In the past, two different options to increase treatment capacity to meet the ultimate demand were considered. These are: 1) design and construct a new Gregory Hill WTP to treat Solano Project supplies, and 2) enter into an agreement with the City of Fairfield for treatment and delivery of SSWA-supplied water through the Fairfield treatment and transmission facilities. The SSWA Board of Directors has not decided how or if to increase system treatment capacity. Water conservation may decrease demand and Cement Hill WTP enhancements may increase its capacity to the point where an additional facility or new source is unnecessary. Slow development and recent effects of conservation have delayed the need to make a decision.

Currently SSWA does not have any facilities to convey and treat Suisun City's State Water Project (SWP) allocation of 1,300 AF/year deliverable through the North Bay Aqueduct (NBA). This item was listed in the February 2005 Solano County Water Agency Integrated Regional Water Management Plan and Strategic Plan as a possible item to be investigated to determine when facilities would be needed in order to meet projected demand increases. Alternatives to accomplish this include:

- The Fairfield option described above provides a convenient means since Fairfield treats NBA water already, and could concurrently treat Suisun City's allocation.
- Suisun City exchanging the NBA water with the Solano Irrigation District in accordance with the 1990 SSWA Implementation Agreement between the two agencies. This can occur once a means is in place to deliver the NBA raw water to SID. The most likely place to do this will be somewhere along the proposed NBA Alternate Intake pipeline southeast of the city of Vacaville.
- Extend a pipeline from the NBA to the Cement Hill WTP and modify the plant to treat NBA water. This appears to be relatively complicated and expensive, and has not been considered seriously in light of other alternatives.

Please see Appendix J for the Capital Improvement Plan included in the 2015 Water Rate Study. It does not include funding for water supply projects since the selection of which project to pursue was (and is) undecided.

Table 6-7. Expected Future Water Supply Projects or Programs

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	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.					
p. 44	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 *Drop Down List*	Expected Increase in Water Supply to Agency *This may be a range*
	Drop Down List (y/n)	*If Yes, Agency Name*				

6.9 Summary of Existing and Planned Sources of Water

Demand projections are shown in Table 6-9. According to the Water Supply Assessment for the Gentry Project, "Both City of Suisun City and Solano Irrigation District have contracts with Solano County Water Agency for water supplies from the federal Solano Project. The Solano County Water Agency is the contracting agency with the United States Bureau of Reclamation (USBR) for the water supplies from the Solano Project". The Solano County Water Agency is also the contracting agency for water supply from the State Water Project's North Bay Aqueduct from which City of Suisun City has an allocation.

Table 6-8 lists the actual volume of purchased or imported water for the SSWA service area.

Table 6-8. Water Supplies – Actual

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume (MG)	Water Quality	Total Right or Safe Yield (MG)
Purchased or Imported Water	Solano County Water Agency under contract to City of Suisun City for Solano Project water	521	Raw Water	521
Purchased or Imported Water	Solano County Water Agency under contract to City of Suisun City for State Water Project water	0		424
Purchased or Imported Water	Solano County Water Agency under contract to Solano Irrigation District for Solano Project water	537	Raw Water	(see note below)
	Total	1,058		945
NOTES: SID is under contract with SSWA to provide Solano Project water to the Authority to meet water demands of new development after full utilization of City of Suisun City's allocated supplies.				

Table 6-9 lists the projected volume of water supplies for the SSWA service area.

Table 6-9. Water Supplies – Projected

Table 6-9 Retail: Water Supplies — Projected											
Water Supply	Additional Detail on Water Supply	Projected Water Supply (MG) *Report To the Extent Practicable*									
		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)*
Purchased or Imported Water	Solano County Water Agency under contract to City of Suisun City for Solano Project water	521	521	521	521	521	521	521	521	521	521
Purchased or Imported Water	Solano County Water Agency under contract to City of Suisun City for State Water Project water	424	424	424	424	424	424	424	424	424	424
Purchased or Imported Water	Solano County Water Agency under contract to Solano Irrigation District for Solano Project water	570	(see note below)	572	(see note below)	576	(see note below)	597	(see note below)	628	(see note below)
	Total	1,515	945	1,517	945	1,521	945	1,542	945	1,573	945
NOTES: SID is under contract with SSWA to provide Solano Project water to the Authority to meet water demands of new development after full utilization of City of Suisun City's allocated supplies.											

6.10 Climate Change Impacts to Supply

Previous section 3.3.1 presents a brief summary of climate change impacts of SSWA service area.

7. WATER SUPPLY RELIABILITY ASSESSMENT

"Reliability" of a water source is defined to be the percentage of a full contractual annual amount that was historically delivered or is modeled to be delivered in the future. Assessment of water supply reliability is complex and dependent upon a number of factors, such as the number of water sources, regulatory and legal constraints, climate change, and expected growth. SSWA has two sources of water, the Solano Project and the State Water Project (SWP), the reliability of which will be assessed below.

7.1 Constraints on Water Sources

State Water Project

There are numerous factors that affect the reliability of SWP supplies. The main factor is hydrologic conditions that result in extremely variable runoff conditions. The SWP has storage from Oroville Reservoir. However most of the SWP water supply comes from Sacramento Valley runoff. There is a myriad of environmental, water quality, and legal constraints on the SWP that effect water supply reliability. The water rights for the SWP are conditioned upon meeting various water quality and environmental conditions including the Federal Endangered Species Act. The models used to develop the SWP reliability data incorporate these constraints.

Solano Project

The main factor affecting Solano Project reliability is the frequency of long droughts which could result in major drawdown of Lake Berryessa. Participating agencies in the Solano Project have entered into a Drought Measures Agreement described below in Section 7.4.2 and attached in Appendix K. Environmental issues have been addressed in a legal settlement regarding downstream flows from the Solano Project, and the settlement has been ratified by the State Water Resources Control Board. Limits on upstream depletions have been established through a settlement agreement administered by a court appointed water master.

As noted in Section 6.9, SSWA receives Solano Project supplies from its two parties, Suisun City and Solano Irrigation District. The reliability of both of these supplies has been analyzed as described at the end of Section 7.2.1. While the entire Suisun City allocation is delivered to SSWA, only a small portion of SID's allocation is delivered to SSWA. At this time SID is able to provide sufficient supply to SSWA to meet its full demand (i.e., guarantee 100% reliability of supply).

7.2 Reliability by Type of Year

Scenarios for analysis of supply reliability are based on deliveries in historic water years characterized as "normal" or "average" water years, and "single dry" water years and combinations of these into "multiple dry water years." See Sections 7.2.1 below for description of these types of years and the reliability during them. Sources of delivery data for SSWA's two supplies – the State Water Project and the Solano Project – are described in the "Sources for Water Data" section below. The main source of information for this analysis is the 2015 Reliability Technical Memorandum by Kennedy Jenks, which is described below. Combined reliability of the SSWA supplies is presented in Section 7.2.2.

