Water Shortage Contingency Plan for the Greater Novato Service Area.

Stage 1 - Voluntary Stage (up to 20% reduction). Achieve up to 20% reduction in water usage compared to the corresponding billing period in 2013 by encouraging voluntary rationing, enforcement of water wasting regulations and water conservation Regulation 15, requesting customers to make conscious efforts to conserve water, request restaurants to serve water only upon request, encourage private sector to use alternate source and encourage night irrigation.

- (b) The following uses are declared to be non-essential from and after April 1, 2014:

- (1) washing sidewalks, driveways, parking areas, tennis courts, patios or other exterior paved areas except by the Novato Fire Protection District or other public agency for the purpose of public safety;
- (2) refilling a swimming pool drained after July 1, 2014;
- (3) non-commercial washing of privately-owned motor vehicles, trailers and boats except from a bucket and except that a hose equipped with a shut-off nozzle may be used for a quick rinse.

Stage 2 - Moderate Mandatory Rationing (up to 30% reduction)

(c) From and after the date that the Board of Directors, by resolution, determines that the following additional uses are declared to be non-essential:

- (1) any use of water from a fire hydrant except for fighting fires, human consumption, essential construction needs or use in connection with animals;
- (2) watering of any lawn, garden, landscaped area, tree, shrub or other plant except from a handheld hose equipped with an automatic shut-off nozzle, container or drip irrigation system except overhead sprinkler irrigation can be used if customer maintains an overall 30% reduction in water use compared to the corresponding billing period in 2013 (Customers using less than 300 gallons per day are permitted to water their landscapes without a required 30% reduction), and properly operates the irrigation system in a non-wasteful manner between the hours of 7:00 p.m. and 9:00 a.m the next day. If sprinkler water is used in a wasteful manner, the General Manager may prohibit sprinkling by that customer.
- (3) watering any portion of a golf course except the tees and greens except as provided in Section 10 hereof or where private well or recycled water supply is used;
- (4) use of water for dust control at construction sites;
- (5) initial filling of any swimming pool for which application for a building permit was made after April 1, 2014;
- (6) use by a vehicle washing facility in excess of up to 30% less than the amount used by it during the corresponding billing period in 2013. If the facility was not operating in 2013, an assumed amount shall be computed by the District from its records. This subsection shall not apply to any facility that recycles water in a manner satisfactory to the District.

- (7) any non-residential use in excess of up to 30% less than the amount used by the customer during the corresponding billing period in 2013. If connection to the District system was not in existence or use in 2013, an assumed amount will be computed from the District's records.

Stage 3 - Severe Mandatory Rationing (up to 50% reduction)

(d) From and after the date that the Board of Directors, by resolution, determines that the water shortage emergency requires severe rationing, the following additional uses are declared to be non-essential:

- (1) Watering any residential lawn, or any commercial or industrial area lawn maintained for aesthetic purposes, at any time of the day or night during the period of March 1, through September 30, when a Stage 3 is in progress.
- (2) Planting any new landscaping, except for designated drought resistant landscaping prescribed by the District.
- (3) All day and nighttime sprinkling will be discontinued. Any and all outside watering will be done only with a hand held nozzle. An exception will be made for carefully timed drip irrigation for established perennial plants and trees. Only sufficient water for assured plant survival may be applied.
- (4) No new annual plants, vegetables, flowers or vines may be planted during the Stage 3 emergency period. An exception will be made for customers who are eliminating existing thirsty landscaping and replacing same with drought resisting landscaping prescribed by the District, as in (2) above.

The combined rationing including Stage 1, 2, and 3 is designed to achieve a minimum reduction of 50% or more in Novato service territory water consumption as compared with normal annual usage.

(e) The percentages stipulated in Stage 2 and Stage 3 may be increased by the General Manager for any class of customer if the General Manager determines that such increase is necessary to protect the public health, safety and welfare or to spread equitably among the water users of the District the burdens imposed by the drought and the shortage in the District's water supply.

Section 7. Variances

Applications for a variance from the provisions of Section 6 of this ordinance may be made to the General Manager. The General Manager may grant a variance to permit a use of water otherwise prohibited by Section 6 if the General Manager determines that the variance is reasonably necessary to protect the public health and safety and/or economic viability of commercial operation. Any decision of the General Manager under this section may be appealed to the Board of Directors.

Section 8. Violations

(a) If and when the District becomes aware of any violation of any provision of Section 5 or 6 of this ordinance, a verbal warning will be given, then if the violation continues or is repeated, a written notice shall be placed on the property where the violation occurred and mailed to the person who is regularly billed for the service where the violation occurs and to any other person known to the District who is responsible for the violation or its correction. Said notice shall describe the violation and order that it be corrected, cured and abated immediately or within such specified time as the General Manager determines is reasonable under the circumstances. If said order is not complied

with, the District may forthwith disconnect the service where the violation occurs.

(b) For the first offense, a fee of \$50 shall be paid for the reconnection of any service disconnected pursuant to subsection (a) during the suspension period. For each subsequent violation of Section 8 (a), the fee for reconnection shall be \$75.

(c) No service which is disconnected twice because of a violation of Section 5 or 6 of this ordinance during the suspension period, shall be reconnected unless a device supplied by the District which will restrict the flow of water to said service is installed. Furthermore, the fee for reconnection of such a service during the suspension period shall be \$100 in lieu of the fee required by subsection (b) hereof.

(d) In the event the District determines that water furnished by the District has been used to fill a swimming pool in violation of Section 5 or 6 hereof, service shall be disconnected and shall be reconnected pursuant to Section 8 (b) hereof, as applicable, except that the reconnection fee shall be \$200 for each subsequent offense.

Section 9. Signs on Lands Supplied from Private Wells or Recycled Water

The owner or occupant of any land within the Novato water service area that is supplied with water from a private well or with recycled water shall post and maintain in a conspicuous place thereon a sign furnished by the District giving public notice of such supply.

Section 10. Drought Surcharge

In the event a mandatory reduction in water use is triggered (Stage 2 or Stage 3 herein), a Drought Surcharge will be implemented simultaneous with enactment of the mandatory stage. The Drought Surcharge will serve to mitigate the revenue loss resulting from a reduction in water use, as well as the liquidated damages assessed by the Sonoma County Water Agency pursuant to the water shortage and apportionment provisions of the Restructured Agreement for Water Supply. The Drought Surcharge shall be a quantity charge for each 1,000 gallons as specified in District Regulation 54.

* * * * *

I hereby certify that the foregoing is a true and complete copy of an ordinance duly and regularly adopted by the Board of Directors of North Marin Water District at a regular meeting thereof held on April 1, 2014 by the following vote:

AYES: Directors Baker, Fraites, Petterle, Rodoni, Schoonover
NOES: None
ABSENT: None
ABSTAINED: None

(SEAL)



Katie Young

District Secretary
North Marin Water District

NORTH MARIN WATER DISTRICT
REGULATION 15
WATER CONSERVATION - NOVATO SERVICE AREA

A. Purpose

The purpose of this regulation is to assure that water resources available to the District are put to reasonable beneficial use, that the instream values of Novato Creek and the Russian River are preserved to the maximum possible extent and that the benefits of the District's water service extend to the largest number of persons.

B. Waste of Water Prohibited

- (1) Customers shall not permit any water furnished by the District for the following nonessential uses:
 - (a) The washing of sidewalks, walkways, driveways, parking lots and other hard surfaced areas by direct hosing when runoff water directly flows to a gutter or storm drain, except as may be necessary to properly dispose of flammable or other dangerous liquids or substances, wash away spills that present a trip and fall hazard, or to prevent or eliminate materials dangerous to the public health and safety;
 - (b) The escape of water through breaks or leaks within the customers' plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of seventy-two (72) hours after the customer discovers such a break or leak or receives notice from the District, is a reasonable time within which to correct such break or leak, or, as a minimum, to stop the flow of water from such break or leak;
 - (c) Irrigation in a manner or to an extent which allows excessive run-off of water or ~~unreasonable over-spray of the areas being watered. Every customer is deemed to have his/her water system under control at all times, to know the manner and extent of his/her water use and any run-off, and to employ available alternatives to apply irrigation water in a reasonably efficient manner;~~
 - (d) Washing cars, boats, trailers or other vehicles and machinery directly with a hose not equipped with a shutoff nozzle;
 - (e) Water for non-recycling decorative water fountains;
 - (f) Water for new non-recirculating conveyor car wash systems;
 - (g) Water for new non-recirculating industrial clothes wash systems;
 - (h) Water for single pass coolant systems.
- (2) Exempt Water Uses. All water use associated with the operation and maintenance of fire suppression equipment or employed by the District for water quality flushing and sanitation purposes shall be exempt from the provisions of this section. Use of water supplied by a private well or from a recycled water, gray water or rainwater utilization system is also exempt.
- (3) Variances. Any customer of the District may make written application for a variance. Said application shall describe in detail why Applicant believes a variance is justified.

Permit, Plan Check, Design Review or water service upgrade for Commercial, industrial and institutional landscaping, park and greenbelt landscaping, multiple-family residential and single-family residential landscaping.

- i. At District discretion, landscape requirements for applicable projects may be deferred to the State Model Water Efficient Landscape Ordinance (California Code of Regulations Title 23. Waters, Division 2. Department of Water Resources, Chapter 2.7. Model Water Efficient Landscape Ordinance).
- ii. For projects with irrigated landscape area less than 2,500 square feet, the District may choose to select any or all of the requirements to the State Model Water Efficient Landscape Ordinance (Referenced above), Appendix D – Prescriptive Compliance Option.

b. Requirements stated herein shall not apply to:

- i. Registered local, state or federal historical landscape area;
- ii. Ecological restoration or mined-land reclamation projects that do not require a permanent irrigation system.