7.2.1 Types of Years

In order to categorize water years into Dry and Normal water year types, DWR uses the Sacramento Valley Index, also known as the 40/30/30 index. The Sacramento Valley Index uses 40% of April-through-July runoff, 30% of October-through-March runoff and 30% of the previous year's index. The Index is used to determine water year types in State Water Resources Control Board Decision 1641.

For the 2005 analysis of Solano Project supply delivery data, SCWA developed a year type index based upon procedures similar to those used to develop the Sacramento Valley Index. A model now exists for the Solano Project that uses hydrologic records of Lake Berryessa inflow data. Using similar assumptions as the Sacramento Valley Index, year types

were assigned to each of the years in the Solano Project model resulting in a Lake Berryessa Index that identified wet, normal, and dry years.

The following sections summarize the information in the data sources described in Section 7.2.1.4 below. These data are also used in the following Supply and Demand Assessment in Section 7.3.

Average Year

The average year is a year, or an averaged range of years, that most closely represents the average water supply available to the agency. The UWMP Act uses the term "normal" conditions. Within this 2015 UWMP, the terms "normal" and "average" are used interchangeably.

State Water Project

The estimated deliveries in an average water year are based on the average SWP deliveries over a repeat of the 2015 DCR's historic hydrologic period of 1922 through 2003. Per Table 3c of the 2015 Reliability TM, Suisun City (and therefore SSWA) may in an Average Water Year receive 949 AF, or 73% of its contractual Table A Supply of 1,300 AF. In other words, Suisun City's SWP supply is 73% reliable in a normal water year. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Solano Project

The estimated deliveries in an average water year are based on the average total Solano Project deliveries over a repeat of the 2010 SCWA UWMP's historic hydrologic period of 1906 through 2003.

Per Table 6b of the 2015 Reliability TM, Suisun City (and therefore SSWA) may in an Average Water Year receive 1,588 AF, or 99% of its Participating Agency contractual amount of 1,600 AF. In other words, Suisun City's Solano Project supply is 99% reliable in a normal water year. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Per Table 6g of the 2015 Reliability TM, SID may deliver to SSWA in an Average Water Year 99% of its planned supply amount. Refer to Section 7.1 above for a discussion of what this quantity is. In other words, SID's Solano Project delivery to SSWA is 99% reliable in a normal water year. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Single Dry Year

The single-dry year is the year that represents the lowest water supply available to the agency.

State Water Project

The estimated deliveries in a single dry water year are based on a repeat of the worst case historic single dry year of 1977. Per Table 3c of the 2015 Reliability TM, Suisun City (and therefore SSWA) may in a Single Dry Water Year receive 282 AF, or 22% of its contractual Table A Supply of 1,300 AF. In other words, Suisun City's SWP supply is 22% reliable in a single dry water year. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Solano Project

The estimated deliveries in a single dry water year are based on the average percent of total Solano Project allocation during single dry years.

Per Table 6b of the 2015 Reliability TM, Suisun City (and therefore SSWA) may in a Single Dry Water Year receive 1,575 AF, or 98% of its Participating Agency contractual amount of 1,600 AF. In other words, Suisun City's Solano Project supply is 98% reliable in a single dry water year. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Per Table 6g of the 2015 Reliability TM, SID may deliver to SSWA in a Single Dry Water Year 98% of its planned supply amount. Refer to Section 7.1 above for a discussion of what this quantity is. In other words, SID's Solano Project delivery to SSWA is 98% reliable in a normal water year. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Multiple Dry Year

The multiple dry year period is the period that represents the lowest average water supply availability to the agency for a consecutive multiple year period (three years or more). This is generally considered to be the lowest average runoff for a consecutive multiple year period (three years or more) for a watershed since 1903. DWR has interpreted "multiple dry years" to mean three dry years. However, water agencies may project their water supplies for a longer time period.

State Water Project

The estimated deliveries in a multiple dry water year period are annual averages over four consecutive dry years, based on a repeat of the historic four-year dry period of 1931-1934. Per Table 3c of the 2015 Reliability TM, Suisun City (and therefore SSWA) may in a Multiple Dry Water Year period receive 314 AF, or 24% of its contractual Table A Supply of 1,300 AF. In other words, Suisun City's SWP supply is 24% reliable in multiple dry water years. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Solano Project

The estimated deliveries in a multiple dry water year period are annual averages over four consecutive dry years, based on a repeat of the historic four-year dry period with low inflow to Lake Berryessa of 1990-1994.

Per Table 6b of the 2015 Reliability TM, Suisun City (and therefore SSWA) may in a Multiple Dry Water Year period receive 1,427 AF, or 89% of its Participating Agency contractual amount of 1,600 AF. In other words, Suisun City's Solano Project supply is 89% reliable in multiple dry water years. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Per Table 6g of the 2015 Reliability TM, SID may deliver to SSWA in a Multiple Dry Water Year period 89% of its planned supply amount. Refer to Section 7.1 above for a discussion of what this quantity is. In other words, SID's Solano Project delivery to SSWA is 89% reliable in a normal water year. This figure is used throughout the period of the 2015 UWMP of 2015 to 2040.

Sources for Water Data

State Water Project

Specific information on the reliability of SCWA's SWP supply comes from the 2015 DWR State Water Project Delivery Capability Report (DCR), a copy of which is included in Appendix V. (This biennial report is an update to the 2009 DWR SWP Delivery Reliability Report used for the SSWA 2010 UWMP.) In this 2015 update, DWR provides SWP supply estimates for SWP contractors to use in their planning efforts, including for use in their 2015 UWMPs. The 2015 DCR includes DWR's estimates of SWP water supply availability under both current and future conditions. Further details on modeling assumptions can be found in the DCR and its appendices.

The 2015 DCR was reviewed for SCWA by Kennedy/Jenks Consultants as technical support for SCWA Partner Agencies (of which SSWA is one) to address water supply reliability for their 2015 UWMPs. The results of the work by Kennedy/Jenks Consultants are presented in the draft SCWA Water Supply Reliability Technical Memorandum (Appendix L) dated April 14, 2016 (the 2015 Reliability TM). The following factors are of significance:

2014 SWP Water Supply Allocation

"The extremely dry sequence from the beginning of January 2013 through the end of 2014 was one of the driest two-year periods in the historical record. Water year 2013 was a year with two hydrologic extremes. October through December 2012 was one of the wettest fall periods on record, but was followed by the driest consecutive 12 months on

record. Accordingly, the 2013 SWP supply allocation was a low 35% of SWP Table A Amounts. The 2013 hydrology ended up being even drier than DWR's conservative hydrologic forecast, so the SWP began 2014 with reservoir storage lower than targeted levels and less stored water available for 2014 supplies. Compounding this low storage situation, 2014 also was an extremely dry year, with runoff for water year 2014 the fourth driest on record. Due to extraordinarily dry conditions in 2013 and 2014, the 2014 SWP water supply allocation was a historically low 5% of Table A Amounts. The dry hydrologic conditions that led to the low 2014 SWP water supply allocation were extremely unusual, and to date have not been included in the SWP delivery estimates presented in DWR's 2015 Delivery Capability Report. It is anticipated that the hydrologic record used in the DWR model will be extended to include the period through 2014 during the next update of the model, which is expected to be completed prior to issuance of the next update to the biennial SWP Delivery Capability Report. For the reasons stated above, the SCWA UWMP uses a conservative assumption that a 5% allocation of SWP Table A Amounts represents the "worst case" scenario.

SCWA SWP Reliability

"All scenarios modeled by DWR include North of Delta considerations, including contract specific allocations and the North of Delta Allocation Settlement terms. For long term planning purposes, the Early Long Term (ELT) scenario found in Appendix C of the DCR (excerpted and attached) was agreed upon by the SWP Contractors as the most appropriate scenario to use to estimate future supply availability. Therefore, future [SCWA Table A] SWP supply availability … is based on the ELT study included in the 2015 DCR." SSWA's Table A Supply Reliability is based on SCWA's as shown in Table 1 of the 2015 Reliability TM on page 5 therein.

The 2015 Reliability TM shows the Table A Supply Reliability for SSWA in Table 3c on page 9 thereof. It shows both percentages and acre-feet, and includes carryover amounts.

Solano Project

As part of their scope of services for SCWA, Kennedy/Jenks Consultants also provided a review and summary of Solano Project Reliability. As noted on page 12 of the 2015 Reliability TM, "As noted in the August 10, 2010 SCWA memorandum presenting the 2010 SCWA water supply reliability, the update of the Solano Project reliability analysis from 2005 to 2009 resulted in minimal change. This is assumed to remain true for 2015; therefore, it is recommended that the 2015 Solano Project Reliability estimates use the Solano Project reliability estimates from the 2010 SCWA UWMP." Reliability of the Solano Project supply is presented in the 2015 Reliability Technical Memo, Table 6b on page 14 thereof for Suisun City's allocation, and Table 6g on page 17 thereof for Solano Irrigation District's allocation. Note that the hydrologic period of the study is 1906-2003, while the Lake Berryessa inflow data are available only from 1956 to date. Prior-years' inflows are projected from historical data.

7.2.2 Agencies with Multiple Sources of Water

Many agencies have multiple water sources and each may have a different hydrology, resulting in different base years for each source. For example, an imported water source may have experienced its single driest year in the same year that a local surface water source experienced a normal year.

A basis for the water year data for SSWA's two water sources is presented in Tables 7-1a, 7-1b and 7-1c. Base years were selected by identifying the year of each Water Year Type within the Historical Sequence with reliability most closely matching the average reliability of the Water Year Type over the Historical Sequence. Referring to the description of the reliability analysis above, however, the basis of the water year data cannot be said to be the reliability data of any single water year. Instead the basis is the average of reliabilities of types of water years within the Historical Sequence as determined by DWR in its 2015 SWP Delivery Capability Report and SCWA in its 2010 UWMP Reliability Data Memo.

State Water Project Supply

Table 7-1a shows the average SWP supply reliabilities for the defined water year scenarios.

Table 7-1a. Basis of State Water Project Water Year Data

Table 7-1a Retail: Basis of Water Year Data (a)			
Year Type	**Base Year** *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.*	**Available Supplies if Year Type Repeats**	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available (MG)	**% of Average Supply**
Average Year (b)	Average 1922-2003	309	100%
Single-Dry Year (c)	1977	92	30%
Multiple-Dry Years 1st Year (d)	Average 1931-1934	102	33%
Multiple-Dry Years 2nd Year (d)	Average 1931-1934	102	33%
Multiple-Dry Years 3rd Year (d)	Average 1931-1934	102	33%

NOTES:
(a) State Water Project supply to City of Suisun City. See Appendix L Table 3c for more information about this supply. Supplies to SCWA are based on DWR analyses presented in its "2015 State Water Project Delivery Capability Report" (2015 DCR), assuming existing SWP facilities and current regulatory and operational constraints.
(b) Based on average SWP deliveries over a repeat of the study's historic hydrologic period of 1922 through 2003. This supply is a percentage of City of Suisun City's SCWA contract amount for SWP supply of 1,300 AF.
(c) Based on a repeat of the worst case historic single dry year of 1977 (from 2015 DCR).
(d) Supplies shown are annual averages over four consecutive dry years, based on a repeat of the historic four-year dry period of 1931-1934.

Suisun City Solano Project Supply

Table 7-1b shows the average Suisun City Solano Project supply reliabilities for the defined water year scenarios.

Table 7-1b. Basis of Suisun City Solano Project Water Year Data

Table 7-1b Retail: Basis of Water Year Data (a)			
Year Type	**Base Year** *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.*	**Available Supplies if Year Type Repeats**	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available (MG)	**% of Average Supply**
Average Year (b)	Average 1906-2007	517	99%
Single-Dry Year (c)	Average 1906-2007	513	98%
Multiple-Dry Years 1st Year (d)	Average 1990-1994	465	89%
Multiple-Dry Years 2nd Year (d)	Average 1990-1994	465	89%
Multiple-Dry Years 3rd Year (d)	Average 1990-1994	465	89%

NOTES:
(a) Basis of Water Year Data - City of Suisun City Solano Project supply. See Appendix L Table 6b for more information about this supply.
(b) Average Year - Average year is based on average total Solano Project deliveries over a repeat of the historic hydrologic period of 1906 through 2007. This supply represents the percentage of City of Suisun City's Solano Project Contract Amount of 1,600 AF, not including canal losses.
(c) Single-Dry Year - (1) Based on the average percent of total Solano Project allocation during Single Dry Years over the study's historic hydrologic period of 1906-2007.
(d) Multiple-Dry Years - Supplies shown are annual averages over four consecutive dry years, based on a repeat of the historic four-year dry period with low inflow to Lake Berryessa of 1990-1994.