(3) Landscape Design Plan. For each landscape project subject to this Regulation, applicants shall submit a landscape design plan and install a landscape in accordance with the following:

a. Amendments, Mulching and Soil Conditioning

- i. A minimum of 8" of non-mechanically compacted soil shall be available for water absorption and root growth in planted areas.
- ii. Prior to incorporating compost or fertilizer and planting of any materials, compacted soils shall be transformed into a friable condition.
- iii. Incorporate compost or natural fertilizer into the soil to a minimum depth of 8" at a minimum rate of 8 cubic yards per 1000 square feet and per specific amendment recommendations from a soils management report.
- iv. A minimum 3" layer of District approved mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers or direct seeding applications. Mulch shall be made from recycled or post-consumer materials when possible.

b. Plants

- i. Selected plants, other than the allowable turf areas in residential projects, shall be Water Use Classification of Landscape Species (WUCOLS) categorized "Very Low" or "Low" water use for the North-Central Coastal Region and not cause the Estimated Water Use (ETWU) to exceed the Maximum Applied Water Allowance (MAWA) using an evapotranspiration factor of 0.55 for residential and 0.45 for non-residential sites and a WUCOLS corresponding plant factor of 0.3 or less for Very Low or Low water use plants. (Special Landscape Areas including areas dedicated to edible plants, recreational areas, or areas irrigated solely with recycled water shall not be subjected to the plant selection requirements and shall use an evapotranspiration factor of 1.0 for the purposes of calculating ETWU and MAWA.)

- ii. Plants with similar water use needs shall be grouped together in distinct hydrozones and where irrigation is required each distinct hydrozone shall be irrigated with a separate valve(s) and noted on the plans.
 - iii. Moderate and High water use plants as classified by WUCOLS shall not be mixed with low water use plants.
 - iv. All non-turf plants shall be selected, spaced and planted appropriately based upon their adaptability to the climatic, soils, and topographical conditions of the project site.
 - v. Turf shall not be planted in the following conditions:
 - 1. Slopes exceeding 10%.
 - 2. Planting areas 10 feet wide (in any direction) or less unless irrigated by District approved subsurface irrigation or with recycled water.
 - 3. Street medians, traffic islands, planter strips or bulb-outs of any size. Front yard landscaping of single family residential homes where the backyard landscape is not developer installed.
 - vi. Total turf areas shall not exceed the following
 - 1. Single Family: 25% of the total landscape area not to exceed 600 square feet.
 - 2. Townhouse/Condominium (THC): 300 square feet.
 - 3. Apartment (APT): 130 square feet.
 - 4. Commercial and/or non-residential: 0 square feet.
 - 5. Special Landscape Areas: The preceding turf limitations shall not apply to sites irrigated with recycled water or areas dedicated to District approved recreational uses.
 - vii. Invasive plants as listed by the California Invasive Plant Council are prohibited.
- c. Water Features
- i. Recirculating water systems shall be used for water features.
 - ii. Recycled water shall be used in water features when available onsite.
- (4) Irrigation Design Plan. For each landscape project subject to this Regulation, applicants shall submit an irrigation design plan that is designed and installed to meet the MAWA irrigation efficiency criteria and in accordance with the following:
- a. Dedicated irrigation meter or private landscape water or submeter for residential must be specified for all non-residential irrigated landscapes and residential irrigated landscapes of 5,000 sq. ft. or greater.
 - b. Irrigation systems with meters 1 ½" or greater, or non-residential projects with irrigated landscapes over 5,000 square feet, require a high-flow sensor that can detect high-flow conditions and have the capabilities to shut off the system.

- c. Isolation valves shall be installed at the point of connection and before each valve or valve manifold.
- d. Weather-based or other sensor based self-adjusting irrigation controllers with non-volatile memory shall be required.
- e. Rain sensors shall be installed for each irrigation controller.
- f. Pressure regulation and/or booster pumps shall be installed so that all components of the irrigation system operate at the manufacturer's recommended optimal pressure.
- g. Irrigation system shall be designed to prevent runoff or overspray onto non-targeted areas.
- h. Point source irrigation is required where plant height at maturity will affect the uniformity of an overhead system.
- i. Minimum 24" setback of overhead irrigation is required where turf is directly adjacent to a continuous hardscape that flows or could runoff into the curb and gutter.
- j. Slopes greater than 10% shall be irrigated with point source or other low-volume irrigation technology.
- k. A single valve shall not irrigate hydrozones that mix high water use plants with moderate or low water use plants.
- l. Trees shall be placed on separate valves.
- m. All non-turf landscape areas shall be irrigated with District approved drip irrigation systems or other alternative District approved point source irrigation.
- n. Sprinkler heads, rotors and other emission devices on a valve shall have matched precipitation rates. All spray irrigation systems shall be a brake rotary type or be multi-stream, multi-trajectory, adjustable arc, rotating stream sprinkler with matched precipitation rates. All rotating stream sprinkler units shall be installed in a 40 psi pressure regulated spray head body and provide the highest potential distribution uniformity. All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher.
- o. Head-to-head coverage is required unless otherwise directed by the manufacturer's specifications
- p. Swing joints or other riser protection components are required on all risers.
- q. Check valves shall be installed to prevent low-head drainage.
- r. Master shut-off valves are required on all projects with irrigated landscapes over 5,000 square feet.
- s. Irrigation efficiency factors of 0.75 for overhead spray devices and 0.81 for drip system devices shall be used for ETWU and MAWA calculations.
- t. A diagram of the irrigation plan, including hydrozones and equipment locations, shall be provided and kept with the irrigation controller for subsequent management purposes.

(5) Irrigation Audit: Project applicants shall submit an irrigation audit report for all

applicable projects.

- a. The project applicant shall submit an irrigation audit report that includes inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule, including configuring irrigation controllers with application rate, soil types, plant factors, slope, exposure and any other factors necessary for accurate programming
- b. All landscape irrigation audits shall be conducted by a local agency landscape irrigation auditor or a third party certified landscape irrigation auditor. Landscape audits shall not be conducted by the person who designed or installed the landscape.
- c. In production home developments, audits of 15% of the landscapes shall be sufficient.

G. Rebate for High-Efficiency Washing Machines in Residences

District customers in the Novato Service area are eligible for rebate as available from time to time for District approved high-efficiency washing machines in existing residences. New construction in the District's Novato service area are required to be equipped with high-efficiency washing machines in accordance with Section E. (2) (e) of this regulation. District rebates are not available for high-efficiency washing machines required in new residential construction.

H. Rebate for Removing Irrigated Turf from Residential Properties

- (1) The owner of property containing a formal lawn area or areas shall be eligible for a cash rebate from the District if said owner removes all or part of the formal lawn area(s) and replaces same with eligible plant materials and meets the qualification requirements. "Formal lawn area" means an existing lawn in good condition which is irrigated regularly, by an automatic inground irrigation system, with water furnished by the District and mowed regularly.
- (2) Qualification requirements:
 - (a) ~~Application for rebate must be made on District's form prior to removing the formal lawn area(s). All applicable information requested must be supplied;~~
 - (b) Application for rebate must include a landscape plan or sketch showing the size, in square feet, and location of all formal lawn area(s) on the Applicant's parcel and the location of formal lawn area(s) that will be removed and replaced;
 - (c) The Applicant must utilize only eligible replacement materials for the formal lawn area(s) removed which are to be considered in calculating the rebate. Eligible replacement materials are District approved water-conserving or low water use California native plants;

- (d) If the automatic in-ground irrigation system will continue to serve some remaining formal lawn area(s), Applicant must modify the system so that water is not served to the proposed replacement area;
 - (e) Formal lawn area(s) removed and replanted with eligible replacement materials shall be mulched with material suitably thick to prevent weed growth (minimum three inches) and reduce water loss. Areas shall not be irrigated except for limited supplemental hand-watering or temporary drip irrigation to establish the plant material;
 - (f) The owner of the property must sign a statement promising not to reinstall lawn in formal lawn area(s) where lawn has been removed as long as the owner holds property. The owner may be relieved of this promise at any time by returning the full amount of the District's rebate;
 - (g) The General Manager may at any time halt or suspend acceptance of applications for rebate if the District's funds appropriated for this purpose become exhausted.
- (3) After reviewing the information supplied by the Applicant and making at least one site inspection to assure that qualification conditions have been met, District shall mail a rebate check.
 - (4) The amount of the rebate shall be determined by the Board from time-to-time.
 - (5) Rebates may be available for non-residential property or for hotels, motels, hospitals, government housing or a senior citizen complex on a parcel which is separately owned and assessed. Maximum rebate amount for a non-residential property shall be determined by General Manager on a case-by-case basis.

I. Landscape Rebate Alternatives

- (1) The District will consider, and may approve, requests to substitute for any of the requirements in section H, well-designed alternatives or innovations that will effect similar significant and continuing reductions of water requirements. Determination of eligibility shall be at the sole discretion of the General Manager or designated staff.

J. High Efficiency Toilet Replacement Program(s)

- (1) A High Efficiency Toilet (HET) is defined as any toilet with an average flush volume of 1.28 gallons per flush or less. Ultra High Efficiency Toilet (UHET) is defined as any toilet with an average flush volume of 1.1 gallons per flush or less.
- (2) Any qualifying customer of the District who removes and recycles all toilets rated to use more than 1.6 gallons per flush and replaces same with a District approved HET or UHET may request a cash rebate or bill credit in an amount established by the Board of Directors from time to time for each such toilet replaced.
- (3) To qualify for a rebate(s) hereunder, application shall be made on a form available from the District and person signing application shall:
 - (a) Request District make a brief inspection of customer's structure at a time and date approved in advance by customer to identify water conservation measures appropriate and effective for the customer to implement or be

pre-qualified by District staff via other communication means. Should customer refuse access for an inspection or not receive pre-qualification, District shall not be under any obligation to make a rebate. Inspection requirements are subject to available staff time;

- (b) Be a customer of the District and the customer's structure in which the replaced toilet(s) is located shall be served water in the District's Novato Service Area and replacing a toilet installed prior to January 1, 1992, and manufactured to flush more than 1.6 gallons per flush;
 - (c) Provide District with bill of sale or original receipt of sale within the current fiscal year and made out to said customer by person or vendor selling customer the HET or UHET or, in lieu thereof, provide District with letter addressed to said customer signed by a licensed plumber or contractor stating that a HET(s) or UHET(s) has been installed by said plumber or contractor at the customer's address;
- (4) If the customer is renting the structure, a rebate will be made provided customer includes with the application a letter from the owner of the property consenting to District making rebate payment to customer for the replacement of a non-water conserving toilet(s).
 - (5) Rebates are not available for toilets installed in buildings constructed after January 1, 1992 or for replacement of toilets rated to use 1.6 gallons per flush or less.
 - (6) Free or subsidized UHET giveaways may be available to customers from time to time. Eligibility requirements listed in J (3) (a) to (d) apply to this program should it become available.

K. Landscape Water Efficiency Rebate

- (1) Landscape water efficient rebates are available to customers who install District qualified water efficient landscape equipment including:
 - (a) Drip irrigation systems
 - (b) Water pressure-regulating devices
 - (c) Check valves
 - (d) Multi-stream rotating sprinkler nozzles (lawn areas only)
 - (e) Rain shut-off devices
 - (f) Mulch
 - (g) Soil conditioner/amendment
- (2) Rebate amounts will be established by the Board of Directors from time to time depending on customer classification and water savings potential. Customers are allowed only up to the maximum rebate level for the life of the program.

- (3) Applicant shall request and agree to a brief District pre-inspection of customer's property to identify water efficient landscape actions to be taken. District will pre-approve and post inspect to confirm the retrofit installations. Inspections are subject to available staff time.
- (4) Applicant shall provide District with a complete bill of sale or original receipt of sale within the current fiscal year, clearly showing the purchase of the landscape water efficiency installed items noted in the pre-inspection.
- (5) Free or subsidized water efficient landscape items such as rain sensors, and mulch may be available to customers. Eligibility requirements listed in K (1) through (3) apply should items become available.

L. Rebates for District Approved Swimming Pool Covers

District customers are eligible for rebates as available from time to time for purchasing District approved swimming pool covers. Eligible pool covers must be a solar or safety cover with non-netted type material, at least 12 mil in thickness, and at least 450 square feet area.

M. Requirement for Installation of Water Conserving Plumbing Fixtures Upon Change of Property Ownership

(1) Definitions.

- (a) "Water Conserving Plumbing Fixtures" means any toilet rated at 1.6 gallons of water per flush or less, urinals that are rated at 1.0 gallons of water per flush, showerheads with a flow rated at 2.0 gallons of water per minute or lavatory faucets that can emit no more than 1.5 gallons of water per minute;
- (b) "Change in Property Ownership" means a transfer of present interest of real property, or a transfer of the right to beneficial use thereof, the value of which is substantially equal to the proportion of ownership interest transferred.
- (c) "Retrofit" means replacing "Existing Plumbing Fixtures" with "Water-Conserving Plumbing Fixtures,"
- (d) "Existing Plumbing Fixtures" means any toilet using more than 1.6 gallons of water per flush, urinals using more than 1.0 gallons of water or more per flush, showerheads with a flow rated more than 2.0 gallons of water per minute or lavatory faucets that emit more than 1.5 gallons of water per minute.
- (e) "Existing Structure" means any structure built and available for use or occupancy on or before January 1, 1992, which is equipped with a toilet using more than 1.6 gallons of water per flush or a urinal using more than 1.0 gallons of water per flush.

(2) Retrofit Upon Change of Property Ownership.

All existing plumbing fixtures in existing structures receiving water from the District's water system shall, at the time of change of ownership, be retrofitted, if not already done, exclusively with water conserving plumbing fixtures as defined in Section M(1) of this regulation.

(3) Compliance and Penalties

Compliance shall be by the honor system. It shall be the Seller's responsibility to obtain from the District, in addition to any normal permits required by agencies other than the District, a Certificate of Compliance acknowledging that the Seller or title holder has stated that the retrofit installation required by this Regulation has been completed. If the District later determines or finds that the work was not done or was not completed or that water conserving plumbing fixtures are no longer present, the District may assess an annual fee of 20% of the estimated annual water bill as determined by the District until the owner of the property demonstrates that the required retrofit work has in fact been done. A site inspection shall be required in such cases and the owner shall be charged \$35 for each such site inspection as an added fee on the owner's water bill.

(4) Alternative Compliance Procedure for Transfers of Residential Property

At Seller's option, Seller shall pay the District \$315 per bathroom that does not fully comply with Regulation 15 M. Half bathrooms shall count as one bathroom. The District shall thereupon immediately provide a Certificate of Compliance to Seller. Buyer shall then be responsible for installation of the water conserving plumbing fixtures and Seller shall provide Buyer with a copy of District Regulation 15 M. and shall notify Buyer of this requirement in writing before close of escrow. Buyer shall have one year from the date of close of escrow to install such fixtures. Upon being notified that said fixtures have been installed and making a brief inspection confirming installation, the District shall pay the Buyer an amount equal to the payment made to District by Seller. If after one year, the water conserving plumbing fixtures have not been installed, the District shall use this money for any other Board approved water conservation program and shall be under no obligation to pay said money to Buyer.

(5) Responsibility for Compliance Negotiable

The Seller is responsible for compliance with Regulation 15 M, however responsibility for payment of the deposit specified in Section M(4) may be assumed by the Buyer so long as the agreement is not otherwise inconsistent with the terms of Regulation 15 M. Any such agreement shall be evidenced in a writing signed by both the Buyer and Seller.

N. Weather Based Irrigation Controller Installation Program

- (1) A weather based irrigation controller is defined as any irrigation controller using weather data to create the actual irrigation schedule and which schedule is automatically adjusted by the controller to meet the applied water demand based on actual weather data. Weather based irrigation controllers may either receive "real time" weather data or generate their weather data using an integrated solar radiation sensor.
- (2) District customers using more than an average of 600 gallons per day are eligible for rebates or vouchers as available from time to time for purchasing District approved weather based irrigation controllers. Directly installed weather based irrigation controllers may be available from time to time. Customers receiving weather based irrigation controller rebates or vouchers may be subject to a pre and post installation inspection.

O. Exemptions from Provisions Set Forth in Regulation 15 (A. through N.)

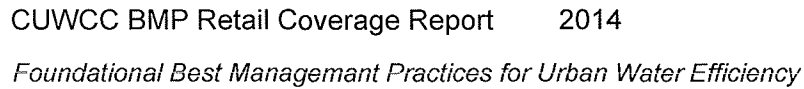
(1) Retrofit Exemptions

The District's General Manager may grant an exemption from Section M in the following instances:

- (a) Unavailability of Water Conserving Plumbing Fixtures to either match a well-defined historic architectural style fitted with authentic plumbing fixtures or accommodate existing house plumbing without bathroom alteration;
- (b) Special health circumstances upon submittal of reasonable evidence that demonstrates that specific plumbing fixtures are required by the user that may not meet the Water Conserving Plumbing Fixture criteria defined by this regulation.
- (c) Faucets at kitchen sinks or antique faucets which do not have standard threaded openings for aerators.

(2) Other Exemptions

The District's General Manager may grant exemptions from Section A. through N. for purposes of health, safety and sanitation or if Applicant demonstrates an "at least as effective as" water efficiency alternative. The District's General Manager shall have the sole decision of determining whether Applicant has demonstrated an "at least as effective as" water efficiency alternative.



ON TRACK

ryan@nmwd.com

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.			Regulation 15, Section b. meets the water waste prevention requirements of the BMP.
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.			Regulation 15, Sections e. and f. regulate new development for indoor/outdoor use. NMWD works with City of Novato and County of Marin Building Depts. and has signature authority on applicable building permits to enforce water conservation requirements

No



CUWCC BMP Retail Coverage Report 2014

Foundational Best Management Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

Exemption

No

Comments:

--



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

6274 North Marin Water District

Completed Standard Water Audit Using AWWA Software? Yes

AWWA File provided to CUWCC? Yes

Copy_of_Water_Loss_FY_14_2014_Final.xls

AWWA Water Audit Validity Score? 81

Complete Training in AWWA Audit Method Yes

Complete Training in Component Analysis Process? Yes

Component Analysis? Yes

Repaired all leaks and breaks to the extent cost effective? Yes

Locate and Repair unreported leaks to the extent cost effective? Yes

Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair. Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
138				False	581000	

At Least As effective As

No

Exemption

No

Comments:



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

6274 North Marin Water District

Numbered Unmetered Accounts	No
Metered Accounts billed by volume of use	Yes
Number of CII Accounts with Mixed Use Meters	315
Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	Yes
Feasibility Study provided to CUWCC?	Yes
Date: 6/13/2013	
Uploaded file name:	
Completed a written plan, policy or program to test, repair and replace meters	Yes
At Least As effective As	<input type="text" value="No"/>
Exemption	<input type="text" value="No"/>
Comments:	



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.4 Retail Conservation Pricing

On Track

6274 North Marin Water District

Implementation (Water Rate Structure)

Customer Class	Water Rate Type	Conserving Rate?	(V) Total Revenue Comodity Charges	(M) Total Revenue Fixed Carges
Single-Family	Increasing Block	Yes	9747695	3404027
Multi-Family	Increasing Block	Yes	936068	191594
Commercial	Increasing Block Seasonal	Yes	1469763	295788
Institutional	Increasing Block Seasonal	Yes	458727	63668
Dedicated Irrigation	Increasing Block Seasonal	Yes	1256160	166373
			13868413	4121450

Calculate: $V / (V + M)$

77 %

Implementation Option: Use Annual Revenue As Reported

☐ Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: No

At Least As effective As

No

Exemption

No

Comments:



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

6274

North Marin Water District

Retail

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Sonoma County Water Agency

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quarter of the reporting year?

No

Public Outreach Program List

Newsletter articles on conservation

Number

3

Landscape water conservation media campaigns

2

Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets

4

Email Messages

5

Total 14

Did at least one contact take place during each quarter of the reporting year?

Yes

Number Media Contacts

Articles or stories resulting from outreach

Number

2

Television contacts

3

News releases

5

Total 10

Did at least one website update take place during each quarter of the reporting year?