SID Solano Project Supply

Table 7-1c shows the average SID Solano Project supply reliabilities for the defined water year scenarios. As noted in Section 7.1 above, the Volume Available cannot be listed in Table 7.1 because the volume available from SID's Solano Project supply is not fixed.

Table 7-1c. Basis of SID Solano Project Water Year Data

Table 7-1c Retail: Basis of Water Year Data (a)			
Year Type	**Base Year** *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.*	**Available Supplies if Year Type Repeats**	
		☐	Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____
		☑	Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available (MG)	**% of Average Supply**
Average Year (b)	Average 1906-2007	45,607	99%
Single-Dry Year (c)	Average 1906-2007	45,214	98%
Multiple-Dry Years 1st Year (d)	Average 1990-1994	40,967	89%
Multiple-Dry Years 2nd Year (d)	Average 1990-1994	40,967	89%
Multiple-Dry Years 3rd Year (d)	Average 1990-1994	40,967	89%

NOTES:
(a) Solano Project supply of 141,000 AF, not including canal losses for Solano Irrigation District (NOT SSWA). See Appendix L Table 6g for more information about this supply.
(b) Based on average percent allocation (including canal losses) during Average Years over the study's historic hydrologic period of 1906 through 2007.
(c) Based on the average percent allocation (including canal losses) during Single Dry Years over the study's historic hydrologic period of 1906-2007.
(d) Supplies shown are average percent allocation (including canal losses) over four consecutive dry years, based on a repeat of the historic four-year dry period with low inflow to Lake Berryessa of 1990-1994.

Solano Irrigation District may have additional water supply agreements in place with other agencies, which are not represented in this table.

7.3 Supply and Demand Assessment

Note that the following information must be provided to all cities and counties within the Suisun-Solano Water Authority's service area within 60 days of submission of the 2015 UWMP to the DWR. Reliability is based on the normal/average water year supply, not the contractual allocation.

Normal/Average Water Years

Comparison of the projected normal water supply to the projected normal water use over the next 20 years in 5-year increments is shown in Table 7-2 below. Note that the only water supply available to SSWA within the table's timeframe is the Solano Project supply.

Table 7-2. Normal Year Supply and Demand Comparison

Table 7-2 Retail: Normal Year Supply and Demand Comparison (MG)					
	2020	2025	2030	2035	2040
Supply totals *(autofill from Table 6-9)*	1,515	1,517	1,521	1,542	1,573
Demand totals *(autofill from Table 4-3)*	1,515	1,517	1,521	1,542	1,573
Difference	0	0	0	0	0

Single Dry Water Years

Comparison of the projected single-dry-year water supply to the projected single-dry-year water use over the next 20 years, in 5-year increments is shown in Table 7-3 below. The supply totals are based upon the Combined Regional Supply Reliability of 100% as described in Section 7.4.2 below.

Table 7-3. Single Dry Year Supply and Demand Comparison

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison (MG)					
	2020	2025	2030	2035	2040
Supply totals	1,515	1,517	1,521	1,542	1,573
Demand totals	1,515	1,517	1,521	1,542	1,573
Difference	0	0	0	0	0
NOTES: Supply totals consist of 3 sources: SCWA's contract with Suisun City for Solano Project water, SCWA's contract with Suisun City for SWP water, and SCWA's contract with SID for Solano Project water. The amount of water from SID equals the demand minus the SCWA/SP water and SCWA/SWP water.					

Multiple Dry Water Years

Comparison of the projected multiple dry year water supplies to the projected multiple dry year water use over the next 20 years, in 5-year increments is shown in Table 7-4 below. The supply totals are based upon the Combined Regional Supply Reliability of 100% as described in Section 7.4.2 below.

Table 7-4. Multiple Dry Years Supply and Demand Comparison

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison (MG)						
		2020	2025	2030	2035	2040
First year	Supply totals	1,515	1,517	1,521	1,542	1,573
	Demand totals	1,515	1,517	1,521	1,542	1,573
	Difference	0	0	0	0	0
Second year	Supply totals	1,515	1,517	1,521	1,542	1,573
	Demand totals	1,515	1,517	1,521	1,542	1,573
	Difference	0	0	0	0	0
Third year	Supply totals	1,515	1,517	1,521	1,542	1,573
	Demand totals	1,515	1,517	1,521	1,542	1,573
	Difference	0	0	0	0	0
Fourth year	Supply totals	1,515	1,517	1,521	1,542	1,573
	Demand totals	1,515	1,517	1,521	1,542	1,573
	Difference	0	0	0	0	0
Fifth year	Supply totals	1,515	1,517	1,521	1,542	1,573
	Demand totals	1,515	1,517	1,521	1,542	1,573
	Difference	0	0	0	0	0
Sixth year	Supply totals	1,515	1,517	1,521	1,542	1,573
	Demand totals	1,515	1,517	1,521	1,542	1,573
	Difference	0	0	0	0	0
NOTES: Supply totals consist of 3 sources: SCWA's contract with Suisun City for Solano Project water, SCWA's contract with Suisun City for SWP water, and SCWA's contract with SID for Solano Project water. The amount of water from SID equals the demand minus the SCWA/SP water and SCWA/SWP water.						

7.4 Regional Supply Reliability

This section describes groundwater supply reliability, combined regional supply reliability, and water quality impacts on supply reliability.

7.4.1 Combined Regional Supply Reliability

Full allocations from each SSWA supply are presented in Table 6-9.

To combine the reliability of the sources, reliabilities are converted into expected deliveries, combined and compared to the expected Normal Year delivery amount from the supplies as presented in Tables 7-1a, 7-1b, and 7-1c. SCWA concluded that if projected SCWA and member agency supplies are developed as planned, no shortages are anticipated within SCWA's service area under normal year, single dry year or multiple dry water years through 2040 (i.e., the combined reliability of SSWA's water sources is 100%). However, and as a safeguard, SCWA is pursuing development of other potential supplies.

7.4.2 Measures to Improve Supply Reliability

Solano County Water Agency (SCWA) prepared a "Drought Contingency Plan for 1993." This plan addressed deliveries from both the Solano Project and the North Bay Aqueduct and proposed two potential drought mitigation measures that might temporarily offset or reduce use of surface water supplies, thus preserving urban supplies for agencies like SSWA.

Conjunctive Use

First, increased use of groundwater would mitigate decreased surface supplies due to a drought. Groundwater is extensively used in the north-central portion of Solano County near Vacaville and Dixon, and supplements the surface supply of the State Water and Solano Projects. Since these are both supplies to SSWA, drought effects on groundwater supplies may indirectly affect deliveries to SSWA. However, if the aquifer is overdrawn, this might cause long-term permanent damage to the aquifer due to compaction or subsidence and water quality problems. To date there is no evidence that the aquifer is overdrawn, as noted below.