Yes

Public Information Program Annual Budget

Annual Budget Category

Annual Budget Amount

Public Information

50000

Total Amount:

50000

Description of all other Public Outreach programs

Comments:

At Least As effective As

No

Exemption

No

0



CUWCC BMP Coverage Report 2014

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

6274 North Marin Water District

Retail

Does your agency implement School Education programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Sonoma County Water Agency

Cari Olin with SCWA

Materials meet state education framework requirements? Yes

Materials distributed to K-6? Yes

Materials distributed to 7-12 students? No (Info Only)

Annual budget for school education program:

Description of all other water supplier education programs

Comments:

At Least As effective As

No

Exemption

No

0



CUWCC BMP Coverage Report 2014

6274 North Marin Water District

Baseline GPCD: 174.56

GPCD in 2014 134.55

GPCD Target for 2018: 143.10

Biennial GPCD Compliance Table

ON TRACK

Year	Report	Target		Highest Acceptable Bound	
		% Base	GPCD	% Base	GPCD
2010	1	96.4%	168.30	100%	174.60
2012	2	92.8%	162.00	96.4%	168.30
2014	3	89.2%	155.70	92.8%	162.00
2016	4	85.6%	149.40	89.2%	155.70
2018	5	82.0%	143.10	82.0%	143.10



CUWCC BMP Retail Coverage Report 2013

Foundational Best Management Practices for Urban Water Efficiency

BMP 1.1 Operation Practices

ON TRACK

6274 North Marin Water District

1. Conservation Coordinator provided with necessary resources to implement BMPs?

Name:

Ryan Grisso

Title:

Water Conservation Coordinator

Email:

ryan@nmwd.com

2. Water Waste Prevention Documents

WW Document Name	WWP File Name	WW Prevention URL	WW Prevention Ordinance Terms Description
Option A Describe the ordinances or terms of service adopted by your agency to meet the water waste prevention requirements of this BMP.			Regulation 15, Section b. meets the water waste prevention requirements of the BMP.
Option B Describe any water waste prevention ordinances or requirements adopted by your local jurisdiction or regulatory agencies within your service area.			
Option C Describe any documentation of support for legislation or regulations that prohibit water waste.			
Option D Describe your agency efforts to cooperate with other entities in the adoption or enforcement of local requirements consistent with this BMP.			
Option E Describe your agency support positions with respect to adoption of legislation or regulations that are consistent with this BMP.			
Option F Describe your agency efforts to support local ordinances that establish permits requirements for water efficient design in new development.			Regulation 15, Sections e. and f. regulate new development for indoor/outdoor use. NMWD works with City of Novato and County of Marin Building Depts. and has signature authority on applicable building permits to enforce water conservation requirements

At Least As effective As

No

--



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.2 Water Loss Control

ON TRACK

6274 North Marin Water District

Completed Standard Water Audit Using AWWA Software? Yes

AWWA File provided to CUWCC? Yes

Water Loss FY 13 2013 Final.xls

AWWA Water Audit Validity Score? 81

Complete Training in AWWA Audit Method Yes

Complete Training in Component Analysis Process? Yes

Component Analysis? Yes

Repaired all leaks and breaks to the extent cost effective? Yes

Locate and Repair unreported leaks to the extent cost effective? Yes

Maintain a record keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair. Yes

Provided 7 Types of Water Loss Control Info

Leaks Repairs	Value Real Losses	Value Apparent Losses	Miles Surveyed	Press Reduction	Cost Of Interventions	Water Saved (AF)
164				False	621000	

At Least As effective As

No

Exemption

No

Comments:



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.3 Metering With Commodity

ON TRACK

6274 North Marin Water District

Numbered Unmetered Accounts No

Metered Accounts billed by volume of use Yes

Number of CII Accounts with Mixed Use Meters 315

Conducted a feasibility study to assess merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters? Yes

Feasibility Study provided to CUWCC? Yes

Date: 6/13/2013

Uploaded file name:

Completed a written plan, policy or program to test, repair and replace meters Yes

At Least As effective As

No

Exemption

No

Comments:



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 1.4 Retail Conservation Pricing

On Track

6274 North Marin Water District

Implementation (Water Rate Structure)

Customer Class	Water Rate Type	Conserving Rate?	(V) Total Revenue Commodity Charges	(M) Total Revenue Fixed Charges
Single-Family	Increasing Block	Yes	9035252	2826650
Multi-Family	Increasing Block	Yes	859168	160258
Commercial	Increasing Block Seasonal	Yes	1440931	243436
Institutional	Increasing Block Seasonal	Yes	386606	50336
Dedicated Irrigation	Increasing Block Seasonal	Yes	1318165	151058
			13040122	3431738

Calculate: $V / (V + M)$

79 %

Implementation Option: Use Annual Revenue As Reported

☐ Use 3 years average instead of most recent year

Canadian Water and Wastewater Association

Upload file:

Agency Provide Sewer Service: No

At Least As effective As

No

Exemption

No

Comments:



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.1 Public Outreach

ON TRACK

6274 North Marin Water District

Retail

Does your agency perform Public Outreach programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Sonoma County Water Agency

The name of agency, contact name and email address if not CUWCC Group 1 members

Did at least one contact take place during each quarter of the reporting year? No

Public Outreach Program List

	Number
Newsletter articles on conservation	2
Flyers and/or brochures (total copies), bill stuffers, messages printed on bill, information packets	10
Email Messages	5
Landscape water conservation media campaigns	1
Total	18

Did at least one contact take place during each quarter of the reporting year? Yes

Number Media Contacts

	Number
News releases	4
Newspaper contacts	5
Articles or stories resulting from outreach	2
Total	11

Did at least one website update take place during each quarter of the reporting year? Yes

Public Information Program Annual Budget

Annual Budget Category	Annual Budget Amount
Public Information	50000
Total Amount:	50000

Description of all other Public Outreach programs

Comments:

At Least As effective As

No

Exemption

No

0



CUWCC BMP Coverage Report 2013

Foundational Best Management Practices For Urban Water Efficiency

BMP 2.2 School Education Programs

ON TRACK

6274 North Marin Water District

Retail

Does your agency implement School Education programs? Yes

The list of wholesale agencies performing public outreach which can be counted to help the agency comply with the BMP

Sonoma County Water Agency

Materials meet state education framework requirements? No

Materials distributed to K-6? No

Materials distributed to 7-12 students? No (Info Only)

Annual budget for school education program:

Description of all other water supplier education programs

Comments:

At Least As effective As

No

Exemption

No

0



*Good Water
Good Service
Good Value
Safe Place to Work*

MEMORANDUM

To: Robert Clark
Cc: Drew McIntyre, Ryan Grisso
From: David Ladd
Subject: 2015 water loss audit
X:\O&M Tech\AWWA\Memo Re water loss 15.docx

March 22, 2016

The following is a narrative of the North Marin Water District FY2015 water loss audit performed in Feb. 2016. (X:\O&M Tech\AWWA\Water Loss FY2015.xls). The audit is based on an AWWA created spreadsheet that is designed to help quantify and track water losses associated with water distribution systems, and to identify areas for improved efficiency and cost recovery.

Overall, the results of the audit show that we are supplying 2,552MG and have an authorized consumption of 2,474MG, showing a loss of 78MG. When using industry standard default values for estimated apparent losses, we see a 63MG apparent loss. This calculates into a real loss of 15MG. In order to understand the accuracy of the overall audit, it is worth looking at the three main points of data input. 1) Reported water supplied. 2) Reported consumption. 3) Reported apparent water losses.

1) Accuracy of reported water supplied. NMWD has three components to our water supplied. Volume from Stafford Lake, volume from SCWA, and volume wheeled to MMWD.

23% of our supplied water came from Stafford Lake Treatment Plant. This volume is measured through a meter at the exit of the plant, as the water enters the distribution system. This is good, as it is measuring the real volume of water delivered. This meter is calibrated against a known meter annually. Top recommendation by the AWWA is to have this meter calibrated semi-annually, and to maintain a documented accuracy of +/- 3%. We are using an assumption of a 2% under-read based on internal testing data.

77% of our supplied water came from the SCWA through the aqueduct. In 2015, this water was metered by SCWA and I do not have any data on the meters accuracy or calibration status. The actual number used in this audit is a derived number (by David Bentley) based on meter reads and billing values from SCWA. It is a corrected value using industry standard accounting methods to account for billing period misalignments, and I have added an estimated 2% under-read. In the future, NMWD will have increased accuracy here as we are going to have direct access to real time meter reads in the aqueduct.

The final part component of water supplied is subtracting out the water that is wheeled to MMWD. This water is metered by a MMWD meter which is calibrated annually, and a 2% under-read has been applied.

2) Accuracy of reported consumption. This consists of billed metered, billed unmetered, unbilled metered and unbilled unmetered water. The first three categories are found in reports from CORE, and are accurate in terms of data collection. The fourth, unbilled unmetered, is an estimated calculation taking into account planned flushing and water loss from jobs. Billed metered is by far the largest (99.8%), rendering the others almost negligible. We bill bi-monthly so there is some inherent inaccuracy in this number due to the difference in timing between actual fiscal year end, and the date billed. This is not accounted for in this number, but averages out over several years.

3) Accuracy of reported apparent losses. Apparent losses are the nonphysical losses that occur when water is successfully delivered to the customer but is not measured or recorded accurately. There are three components to reported apparent water losses. Unauthorized consumption, also known as water theft, includes illegal connections, bypasses, misuse of hydrants and meter tampering. These are very difficult to investigate and determine, so an AWWA default estimate of 0.25% has been applied.

Second is consumer metering inaccuracies. All meter populations feature a

certain degree of inaccuracy, which typically result in meter under-registration due to wear-and-tear and oversizing (low flow). It is recommended that a statistically significant random sample of consumer meters be tested annually. It is also recommended to have a replacement program in place which routinely replaces the oldest meters each year. I am not aware that we do either of these, and have used a value of 2% (based on a 2012 5/8" meter accuracy study by NMWD).

The final component of apparent loss is systematic data handling errors. This refers to data entry errors, meter reading errors, billing adjustments etc. The AWWA recommended default value of 0.25% was used here, as a thorough review of our accounting and procedure shortcomings is beyond the scope of this report.

Overall we have solid practices in place to track and record water production and consumption. Moving forward, the addition of direct meter reads in the north aqueduct will help us accurately measure the amount of water brought in from SCWA. Further review of our testing/calibration/replacement procedures of both source meters (at STP and MMWD) and consumer use meters could also increase the accuracy of future water audits.



AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0
American Water Works Association
Copyright © 2014, All Rights Reserved

[?](#) Click to access definition
[+](#) Click to add a comment

Water Audit Report for: **North Marin Water District**

Reporting Year: **2015** **7/2014 - 6/2015**

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

Volume from own sources: [+](#) [?](#) 8 573.230 MG/Yr
Water imported: [+](#) [?](#) 9 4,260.930 MG/Yr
Water exported: [+](#) [?](#) 9 2,333.110 MG/Yr

WATER SUPPLIED: **2,552.092** MG/Yr

Master Meter and Supply Error Adjustments

Pcnt: Value: MG/Yr
4 -2.00% [●](#) [○](#) MG/Yr
4 -2.00% [●](#) [○](#) MG/Yr
4 -2.00% [●](#) [○](#) MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Billed metered: [+](#) [?](#) 7 2,470.340 MG/Yr
Billed unmetered: [+](#) [?](#) 10 0.000 MG/Yr
Unbilled metered: [+](#) [?](#) 10 0.400 MG/Yr
Unbilled unmetered: [+](#) [?](#) 8 3.740 MG/Yr

AUTHORIZED CONSUMPTION: **2,474.480** MG/Yr

Click here: [?](#)
for help using option
buttons below

Pcnt: Value: MG/Yr
[○](#) [●](#) 3.740 MG/Yr

Use buttons to select
percentage of water
supplied
OR
value

Pcnt: Value: MG/Yr
0.25% [●](#) [○](#) MG/Yr

2.00% [●](#) [○](#) MG/Yr
0.25% [●](#) [○](#) MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption)

Apparent Losses

Unauthorized consumption: [+](#) [?](#) 6.380 MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies: [+](#) [?](#) 5 50.423 MG/Yr
Systematic data handling errors: [+](#) [?](#) 6.176 MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **62.979** MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **14.632** MG/Yr

WATER LOSSES: **77.612** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **81.752** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains: [+](#) [?](#) 9 315.2 miles
Number of active AND inactive service connections: [+](#) [?](#) 9 20,749
Service connection density: [?](#) 66 conn./mile main

Are customer meters typically located at the curbstop or property line? **Yes**
(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: [+](#) [?](#) 8 62.5 psi

COST DATA

Total annual cost of operating water system: [+](#) [?](#) 10 \$14,825,092 \$/Year
Customer retail unit cost (applied to Apparent Losses): [+](#) [?](#) 9 \$4.87 \$/1000 gallons (US)
Variable production cost (applied to Real Losses): [+](#) [?](#) 9 \$2,276.00 \$/Million gallons ☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 82 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Customer metering inaccuracies

2: Billed metered

3: Unauthorized consumption

APPENDIX D

Checklist Arranged by Subject

CWC Section	UWMP Requirement	Subject	Guidebook Location	UWMP Location (Optional Column for Agency Use)
10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1	Section 2.1 Page 2-1
10620(d)(2)	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.	Plan Preparation	Section 2.5.2	Section 2.5 Page 2-3
10642	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.	Plan Preparation	Section 2.5.2	Section 2.5 Page 2-3
10631(a)	Describe the water supplier service area.	System Description	Section 3.1	Section 3.2 Page 3-7
10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.3	Section 3.3 Page 3-8
10631(a)	Provide population projections for 2020, 2025, 2030, and 2035.	System Description	Section 3.4	Section 3.4.3 Page 3-9
10631(a)	Describe other demographic factors affecting the supplier's water management planning.	System Description	Section 3.4	Section 3.4.3 Page 3-9
10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Sections 3.4 and 5.4	Section 3.4.3 Page 3-9
10631(e)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.2	Section 4.2 Page 4-2
10631(e)(3)(A)	Report the distribution system water loss for the most recent 12-month period available.	System Water Use	Section 4.3	Section 4.3 Page 4-4
10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.5	Section 4.5 Page 4-6
10608.20(b)	Retail suppliers shall adopt a 2020 water use target using one of four methods.	Baselines and Targets	Section 5.7 and App E	Section 5.6 Page 5-8
10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and	Baselines and Targets	Chapter 5 and App E	Section 5.6 Page 5-8

	compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.			
10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.7.2	Section 5.6 Page 5-8
10608.24(a)	Retail suppliers shall meet their interim target by December 31, 2015.	Baselines and Targets	Section 5.8 and App E	Section 5.5 Page 5-8
10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.8.2	N.A.
10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	Section 5.1	N.A.
10608.40	Retail suppliers shall report on their progress in meeting their water use targets. The data shall be reported using a standardized form.	Baselines and Targets	Section 5.8 and App E	Section 5.6 Page 5-8
10631(b)	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, 2030, and 2035.	System Supplies	Chapter 6	Section 6.9 Page 6-22
10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.2	Section 6.2 Page 6-4
10631(b)(1)	Indicate whether a groundwater management plan has 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.	System Supplies	Section 6.2.2	Section 6.2 Page 6-4
10631(b)(2)	Describe the groundwater basin.	System Supplies	Section 6.2.1	Section 6.2 Page 6-4
10631(b)(2)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.2.2	N.A.
10631(b)(2)	For unadjudicated basins, indicate whether or not the department has identified the basin as overdrafted, or projected to become overdrafted. Describe efforts by the supplier to eliminate the long-term overdraft condition.	System Supplies	Section 6.2.3	N.A.
10631(b)(3)	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.	System Supplies	Section 6.2.4	N.A.

10631(b)(4)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Sections 6.2 and 6.9	N.A.
10631(d)	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	System Supplies	Section 6.7	Section 6.7 Page 6-19
10631(g)	Describe the expected future 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.	System Supplies	Section 6.8	Section 6.9 Page 6-22
10631(h)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6	Section 6.6 Page 6-18
10631(j)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) – if any - with water use projections from that source.	System Supplies	Section 2.5.1	Section 2.5 Page 2-3
10631(j)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	Section 2.5.1	N.A.
10633	For wastewater and recycled water, coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.1	Section 6.5 Page 6-8
10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area. Include quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	System Supplies (Recycled Water)	Section 6.5.2	Section 6.5 Page 6-8
10633(b)	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.	System Supplies (Recycled Water)	Section 6.5.2.2	Section 6.5 Page 6-8
10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3 and 6.5.4	Section 6.5.3 Page 6-15
10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4	Section 6.5.4 Page 6-15
10633(e)	Describe 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.	System Supplies (Recycled Water)	Section 6.5.4	Section 6.5.A Pages 6-16 & 6-17
10633(f)	Describe the actions 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.	System Supplies (Recycled Water)	Section 6.5.5	Section 6.5.5 Page 6-18

10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5	Section 6.5.5 Page 6-18
10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 7.4	Section 7.4 Page 7-8
10631(c)(1)	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage.	Water Supply Reliability Assessment	Section 7.1	Section 7.1 Page 7-1
10631(c)(1)	Provide data for an average water year, a single dry water year, and multiple dry water years	Water Supply Reliability Assessment	Section 7.2	Section 7.2 Page 7-2
10631(c)(2)	For any water source that may not be available at a consistent level of use, describe plans to supplement or replace that source.	Water Supply Reliability Assessment	Section 7.1	Section 7.3 Page 7-6
10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1	Section 7.1 Page 7-1
10635(a)	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.	Water Supply Reliability Assessment	Section 7.3	Section 7.3 Page 7-6
10632(a) and 10632(a)(1)	Provide an urban water shortage contingency analysis that specifies stages of action and an outline of specific water supply conditions at each stage.	Water Shortage Contingency Planning	Section 8.1	Section 8.1 Page 8-1
10632(a)(2)	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.	Water Shortage Contingency Planning	Section 8.9	Section 8.9 Page 8-10
10632(a)(3)	Identify actions to be undertaken by the urban water supplier in case of a catastrophic interruption of water supplies.	Water Shortage Contingency Planning	Section 8.8	Section 8.8 Page 8-10
10632(a)(4)	Identify mandatory prohibitions against specific water use practices during water shortages.	Water Shortage Contingency Planning	Section 8.2	Section 8.2 Page 8-2
10632(a)(5)	Specify consumption reduction methods in the most restrictive stages.	Water Shortage Contingency Planning	Section 8.4	Section 8.4 Page 8-7
10632(a)(6)	Indicated penalties or charges for excessive use, where applicable.	Water Shortage Contingency Planning	Section 8.3	Section 8.3 Page 8-6
10632(a)(7)	Provide an analysis of the impacts of each of the actions and conditions in the water shortage contingency analysis on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts.	Water Shortage Contingency Planning	Section 8.6	Section 8.6 Page 8-8

10632(a)(8)	Provide a draft water shortage contingency resolution or ordinance.	Water Shortage Contingency Planning	Section 8.7	Section 8.7 and Appendix C Page 8-9
10632(a)(9)	Indicate a mechanism for determining actual reductions in water use pursuant to the water shortage contingency analysis.	Water Shortage Contingency Planning	Section 8.5	Section 8.5 Page 8-8
10631(f)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Sections 9.2 and 9.3	Section 9.1 Page 9-1
10631(f)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Sections 9.1 and 9.3	Section 9.1 Page 9-1
10631(i)	CUWCC members may submit their 2013-2014 CUWCC BMP annual reports in lieu of, or in addition to, describing the DMM implementation in their UWMPs. This option is only allowable if the supplier has been found to be in full compliance with the CUWCC MOU.	Demand Management Measures	Section 9.5	Appendix C
10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets.	Plan Adoption, Submittal, and Implementation	Section 10.3	Section 10.3 Page 10-2
10621(b)	Notify, at least 60 days prior to the public hearing, 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.	Plan Adoption, Submittal, and Implementation	Section 10.2.1	Section 10.2 Page 10-1
10621(d)	Each urban water supplier shall update and submit its 2015 plan to the department by July 1, 2016.	Plan Adoption, Submittal, and Implementation	Sections 10.3.1 and 10.4	Section 10.3.1 Page 10-3
10635(b)	Provide supporting documentation that Water Shortage Contingency 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 the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Section 10.4 Page 10-3
10642	Provide supporting documentation that the urban water supplier made the plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan.	Plan Adoption, Submittal, and Implementation	Sections 10.2.2, 10.3, and 10.5	Sections 10.2.2, 10.3 Page 10-2
10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Sections 10.2.1	Appendix A
10642	Provide supporting documentation that the plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.3.1	Section 10.3.1 and Appendix A Page 10-3

10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.4.3	Section 10.4 Page 10-3
10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.4.4	Section 10.4 Page 10-3
10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Sections 10.4.1 and 10.4.2	Section 10.4 Page 10-3
10645	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.5	Section 10.4 Page 10-3

APPENDIX E

Table 2-1 Retail Only: Public Water Systems

Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
02-18-09P2110003	Novato	20,498	7,829
TOTAL		20,498	7,829
NOTES: Number of connections from FY15 Annual Report, Pg 22. Water supply volume in AF and from Table 4-1 (see notes at bottom)			

Table 2-2: Plan Identification		
Select Only One	Type of Plan	Name of RUWMP or Regional Alliance <i>if applicable</i> <i>drop down list</i>
<input checked="" type="checkbox"/>	Individual UWMP	
	<input type="checkbox"/> Water Supplier is also a member of a RUWMP	
	<input checked="" type="checkbox"/> Water Supplier is also a member of a Regional Alliance	North Marin-Sonoma Alliance
<input type="checkbox"/>	Regional Urban Water Management Plan (RUWMP)	
NOTES:		