The City of Suisun City historically used groundwater underlying the Suisun Valley as a supply for the City itself, and SSWA has in the past used one of the City wells to supply its customers in that area. At the present time, no groundwater is used to serve any SSWA service area, and it is unlikely that groundwater will be used in the future. Suisun Valley groundwater is not now or has ever been used in Fairfield or Vallejo service areas. Therefore, drought effects on groundwater supplies in the Suisun Valley, if there should be any, should not significantly affect the supply of groundwater available to SSWA.

Fallowing of Agricultural Land

The second such drought mitigation measure proposed in the SCWA Drought Contingency Plan for 1993 was the potential sale of agricultural water from farmland taken out of production to cities in need of additional water due to drought conditions.

A plan to implement such a system was later formalized in the Solano Project Members' Agreement as to Drought Measures and Water Allocation in 1999. Indeed, fallowing of agricultural land might occur anyway since, per pages 5 and 6 of the SCWA Drought Contingency Plan for 1993: "For agriculture, a 25% or greater cut in Solano Project supplies would require taking land out of production. Local groundwater resources are not adequate to make up the difference from such a Solano Project supply deficiency." This would decrease the surface recharge of shallow aquifers, slow the recharge of the deeper aquifers that are hydraulically connected to the surface aquifers, and result in increased pumping costs for pumping from lower groundwater levels. Based on observed behavior of groundwater levels during and after the 1987-1992 drought, however, recovery from reduced summer recharge is rapid and long-term effects are not expected at this time. Therefore, the actions specified in these drought contingency plans should not significantly affect the supply of surface water available to SSWA.

7.4.3 Water Quality Impacts on Supply Reliability

The water quality in the SSWA service area is very good, with the main source coming from Lake Berryessa. Very little treatment is required to ensure a safe, palatable water supply. Annual water quality reports required by the State reflect compliance with all quality standards. Chlorine is, however, added to the domestic water supply to provide residual disinfection in system pipelines. Other potential impacts could arise from the introduction and uncontrolled spread of invasive species such as Quagga or Zebra mussels as observed in the Colorado River System at Lake Mead and the State Water Project at San Justo Reservoir. Invasive mussel species and/or aquatic plant growth with little or no natural controls could rapidly grow in number and biomass causing reliability issues by clogging intake pipes. Should SSWA start using State Project water, then invasive species may become more of an operational and possibly a water quality issue. Examples of invasive species could include algae species which create toxic by-products, Geosmin, or other taste and odor issues. If this change is ever planned, potential impacts will be dealt with at that time.

8. WATER SHORTAGE CONTINGENCY PLANNING

Water shortage contingency planning is a strategic planning process to prepare for and respond to water shortages. Good planning and preparation can help maintain reliable supplies and reduce the impacts of supply interruptions. This section details SSWA's water shortage contingency planning efforts. Further details are also found in the Water Conservation Requirements (WCR) in Appendix D.

As described in section 6.1 above, SSWA is supplied water from its partner agencies (Suisun City and Solano Irrigation District) through their contracts with the Solano County Water Agency (SCWA). The water supply reliability for SSWA is directly related to the reliability of deliveries of water from the Solano Project (administered by the Federal Bureau of Reclamation, or USBR) and State Water Project (administered by the State Department of Water Resources, or DWR). Reliability is quantified by the percentage of the contracted amount an agency would receive from the supplying agency. (100% reliability means delivery of a full annual allocation, and 50% reliability means delivery of half of an annual allocation.) SCWA conducted a study on the reliability of these two sources for the 2010 UWMPs of its contracted agencies. For this 2015 UWMP, the same method of calculating the reliability data of the Solano County supplies is used. SCWA issued a memoranda documenting the reliability of these sources, which is used for the 2015 UWMP and is included in Appendix L.

State Water Project

The SWP supply is not always available at a consistent level. Plans to replace or supplement the SWP source when there are shortages are the responsibility of SCWA member agencies that contract for SWP supplies. They would typically shift to other supplies such as Solano Project and groundwater (if they have rights to these supplies) or enter into purchase or exchange agreements with other Solano County agencies. SCWA would also keep member agencies informed about any SWP collective programs for dry year water purchases, such as a drought water bank. SCWA would also coordinate any joint local efforts to secure short term water supplies under drought conditions. Increased demand management measures are the responsibility of the member agencies to implement.

Solano Project

Please refer to section 6.1 for a description of the contracts in place for the Solano Project supply. The allocation process for water supplies from the Solano Project is very different than for the SWP. For the Solano Project, the contract between SCWA and USBR calls for the full contract amount to be delivered to SCWA unless it is physically impossible to deliver the water from Solano Project storage (i.e., reservoir is dry). Therefore, the full contract water supply, 207,350 AFY, is allocated until there is no water available in the reservoir (dead storage is 10,300 AF).

8.1 Stages of Action

SSWA formally first codified its Water Conservation Requirements (WCR), an ordinance establishing a Water Shortage Contingency Plan (WSCP), on June 16, 2009; it was adopted by Resolution No. 09-11. Please see the attached copy of the resolution in Appendix D.

As shown in Table 8-1 the Water Conservation Requirements (WCR) define four water shortage stages corresponding to water conservation conditions and are based on the water storage volume in Lake Berryessa (see SSWA WCR Section 3.1 in Appendix D). This table is maintained in acre-feet to match the supporting documentation provided in Appendix D.

Table 8-1. Stages of WSCP

Table 8-1 Retail: Stages of Water Shortage Contingency Plan		
Stage	Complete Both	
	Percent Supply Reduction[1] *Numerical value as a percent*	Water Supply Condition (*Narrative description*)
I	10%	Lake Berryessa Storage Volume: At or above 800,000 af
II	25%	Lake Berryessa Storage Volume: 600,000 - 800,000 af
III	35%	Lake Berryessa Storage Volume: 400,000 - 600,000 af
IV	50%	Lake Berryessa Storage Volume: 200,000 - 400,000 af
[1] One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.		

Note: These Lake Berryessa storage volumes differ from those in the Drought Measures Agreement described in Section 7. The WCR stages listed here are meant to reduce demand while the Drought Measures Agreement stages are meant to conserve supply.

The SSWA Board of Directors shall have sole responsibility for determining whether a water shortage exists or is projected to exist and for determining the magnitude of such shortage. The Board will review recommendations by the SSWA Executive Committee and will authorize implementation of staged water conservation provisions, per WCR Section 3.4. Water shortages can be short term, such as those caused by failure of water system infrastructure, or long term, such as those caused by insufficient raw water supplies.