Table 2-3: Agency Identification	
Type of Agency (select one or both)	
<input type="checkbox"/>	Agency is a wholesaler
<input checked="" type="checkbox"/>	Agency is a retailer
Fiscal or Calendar Year (select one)	
<input type="checkbox"/>	UWMP Tables Are in Calendar Years
<input checked="" type="checkbox"/>	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
7/1	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES:	

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name <i>(Add additional rows as needed)</i>
Sonoma County Water Agency
NOTES:

Table 3-1 Retail: Population - Current and Projected

Population Served	2015	2020	2025	2030	2035	2040(opt)
	61,381	62,656	63,929	65,099	66,139	67,482

NOTES: 2015 from SBX7-7 Table 3 in Appendix B, all other projections from Table 3-1, Pg 20 of July 1 2015 Maddaus Rpt (UWMP Appendix B)

Table 4-1 Retail: Demands for Potable and Raw Water - Actual

Use Type (Add additional rows as needed)	2015 Actual		
<i>Drop down list</i> <i>May select each use multiple times</i> <i>These are the only Use Types that will be recognized by the WUEdata online submittal tool</i>	Additional Description (as needed)	Level of Treatment When Delivered <i>Drop down list</i>	Volume (AF)
Single Family	61% of total demand (see note)	Drinking Water	4,631
Multi-Family	Apt/Condos, 14% total	Drinking Water	1,063
Commercial	10% of total	Drinking Water	759
Institutional/Governmental	3% of total	Drinking Water	228
Landscape	8% of total	Drinking Water	607
Other	Pools,moblile homes, misc at 4%	Drinking Water	303
Losses	From Appendix L, Water Audit	Drinking Water	238
Other	IVGC and MC Stafford Park	Raw Water	178
TOTAL			8,007
NOTES: From attached Water Audit Analysis, total Novato FY15 Potable (Drinking Water) Demand is 7,591 AF (7,829 AF supply - 238 AF losses). Percentages shown in "Additional Description" column are based on the total demand number (7,591 AF). Raw water use is from T:\AC\EXCEL\wtr use\raw water use.xls			

Table 4-2 Retail: Demands for Potable and Raw Water - Projected

Use Type <i>(Add additional rows as needed)</i>	Additional Description <i>(as needed)</i>	Projected Water Use <i>Report To the Extent that Records are Available</i>				
<u>Drop down list</u> <i>May select each use multiple times</i> <i>These are the only Use Types that will be recognized by the WUEdata online submittal tool</i>		2020	2025	2030	2035	2040-opt
Single Family		5,551	5,538	5,491	5,512	5,567
Multi-Family	Apts/Condos	1,279	1,261	1,233	1,213	1,206
Commercial		990	1,023	1,057	1,100	1,131
Institutional/Governmental		258	262	267	271	275
Landscape		749	778	815	853	881
Other	Pools, mobile homes, misc	369	372	372	373	378
Losses		598	606	610	615	624
Other	Raw water IVGC&MC Park	218	218	218	218	218
TOTAL		10,012	10,058	10,063	10,155	10,280

NOTES: see R Grisso 4-12-16 email in UWMP Appendix B which calculates Customer Demand Projections including Plumbing Code and Program B conservation measures. Table 3-6 (Pg 27) of Maddaus July 1 2015 Demand Forecast Report excludes savings from Plumbing Code and Program B conservation measures. Any rounding errors are adjusted in the "other" category to have totals match Table ES-2 (Pg 8) for Program B

Table 4-3 Retail: Total Water Demands

	2015	2020	2025	2030	2035	2040 (opt)
Potable and Raw Water <i>From Tables 4-1 and 4-2</i>	8,007	10,012	10,058	10,063	10,155	10,280
Recycled Water Demand* <i>From Table 6-4</i>	454	650	650	650	650	650
TOTAL WATER DEMAND	8,461	10,662	10,708	10,713	10,805	10,930

**Recycled water demand fields will be blank until Table 6-4 is complete.*

NOTES:

Table 4-4 Retail: 12 Month Water Loss Audit Reporting

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
07/2014	238
<i>* Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.</i>	
NOTES:	

Table 4-5 Retail Only: Inclusion in Water Use Projections

Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) <i>Drop down list (y/n)</i>	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc... utilized in demand projections are found.	Refer to App B, Maddaus Water Demand Analysis Rpt (July 1 2015). See "Notes" below.
Are Lower Income Residential Demands Included In Projections? <i>Drop down list (y/n)</i>	Yes
NOTES: Within Maddaus Rpt refer to Program B, Fig 5-1 (Pg 40) and Table 5-1 (Pg 41) for both Passive and Active conservation measures	

Table 5-1 Baselines and Targets Summary*Retail Agency or Regional Alliance Only*

Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	1995	2004	173	156	139
5 Year	2003	2007	162		
*All values are in Gallons per Capita per Day (GPCD)					
NOTES: Refer to R Grisso memo and separate SBX 7-7 analysis in Appendix B					

Table 6-1 Retail: Groundwater Volume Pumped						
<input checked="" type="checkbox"/>	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type <i>Drop Down List</i> <i>May use each category multiple times</i>	Location or Basin Name	2011	2012	2013	2014	2015
Add additional rows as needed						
TOTAL		0	0	0	0	0
NOTES:						

Table 6-2 Retail: Wastewater Collected Within Service Area in 2015

<div> <div></div> <div>There is no wastewater collection system. The supplier will not complete the table below.</div> </div>						
Percentage of 2015 service area covered by wastewater collection system <i>(optional)</i>						
Percentage of 2015 service area population covered by wastewater collection system <i>(optional)</i>						
Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? <i>Drop Down List</i>	Volume of Wastewater Collected from UWMP Service Area 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? <i>Drop Down List</i>	Is WWTP Operation Contracted to a Third Party? <i>(optional)</i> <i>Drop Down List</i>
<i>Add additional rows as needed</i>						
Novato Sanitary District	Metered	4,287	Novato Sanitary District	Davidson St.	Yes	Yes
Total Wastewater Collected from Service Area in 2015:		4,287				
NOTES: Total wastewater flow was 1397.6 MG or 4287 AF per John Bailey email dated March 17 2016						

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015

<input type="checkbox"/>	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.									
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number (optional)	Method of Disposal <i>Drop down list</i>	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level <i>Drop down list</i>	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
NSD, Davidson St	San Pablo Bay			Bay or estuary outfall	No	Secondary, Disinfected - 23	2,632	2,632		
	Reclaim Ponds	Ag Irrigation		Other	No	Secondary, Disinfected - 23	1,367		1,367	
	Property Fenceline	Recycled Water Supplied to NMWD		Other	No	Tertiary	288		288	
LGVSD, Las Gallinas Valley TP	Property Fenceline	Recycled Water Supplied to NMWD		Other	Yes	Tertiary			140	
Total							4,287	2,632	1,795	0
NOTES:										

Table 6-5 (DWR Table 6-4) Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area

☐ Recycled water is not used and is not planned for use within the service area of the supplier.
The supplier will not complete the table below.

Name of Agency Producing (Treating) the Recycled Water:			Novato Sanitary District and Las Gallinas Valley Sanitary District					
Name of Agency Operating the Recycled Water Distribution System:			North Marin Water District					
Supplemental Water Added in 2015			19.2					
Source of 2015 Supplemental Water			NMWD Potable Water Supply					
Beneficial Use Type	General Description of 2015 Uses	Level of Treatment <i>Drop down list</i>	2015	2020	2025	2030	2035	2040 (opt)
Agricultural irrigation								
Landscape irrigation (excludes golf courses)	NMWD N&S (now), Central (future)	Tertiary	229	400	400	400	400	400
Golf course irrigation	StoneTree GC (now), MCC (future)	Tertiary	225	250	250	250	250	250
Commercial use								
Industrial use <input type="checkbox"/>								
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge (IPR)*								
Surface water augmentation (IPR)*								
Direct potable reuse								
Other (Provide General Description)								
Total:			454	650	650	650	650	650

**IPR - Indirect Potable Reuse*

NOTES: 2015 Ag Irr Use from NSD for Ag. Irr. 2015
North and South use estimated from SRF Progress Reports at ~50.5% of total use.
StoneTree use estimated from SRF Progress Reports at ~49.5% of total use.

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual

<input type="checkbox"/>		Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.	
Use Type		2010 Projection for 2015	2015 Actual Use
Agricultural irrigation		2,500	1,370
Landscape irrigation (excludes golf courses)		400	229
Golf course irrigation		180	225
Commercial use			
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other			
	<i>Type of Use</i>		
Total		3,080	1,824

NOTES: 2010 UWMP projected 580 AF in 2015 for total RW use and did not list the existing StoneTree GC use separately (~180 AF in 2010). Ag Irrigation is lower because it doesn't include LGVSD Ag Irr which is outside of NMWD's Service Territory.

Table 6-6 Retail: Methods to Expand Future Recycled Water Use

<input type="checkbox"/>	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
TBD	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
<i>Add additional rows as needed</i>			
Central Expansion	Install ~ 5.8 miles of 8"-16" pipelines and rehab a 0.5 MG storage tank	2018	196
Conditional Service	New and existing customers are required to use recycled water where available.	Ongoing	
Total			196
NOTES:			

Table 6-7 Retail: Expected Future Water Supply Projects or Programs

<input type="checkbox"/>	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
<input type="checkbox"/>	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
Section 6.8	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type <i>Drop Down List</i>	Expected Increase in Water Supply to Agency <i>This may be a range</i>
	<i>Drop Down List (y/n)</i>	<i>If Yes, Agency Name</i>				
<i>Add additional rows as needed</i>						
Recycled Water Central Expansion	Yes	Novato Sanitary District	Install ~5.8 miles of 8"-16" pipelines and rehab a 0.5 MG storage Tank	2018	All Year Types	218
Agency Modify/Acquire Additional Water Rights	Yes	Sonoma County Water Agency	Agency estimates that existing rights will be exceeded by 2035	2035	All Year Types	5,000
NOTES: Recycled Water Central Expansion quantity also reported in DWR Table 6-6						

Table 6-8 Retail: Water Supplies — Actual

Water Supply	Additional Detail on Water Supply	2015		
<div>Drop down list</div> <div>May use each category multiple times.</div> <div>These are the only water supply categories that will be recognized by the WUEdata online submittal tool</div>		Actual Volume	Water Quality <div>Drop Down List</div>	Total Right or Safe Yield (optional)
Add additional rows as needed				
Purchased or Imported Water	From Sonoma Co. Water Agency	6,034	Drinking Water	
Surface water		1,795	Drinking Water	
Surface water	Sold to IV Golf Course& MC Parks	178	Raw Water	
Recycled Water	North and South Service Areas	454	Recycled Water	
Total		8,461		0

NOTES: FY15 Water Purchase and Surface DW Volumes are from the Water Audit Worksheet provided in the Appendix. Raw water use is from T:\AC\Excel\wtr use\raw water use.xls. Recycled water use is from 2014-2015 Annual Report, Pg. 21.

Table 6-9 Retail: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	Projected Water Supply Report To the Extent Practicable									
<div>Drop down list</div> <div>May use each category multiple times.</div> <div>These are the only water supply categories that will be recognized by the WUEdata online submittal tool</div>		2020		2025		2030		2035		2040 (opt)	
		Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)	Reasonably Available Volume	Total Right or Safe Yield (optional)
Add additional rows as needed											
Purchased or Imported Water	Sonoma County Water Agency	8,699		8,835		8,913		9,028		9,178	
Surface water	Stafford Lake	2,500		2,125		1,750		1,375		1,000	
Recycled Water	North, South and Central	650		650		650		650		650	
Other	Raw Water	218		218		218		218		218	
Total		12,067	0	11,828	0	11,531	0	11,271	0	11,046	0

NOTES: For SCWA purchased water refer to Dec 9 2015 email from D McIntyre to D Seymour with SCWA

Table 7-1 Retail: Basis of Water Year Data

Year Type	Base Year <i>If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000</i>	Available Supplies if Year Type Repeats	
		<input type="checkbox"/>	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____
		<input checked="" type="checkbox"/>	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year	1962	11046	100%
Single-Dry Year	1977	9339	84%
Multiple-Dry Years 1st Year	1988	11046	100%
Multiple-Dry Years 2nd Year	1989	11046	100%
Multiple-Dry Years 3rd Year	1990	11046	100%
Multiple-Dry Years 4th Year <i>Optional</i>			
Multiple-Dry Years 5th Year <i>Optional</i>			
Multiple-Dry Years 6th Year <i>Optional</i>			

Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

NOTES: Volume includes 1000 AFA Stafford Supply, 650 AFA Recycled Water and 218 AFA Raw Water. Ave Year SCWA is 9178 AFA per 2040 demand. For Single Dry Year reduce 9178 AFA by 18.6% per SCWA 2015 UWMP Table 6-3. For Multiple Dry years no reduction per SCWA 2015 UWMP Table 6-4.

Table 7-2 Retail: Normal Year Supply and Demand Comparison

	2020	2025	2030	2035	2040 (Opt)
Supply totals (autofill from Table 6-9)	12,067	11,828	11,531	11,271	11,046
Demand totals (autofill from Table 4-3)	10,662	10,708	10,713	10,805	10,930
Difference	1,405	1,120	818	466	116
NOTES:					

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison

	2020	2025	2030	2035	2040 (Opt)
Supply totals	12,067	10,459	10,034	9,647	9,339
Demand totals	10,662	10,708	10,713	10,805	10,930
Difference	1,405	(249)	(679)	(1,158)	(1,591)

NOTES: SCWA supply volume from DWR Table 6-9 reduced 0% in 2020, 15.5% in 2025, 16.8% in 2030, 18% in 2035 and 18.6% in 2040 per SCWA 2015 UWMP Table 6-3. Stafford Lake supply set at 1000 AFA. No change in raw or recycled water supply. Demands from Table 4-3

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison

		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	12,067	11,828	11,531	11,271	11,046
	Demand totals	10,662	10,708	10,713	10,805	10,930
	Difference	1,405	1,120	818	466	116
Second year	Supply totals	12,067	11,828	11,531	11,271	11,046
	Demand totals	10,662	10,708	10,713	10,805	10,930
	Difference	1,405	1,120	818	466	116
Third year	Supply totals	12,067	11,828	11,531	11,271	11,046
	Demand totals	10,662	10,708	10,713	10,805	10,930
	Difference	1,405	1,120	818	466	116
Fourth year (optional)	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Fifth year (optional)	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Sixth year (optional)	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0

NOTES: Since there is no predicted reduction in water supply for Multiple Dry Years (see SCWA April 8 2016 email from Don Seymour) all years are the same and the supply and demand volumes come from DWR Table 7-2

Table 8-1 Retail Stages of Water Shortage Contingency Plan		
Stage	Complete Both	
	Percent Supply Reduction ¹ <i>Numerical value as a percent</i>	Water Supply Condition <i>(Narrative description)</i>
<i>Add additional rows as needed</i>		
1	Variable , 15% typ	Voluntary, % based on specific Dry Conditions as determined by NMWD, Sonoma County Water Agency or State Water Resources Control Board
2	Variable, 30% typ.	Mandatory, % based on specific Critical Dry Conditions or a Temporary Impairment of water supply as determined by NMWD, SCWA or SWRCB or SCWA enacts its' water shortage allocation methodology provided that storage in Lake Sonoma does not fall below 100,000 AF.
3	Up to 50%	Mandatory, up to 50% when NMWD determines that storage in Lake Sonoma is projected to fall below 100,000 AF based on advice from SCWA, or NMWD or SWRCB advises that mandatory reductions in water use are required.
¹ One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.		
NOTES: See Water Shortage Contingency Plan in Appendix C.		

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses

Stage	Restrictions and Prohibitions on End Users <i>Drop down list</i> <i>These are the only categories that will be accepted by the WUEdata online submittal tool</i>	Additional Explanation or Reference <i>(optional)</i>	Penalty, Charge, or Other Enforcement? <i>Drop Down List</i>
<i>Add additional rows as needed</i>			
all times	Landscape - Restrict or prohibit runoff from landscape irrigation		Yes
all times	Other - Require automatic shut of hoses	for washing cars, boats, machinery, etc.	Yes
all times	Landscape - Other landscape restriction or prohibition	Turf surface area restrictions for residential units and no turf allowed for commercial unless irrigated with recycled water	Yes
all times	Water Features - Restrict water use for decorative water features, such as fountains	Non-recycling systems prohibited	Yes
all times	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	Fix leaks within 72 hours	Yes
all times	Other - Prohibit use of potable water for washing hard surfaces	Prohibited when runoff water flows directly to a gutter or storm drain	Yes
all times	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		Yes
all times	Other	Single pass evaporative cooling systems for AC units	Yes
all times	Other	Non-recirculating industrial clothes wash systems	Yes
1	Other	All above Prohibitions plus specified % voluntary reduction	Yes
1	CII - Lodging establishment must offer opt out of linen service		Yes
1	Other - Prohibit use of potable water for construction and dust control		Yes
1	CII - Restaurants may only serve water upon request		Yes
2	Other - Prohibit use of potable water for washing hard surfaces	No exceptions allowed	Yes
2	Other water feature or swimming pool restriction	Prohibit refilling of a completely drained pool and/or initial filling.	Yes
2	Other	Prohibit non-commercial washing of privately owned vehicles, boats, etc except from a bucket with shut-off nozzle	Yes

2	Landscape - Prohibit certain types of landscape irrigation	Watering any turf or plants except from hand held hose or drip irrigation system except sprinklers can be used is customer maintains the specified water use reduction	Yes
2	Landscape - Other landscape restriction or prohibition	Watering any portion of a golf course except the tees and greens.	Yes
2	Other	Commercial vehicle washing facility in excess of the called for percent or volume reduction in water use	Yes
2	Landscape - Limit landscape irrigation to specific times	Irrigation must occur between 7 pm and 9 am.	Yes
2	Landscape - Limit landscape irrigation to specific days	Limit to specific number of days per week	Yes
3	Other	All above Prohibitions plus specified % mandatory reduction	Yes
3	Landscape - Prohibit certain types of landscape irrigation	No turf irrigation allowed	Yes
3	Landscape - Other landscape restriction or prohibition	Prohibit planting of new landscaping except for designated drought resistant plants	Yes
3	Landscape - Other landscape restriction or prohibition	Golf courses may only use private well or recycled water for irrigation	Yes
3	Landscape - Other landscape restriction or prohibition	Prohibit day and nighttime sprinklering	Yes
3	Landscape - Other landscape restriction or prohibition	Prohibit planting of annual plants, vegetables, flowers or vines.	Yes
3	Other	Limit deliveries of water	Yes
NOTES:			

Table 8-3 Retail Only:
Stages of Water Shortage Contingency Plan - Consumption Reduction Methods

Stage	Consumption Reduction Methods by Water Supplier <i>Drop down list</i> <i>These are the only categories that will be accepted by the WUEdata online submittal tool</i>	Additional Explanation or Reference <i>(optional)</i>
<i>Add additional rows as needed</i>		
All Stages	Expand Public Information Campaign	
All Stages	Improve Customer Billing	
All Stages	Offer Water Use Surveys	
All Stages	Provide Rebates on Plumbing Fixtures and Devices	
All Stages	Provide Rebates for Landscape Irrigation Efficiency	
All Stages	Provide Rebates for Turf Replacement	
All Stages	Decrease Line Flushing	
All Stages	Increase Water Waste Patrols	
All Stages	Implement or Modify Drought Rate Structure or Surcharge	
NOTES:		

Table 8-4 Retail: Minimum Supply Next Three Years

	2016	2017	2018
Available Water Supply	10,850	10,850	11,046

NOTES: 11,046 AFY (from DWR Table 7-1) minus 650 AFY RW (total future) + 454 AFY RW (current RW use, see Table 6-8) = 10,850 for 2016 and 2017. For 2018 increase total RW supply to 650 AFA due to Central RW coming online.

Table 10-1 Retail: Notification to Cities and Counties

City Name	60 Day Notice	Notice of Public Hearing
<i>Add additional rows as needed</i>		
Novato	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>
County Name <i>Drop Down List</i>	60 Day Notice	Notice of Public Hearing
<i>Add additional rows as needed</i>		
Marin County	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Sonoma County	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

SB X7-7 Table-1: Baseline Period Ranges

Baseline	Parameter	Value	Units
10- to 15-year baseline period	2008 total water deliveries	10,583	Acre Feet
	2008 total volume of delivered recycled water	144	Acre Feet
	2008 recycled water as a percent of total deliveries	1.36%	Percent
	Number of years in baseline period ^{1, 2}	10	Years
	Year beginning baseline period range	1995	
	Year ending baseline period range ³	2004	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range ⁴	2007	

¹ If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. ² The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.