8.2 Prohibitions on End Uses

Table 8-2 lists water use restrictions (prohibitions) established by the WCR. These are enforceable by the penalties set forth in Table 8-2 below. Typically, these restrictions “shall” be done. Restrictions from prior stages stay in effect when more restrictive stages are enacted.

Table 8-2. Restrictions and Prohibitions on End Uses

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
1-4	Landscape - Restrict or prohibit runoff from landscape irrigation	Prohibit runoff.	Yes
1-4	CII - Other CII restriction or prohibition	Washing sidewalks, walkways, driveways, parking lots and all other hard surfaced areas by direct hosing, except as may be necessary to protect the public health and safety. (WCR § 2.1b)	Yes
1-4	CII - Other CII restriction or prohibition	Multiple shower and lavatory installations within non-residential facilities shall be equipped with metering or self-closing valves except where necessary to protect the public health and safety. (WCR § 4.3.2b)	Yes
1-4	Other - Require automatic shut of hoses	The use of a hose to wash a motor vehicle is prohibited unless fitted with a shut-off nozzle.	Yes
1-4	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner		Yes
1-4	Other	Hot water pipes in all new construction shall be thermally insulated. (WCR § 4.3.2d)	Yes
1-4	Other	New plumbing fixtures, whether installed as part of new construction or as replacements for existing fixtures, shall comply with Health and Safety Code Section 17921.3. (WCR § 4.3.2a)	Yes
2-4	Landscape - Limit landscape irrigation to specific times	Watering is restricted to before noon and after 6:00pm.	Yes
2-4	Landscape - Limit landscape irrigation to specific days	Irrigation of ornamental landscapes or turf is restricted to Mondays and Thursdays for even numbered house addresses, and Tuesdays and Thursdays for odd numbered house addresses.	Yes
2-4	CII - Restaurants may only serve water upon request		Yes
2-4	Water Features - Restrict water use for decorative water features, such as fountains	Only fountains which recycle at least 75% of their water may be operated, and if operated, a sign shall be posted stating that the water is recycled. (WCR § 4.4.4)	Yes
2-4	Other	Non-irrigation outdoor water use: All non-irrigation outdoor water use shall be done in accordance with the established outdoor water use regulations, including the washing of vehicles, buildings, equipment, and structures, and refilling of pools or ornamental bodies of water. (WCR § 4.4.3)	Yes

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

Stage	Restrictions and Prohibitions on End Users	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
3-4	Landscape - Prohibit certain types of landscape irrigation	Landscape irrigation: Watering of trees, shrubs, and other non-turf vegetation shall be restricted to an outdoor water use schedule and only with a hand held hose, bucket, or drip irrigation system.	Yes
3-4	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		Yes
3-4	Water Features - Restrict water use for decorative water features, such as fountains	Operations of fountains shall not be permitted.	Yes
3-4	CII - Lodging establishment must offer opt out of linen service		Yes
3-4	CII - Other CII restriction or prohibition	Drought notices approved by SSWA shall be posted in motels, hotels, and other commercial establishments offering lodgings. (WCR § 4.5.5)	Yes
3-4	Landscape - Prohibit certain types of landscape irrigation	Irrigation of landscaping in new development shall not be permitted, except for relandscaping of existing areas which results in a decrease in water consumption. (WCR § 4.5.7)	Yes
3-4	Other	Non-irrigation outdoor water use: All non-irrigation outdoor water use shall be prohibited except as necessary to protect public health and safety. Prohibited uses include but not be limited to the washing of vehicles, buildings, equipment, and structures, and refilling ornamental bodies of water, except by tank truck services from outside Solano County. (WCR § 4.5.3)	Yes
4	Landscape - Prohibit all landscape irrigation	All landscape irrigation shall be prohibited except with approved greywater use practices. (WCR § 4.6.2)	Yes

8.2.1 Landscape Irrigation

The following categories of prohibitions on landscape irrigation are listed in Table 8.2. The section below includes examples of restrictions or prohibitions that may fall within these categories.

- Prohibit runoff from landscape irrigation – The watering of lawns, grass, ground cover, shrubbery, or trees in a manner that causes water to runoff onto adjacent property, non-irrigated areas, or hard surfaces, such as driveways, sidewalks, and streets, is not permitted.
- Prohibit washing hard surfaces – The washing of sidewalks, walkways, driveways, parking lots, and all other hard surfaced areas by direct hosing is not permitted, except as may be necessary to protect public health and safety.

- Limit landscape irrigation to specific days of the week – Houses with even numbered addresses are permitted to irrigate ornamental landscapes and turf only on Monday and Thursday. Odd numbered addresses are permitted to irrigate ornamental landscapes and turf only on Tuesdays and Fridays.
- Limit landscape irrigation to specific times – Irrigation of ornamental landscapes and turf is limited to before noon and after 6 pm.
- Prohibit certain types of landscape irrigation – During a Stage 3 or 4 condition, the irrigation of landscaping in new developments shall not be permitted, except for re-landscaping of existing areas which results in a decrease in water consumption.
- Prohibit all landscape irrigation – During a Stage 4 condition, all landscape irrigation is prohibited, except with approved greywater use practices.

8.2.2 Commercial, Industrial, and Institutional (CII)

The following categories of prohibitions on CII are listed in Table 8.2. The section below includes examples of restrictions or prohibitions that may fall within these categories.

- Lodging establishments must offer opt out of linen service – Lodging establishments are required to place notices in each room that inform the guest that they may opt out of linen service.
- Restaurants may only serve water upon request by a customer.
- Multiple shower and lavatory installations within non-residential facilities shall be equipped with metering or self-closing valves, except where necessary to protect the public health and safety.

8.2.3 Water Features and Swimming Pools

The following categories of prohibitions on water features are listed in Table 8.2. The section below includes examples of restrictions or prohibitions that may fall within these categories.

- During a Stage 2 condition, a fountain which recycles at least 75% of its water may be operated, and if operated, a sign shall be posted stating that the water is recycled.
- During a Stage 3 or 4 condition, the operation of a fountain is not permitted.

8.2.4 Defining Water Features

The current WCR only references “fountains.” There are no references to “decorative water features.”

8.2.5 Other

The following categories of other prohibitions or restrictions are listed in Table 8.2. The section below includes examples of restrictions or prohibitions that may fall within these categories.

- Customers must repair leaks, breaks, and malfunctions in a timely manner; 24 hours after the leak has been discovered is considered a reasonable time period.
- Require hoses to have automatic shut off nozzles – The use of a hose to wash a motor vehicle is prohibited unless fitted with a shut-off nozzle or similar device that causes it to cease dispensing water immediately when not in use.
- Prohibit use of potable water for washing hard surfaces – Washing impermeable surfaces such as sidewalks, walkways, driveways, parking lots, and all other hard surfaced areas is prohibited, except as may be necessary to protect the public health and safety.

- Prohibit vehicle washing except at facilities using recycled or recirculating water.
- During a Stage 3 or 4 condition, vehicle washing shall only be done if the car wash is equipped with the capability to complete a wash/rinse cycle with a net consumption of 10 gallons of water or less through recycling or low flow spray nozzles.

8.3 Penalties, Charges, Other Enforcement of Prohibitions

To enforce the conservation requirements, penalties and charges are established in increasing severity depending on how many offenses have occurred. These are presented in Section 3.5 of the Water Conservation Requirements and are reproduced in Table 8-2b.

Table 8-2b. Water Shortage Contingency — Penalties and Charges

Penalties or Charges	Stage When Penalty Takes Effect
Issue a written notice of the fact of a violation of a water use restriction to the Account Holder	First violation within the preceding twelve (12) calendar months
Impose a surcharge against the Account Holder for the property where the violation of a water use restriction occurred or is occurring in the amount of $50	Second violation within the preceding twelve (12) calendar months
A surcharge against the Account Holder for the property where the violation of a water use restriction occurred or is occurring, in the amount of $250	Third violation within the preceding twelve (12) calendar months (optional response)
Install a Flow Restrictor in the water service to the property where the violation of a water use restriction occurred or is occurring, at the Account Holder's cost, for a length of time to be determined by SSWA, with annual review by SSWA staff	Third violation within the preceding twelve (12) calendar months (optional response)
Install a Flow Restrictor in the water service to the property where the violation of a water use restriction occurred or is occurring, at the Account Holder's cost, for a length of time to be determined by SSWA, with annual review by SSWA staff.	Fourth and any subsequent violation within the preceding twelve (12) calendar months

Exemptions to these penalties can be granted by the SSWA Board of Directors for various reasons, including medical requirements, livestock, protection of public health and safety, severe economic hardship, substantial re-plumbing to comply, commercial carwashes, golf courses, and nurseries. Refer to WCR sections 4.7 and 4.8.

8.4 Consumption Reduction Methods

While the WCR established restrictions that are enforceable by penalties and charges, they also establish methods of reducing consumption that are set forth below in Table 8-3 below. Typically, these restrictions "should" or "may" be done. Methods from prior stages stay in effect when more restrictive stages are enacted.

8.4.1 Categories of Consumption Reduction Methods

The following categories of consumption reduction methods are listed in Table 8.3. The section below includes examples of consumption reduction methods that fall within these categories. Note that "Other" is a category that will be used to include consumption reduction methods that do not fall into the listed categories.

- Expand Public Information Campaign – SSWA collaborates with county-wide agencies to maintain a water conservation website, www.solanosaveswater.org. Radio advertisements are aired on KUIC 95, based in

Vacaville, and covering all of Solano County. Press releases and newspaper articles are published in the Fairfield Daily Republic and Vallejo Times Herald, both of which are located near Suisun City. Water conservation displays and booths are in place at public events, such as the City's Fourth of July celebration. Water efficiency workshops promoting drought tolerant landscaping are held annually at the Home Depot store in Fairfield and at Solano Resource Conservation District workshops in Vacaville. A series of landscape workshops are held for contractors in Napa or Vallejo.

- Offer-Water Use Surveys – Residential water use surveys are offered to single family residents in Suisun City. Letters are sent to the top 10-20% of high water users to actively reach out to customers. The surveys are conducted by college age interns who are employed by the Solano County Water Agency and managed by staff from the City Fairfield.
- Provide Rebates or Giveaways of Plumbing Fixtures and Devices – Rebates are available for high efficiency clothes washers and high efficiency toilets. Plumbing devices such as low-flow shower heads and faucet aerators are provided free-of-charge at City Hall and at public events, dependent on availability. Hose shut-off nozzles are also made available.
- Provide Rebates for Landscape Irrigation Efficiency – SSWA's Water Savings Incentive Program (WSIP), in collaboration with regional agencies, provides rebates for landscape irrigation system conversion or upgrades, including irrigation controllers, sprinkler heads, and piping.
- Decrease Line Flushing – SSWA has decreased the length of time for each line flushing and decreased the frequency of flushing in an effort to conserve water.
- Reduce System Water Loss – SSWA is implementing a full-scale, system-wide water audit program to identify leaks in the water system and expanding the leak repair program to control system losses. Refer to Chapter 4, Section 4.3 for required distribution system audit protocols.
- Increase Water Waste Patrols – A residential water waste patrol program is implemented. Patrolling is initiated by citizen complaints of overwatering or from visual inspections of water waste. Staffing has been increased. Patrols have the authority to speak to water violators and leave water waste notices at residences.
- Moratorium or Net Zero Demand Increase on New Connections – During a Stage 3 or Stage 4 condition, new service connections may be restricted.
- Other – Any other consumption reduction method that the agency may take that does not fall into the categories listed above.

Table 8-3. Stages of WSCP – Consumption Reduction Methods

Table 8-3 Retail Only: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier	Additional Explanation or Reference *(optional)*
1-4	Expand Public Information Campaign	Drought-specific website
1-4	Offer Water Use Surveys	Ongoing water conservation measure
1-4	Provide Rebates on Plumbing Fixtures and Devices	Ongoing water conservation measure
1-4	Provide Rebates for Landscape Irrigation Efficiency	Ongoing water conservation measure
1-4	Provide Rebates for Turf Replacement	Ongoing water conservation measure
1-4	Decrease Line Flushing	Ongoing water conservation measure
1-4	Reduce System Water Loss	Ongoing water conservation measure
1-4	Increase Water Waste Patrols	Activity implemented only in response to CA State regulations as ordered
3-4	Moratorium or Net Zero Demand Increase on New Connections	Moratorium on new connections. Ongoing water conservation measure
3-4	Implement or Modify Drought Rate Structure or Surcharge	

8.5 Determining Water Shortage Reductions

SSWA water production and usage is fully metered and analyzed monthly to evaluate consumption levels associated with different stages of the Water Shortage Contingency Plan. Demand for each user category is assessed and compared to historical consumption and baseline periods related to normal year storage conditions. Sufficient data are collected to assess modifications to the WSCP if needed. SSWA is planning to implement an Advanced Metering Infrastructure (AMI) system when existing customer meters are replaced. In addition to reducing apparent water losses, the automatic features of an AMI system will permit a responsive analysis of water use reduction due to changes in current shortage conditions.