³ The ending year must be between December 31, 2004 and December 31, 2010.

⁴ The ending year must be between December 31, 2007 and December 31, 2010.

NOTES:

SB X7-7 Table 2: Method for Population Estimates

Method Used to Determine Population (may check more than one)	
<input type="checkbox"/>	1. Department of Finance (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
<input type="checkbox"/>	2. Persons-per-Connection Method
<input type="checkbox"/>	3. DWR Population Tool
<input checked="" type="checkbox"/>	4. Other DWR recommends pre-review
NOTES: 1. Persons-per-dwelling unit multiplier method using 2000 and 2010 Census data was used to determine the baseline population number back to 1995.	

SB X7-7 Table 3: Service Area Population

Year		Population
10 to 15 Year Baseline Population		
Year 1	1995	52,762
Year 2	1996	51,809
Year 3	1997	51,950
Year 4	1998	52,073
Year 5	1999	53,119
Year 6	2000	54,099
Year 7	2001	54,712
Year 8	2002	56,196
Year 9	2003	56,358
Year 10	2004	57,527
<i>Year 11</i>	<i>2005</i>	
<i>Year 12</i>	<i>2006</i>	
<i>Year 13</i>	<i>2007</i>	
<i>Year 14</i>	<i>2008</i>	
<i>Year 15</i>	<i>2009</i>	
5 Year Baseline Population		
Year 1	2003	56,358
Year 2	2004	57,527
Year 3	2005	59,146
Year 4	2006	60,357
Year 5	2007	60,474
2015 Compliance Year Population		
2015		61,381
NOTES:		

SB X7-7 RA1 - Weighted 2020 Target

Participating Member Agency Name	2020 Target GPCD*	2015 Population	(Target) X (Population)	Regional Alliance Weighted Average 2020 Target
City of Cotati	130	7,288	947,440	
Marin Municipal Water District	124	189,000	23,436,000	
North Marin Water District	139	61,381	8,531,959	
City of Petaluma	141	61,798	8,713,518	
City of Rohnert Park	119	41,675	4,959,325	
City of Santa Rosa	126	173,071	21,806,946	
City of Sonoma	180	11,147	2,006,460	
Valley of the Moon Water District	124	23,478	2,911,272	
Town of Windsor	130	27,486	3,573,180	
Regional Alliance Total	1,213	596,324	76,886,100	129

**All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6, Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

NOTES

SB X7-7 Table 4: Annual Gross Water Use *

Baseline Year Fm SB X7-7 Table 3		Volume Into Distribution System <i>This column will remain blank until SB X7-7 Table 4-A is completed.</i>	Deductions					Annual Gross Water Use
			Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water <i>This column will remain blank until SB X7-7 Table 4-B is completed.</i>	Water Delivered for Agricultural Use	Process Water <i>This column will remain blank until SB X7-7 Table 4-D is completed.</i>	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1995	9,779			-		-	9,779
Year 2	1996	10,328			-		-	10,328
Year 3	1997	10,537			-		-	10,537
Year 4	1998	9,215			-		-	9,215
Year 5	1999	10,188			-		-	10,188
Year 6	2000	10,784			-		-	10,784
Year 7	2001	10,969			-		-	10,969
Year 8	2002	11,042			-		-	11,042
Year 9	2003	10,651			-		-	10,651
Year 10	2004	11,505			-		-	11,505
Year 11	2005	-			-		-	-
Year 12	2006	-			-		-	-
Year 13	2007	-			-		-	-
Year 14	2008	-			-		-	-
Year 15	2009	-			-		-	-
10 - 15 year baseline average gross water use								10,500
5 Year Baseline - Gross Water Use								
Year 1	2003	10,651			-		-	10,651
Year 2	2004	11,505			-		-	11,505
Year 3	2005	10,060			-		-	10,060
Year 4	2006	10,735			-		-	10,735
Year 5	2007	10,326			-		-	10,326
5 year baseline average gross water use								10,655
2015 Compliance Year - Gross Water Use								
2015		7,237	-		-		-	7,237

* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3

NOTES:

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)

Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Annual Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1995	52,762	9,779	165
Year 2	1996	51,809	10,328	178
Year 3	1997	51,950	10,537	181
Year 4	1998	52,073	9,215	158
Year 5	1999	53,119	10,188	171
Year 6	2000	54,099	10,784	178
Year 7	2001	54,712	10,969	179
Year 8	2002	56,196	11,042	175
Year 9	2003	56,358	10,651	169
Year 10	2004	57,527	11,505	179
<i>Year 11</i>	2005	-	-	
<i>Year 12</i>	2006	-	-	
<i>Year 13</i>	2007	-	-	
<i>Year 14</i>	2008	-	-	
<i>Year 15</i>	2009	-	-	
10-15 Year Average Baseline GPCD				173
5 Year Baseline GPCD				
Baseline Year <i>Fm SB X7-7 Table 3</i>		Service Area Population <i>Fm SB X7-7 Table 3</i>	Gross Water Use <i>Fm SB X7-7 Table 4</i>	Daily Per Capita Water Use
Year 1	2003	56,358	10,651	169
Year 2	2004	57,527	11,505	179
Year 3	2005	59,146	10,060	152
Year 4	2006	60,357	10,735	159
Year 5	2007	60,474	10,326	152
5 Year Average Baseline GPCD				162
2015 Compliance Year GPCD				
2015		61,381	7,237	105
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day*Summary From Table SB X7-7 Table 5*

10-15 Year Baseline GPCD	173
5 Year Baseline GPCD	162
2015 Compliance Year GPCD	105
NOTES:	

SB X7-7 Table 7: 2020 Target Method*Select Only One*

Target Method		Supporting Documentation
<input checked="" type="checkbox"/>	Method 1	SB X7-7 Table 7A
<input type="checkbox"/>	Method 2	SB X7-7 Tables 7B, 7C, and 7D <i>Contact DWR for these tables</i>
<input type="checkbox"/>	Method 3	SB X7-7 Table 7-E
<input type="checkbox"/>	Method 4	Method 4 Calculator

NOTES:

SB X7-7 Table 7-A: Target Method 1
20% Reduction

10-15 Year Baseline GPCD	2020 Target GPCD
173	139
NOTES:	

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target

5 Year Baseline GPCD From SB X7-7 Table 5	Maximum 2020 Target ¹	Calculated 2020 Target ²	Confirmed 2020 Target
162	154	139	139

¹ Maximum 2020 Target is 95% of the 5 Year Baseline GPCD
² 2020
 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and
 corresponding tables for agency's calculated target.

NOTES:

SB X7-7 Table 8: 2015 Interim Target GPCD

Confirmed 2020 Target <i>Fm SB X7-7 Table 7-F</i>	10-15 year Baseline GPCD <i>Fm SB X7-7 Table 5</i>	2015 Interim Target GPCD
139	173	156

NOTES:

SB X7-7 Table 9: 2015 Compliance

Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments <i>(in GPCD)</i>					2015 GPCD <i>(Adjusted if applicable)</i>	Did Supplier Achieve Targeted Reduction for 2015?
		Enter "0" if Adjustment Not Used			TOTAL Adjustments	Adjusted 2015 GPCD		
		Extraordinary Events	Weather Normalization	Economic Adjustment				
105	156	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	<i>From Methodology 8 (Optional)</i>	-	105	105	YES

NOTES:

SB X7-7 RA1 - Weighted Baseline

Participating Member Agency Name	10-15 year Baseline GPCD*	Average Population During 10-15 Year Baseline Period	(Baseline GPCD) X (Population)	Regional Alliance Weighted Average 10-15 Year Baseline GPCD
City of Cotati	159	6,559	1,043,146	
Marin Municipal Water District	149	178,670	26,690,318	
North Marin Water District	173	54,061	9,370,435	
City of Petaluma	180	52,622	9,491,997	
City of Rohnert Park	161	40,811	6,582,847	
City of Santa Rosa	145	143,109	20,806,963	
City of Sonoma	225	9,679	2,173,212	
Valley of the Moon Water District	146	20,969	3,058,648	
Town of Windsor	156	24,572	3,834,809	
Regional Alliance Total	1,495	531,051	83,052,375	156

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NOTES

SB X7-7 RA1 - 2015 Target		
Weighted Average 10-15 year Baseline GPCD	Weighted Average 2020 Target	Regional Alliance 2015 Interim Target
156	129	143
NOTES		

SB X7-7 RA1 - 2015 GPCD (Actual)

Participating Member Agency Name	2015 Actual GPCD ¹	2015 Population	(2015 GPCD) X (2015 Population)	Regional Alliance GPCD (Actual)	2015
City of Cotati	93	7,288	679,016		
Marin Municipal Water District	110	189,000	20,716,982		
North Marin Water District	105	61,381	6,461,073		
City of Petaluma	110	61,798	6,823,500		
City of Rohnert Park	89	41,675	3,693,396		
City of Santa Rosa	85	173,071	14,765,037		
City of Sonoma	141	11,147	1,573,338		
Valley of the Moon Water District	90	23,478	2,117,236		
Town of Windsor	99	27,486	2,720,608		
Regional Alliance Totals	923	596,324	59,550,186		100

** All participating agencies must submit individual SB X7-7 Tables, as applicable, showing the individual agency's calculations. These tables are: SB X7-7 Tables 0 through 6, Table 7, any required supporting tables (as stated in SB X7-7 Table 7), and SB X7-7 Table 9, as applicable. These individual agency tables will be submitted with the individual or Regional Urban Water Management Plan.*

NOTES

SB X7-7 RA1 - Compliance Verification

2015 GPCD (Actual)	2015 Interim Target GPCD	Economic Adjustment ¹ <i>Enter "0" if no adjustment</i>	Adjusted 2015 GPCD <i>(if economic adjustment used)</i>	Did Alliance Achieve Targeted Reduction for 2015?
100	143	0	100	YES

¹ Adjustments for economic growth can be applied to either the individual supplier's data or to the aggregate regional alliance data (but not both), depending upon availability of suitable data and methods.

NOTES