8.6 Revenue and Expenditure Impacts

Revenue

Implementing the Water Shortage Contingency Plan affects revenue, depending on the water shortage stage condition and customer responsiveness to watering restrictions. For SSWA, revenue impacts based on decreased water sales results in the same percentage reduction in the variable portion of the SSWA water rate revenue. Since 50% of the water

rates are variable, a 20% reduction in water sales results in a 10% reduction in revenue. The 2015 Water Rate Study in Appendix N addresses revenue impacts.

Expenditures

Impacts to expenditures as a result of implementing the Water Shortage Contingency Plan are anticipated to be minor, with increases due to water conservation activities such as monitoring and enforcement of water violations by residential and commercial customers.

8.6.1 Drought Rate Structures and Surcharges

Water rates are unchanged with respect to drought, based on the decision of the SSWA Board of Directors. It is anticipated that water conservation targets will be met without raising rates due to the responsiveness of SSWA customers towards reducing water use. The 2015 Water Rate Study further addresses water rate structures (see Appendix N).

8.6.2 Use of Financial Reserves

The 2015 Water Rate Study addresses SSWA's planned use of financial reserves to deal with decreased water sales during a water shortage (SSWA, 2015). See Appendix N for a copy of the Water Rate Study.

8.7 Resolution or Ordinance

As noted in Section 8.1, SSWA developed a Water Shortage Contingency Plan (WSCP) and codified the WSCP by adopting its Water Conservation Requirements (WCR) by Resolution 09-11, on June 16, 2009. Please see the attached copy of the resolution in Appendix D.

8.8 Catastrophic Supply Interruption

A catastrophic water shortage occurs in the event of a disaster, such as earthquake, flood, fire, or other emergencies, that results in a sudden insufficient supply of available water to meet SSWA's needs. In addition to the Water Shortage Contingency Plan, addressed in Section 8.1, SSWA's Emergency Response Plan defines how SSWA will respond to emergencies and/or disasters that may affect its operations and ability to deliver safe water supplies.

The Emergency Response Plan, updated in 2014, is compatible with the comprehensive Solano County Multi-Hazard Mitigation Plan (MHMP) and includes participation in the nationwide Water/Wastewater Agency Response Network (WARN). The Plan contains a list of the designated responsible personnel, including their duties during an emergency, and a contact list of external staff who may be essential for coordinating multi-agency and multi-jurisdiction support. A Water Quality Emergency Notification Plan, Public Notification Procedures, and a list of equipment on-hand is provided, with information for sources of supplies and equipment.

The following discusses actions that would take place if there is a catastrophic event affecting either the Solano Project or SWP supplies.

Earthquake: In the event of an earthquake, the Solano Project Emergency Response Plan (Plan) is invoked. The Plan, developed in coordination with the Solano County Water Agency (SCWA), and the USBR, provides a detailed response for various levels of seismic activities both at the Monticello Dam site and within a specified geographical area surrounding the Solano Project. The response is to first perform an inspection then do an assessment of any potential damage. If water deliveries are unavailable from the Solano Project, water users would shift to SWP supplies and/or invoke emergency exchange agreements with other agencies.

Should an earthquake result in a disruption of SWP supplies through the North Bay Aqueduct (NBA), the member agencies would have access to Solano Project supplies.

Power outage: The Solano Project is not dependent upon power to operate. It is a gravity system from the Monticello Dam to the end of the Putah South Canal that can be operated manually.

The NBA relies upon PG&E to provide power to pump water through the NBA. A power outage of any duration would result in the NBA not being able to utilize its water supply, except for the limited amount of storage in the pipeline. The NBA water users would shift to Solano Project supplies in this scenario.

Contamination: Any detection of contamination would result in a shut-down of the Solano Project deliveries. Member agencies would switch to SWP supply.

Should there be contamination at the intake to the NBA, the NBA would be shut-down and member agencies would use Solano Project water until the contamination is resolved.

Landslide: The Putah South Canal is susceptible to a landslide which could either block or damage the Putah South's ability to deliver water. In 2014, an underground pipeline bypass was installed in an area most susceptible to a landslide. However, in an event of a landslide that blocks the Putah South Canal, Solano Project water users would shift to a SWP supply.

The NBA is an underground pipeline and not susceptible to any landslide risks.

8.9 Minimum Supply Next Three Years

Water Code Section 10632(b) requires that the UWMP estimate the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. SSWA has two water supply sources: the State Water Project and the Solano Project. These two projects have different historic dry year sequences.

Per SCWA's Solano Project Reliability Study, 2009, the Solano Project's dry year sequences were 1931-1934, 1947-1950, and 1987-1990. The three worst years historically for the Solano Project supply are 1932-1934. The Solano Project sequence is based on reservoir levels.

For the next three years – 2016, 2017, and 2018 – the deliveries corresponding to the three worst years in the Solano Project Historical Sequence are presented in Table 8-4 below. This analysis is limited to the Solano Project due to the expected unavailability of SWP supply due to the lack of connecting infrastructure, as described previously.

Table 8-4 provides SSWA's minimum available water supply numbers for the next three years.

Table 8-4. Minimum Supply Next Three Years

Table 8-4 Retail: Minimum Supply Next Three Years			
Estimate Year	2016	2017	2018
Full Allocation (1)	1,171	1,262	1,353
Historic Year (2)	1932	1933	1934
Historic Reliability, % of Full Allocation Delivered (2)	100%	45%	45%
Available Water Supply	**1,171**	**568**	**609**

NOTES: (1) SSWA's minimum supply over the next three years is based on an interpolation of actual 2015 supply and projected 2020 single dry year water supplies as reported in Table 7-3 with the addition of 65 AF or 21 MG per the SWP allocation as reported in Table 2c of Appendix L.
(2) An application of 100% supply reliability in 2016 and 45% supply reliability in years 2017 and 2018 is based on the August 10, 2010 SCWA UWMP Reliability Data Memorandum based on historic supply reliability for years 1932, 1933, and 1934, respectively.

Solano Project Supplies under Shortage Conditions

Regarding Solano Project supplies, per Section 9 of City of Suisun City's and Solano Irrigation District's Participating Agency Contracts with SCWA, "In any year in which there may occur a shortage from any cause so that the total quantity of water made available to the Agency is less than the total of all quantities contracted for by this Participating Agency and other Participating Agencies, the Agency shall apportion the water supply available to the Agency among all Participating Agency [sic] entitled to receive water from the Project, in proportion to their contractual entitlements to Project Water,…." This authority has never been exercised by SCWA.

SCWA and the Participating Agencies, including SSWA and SID, entered into the Solano Project Members' Agreement as to Drought Measures and Water Allocation in 1999. Please see the attached copy of this Agreement in Appendix K. Per the Drought Measures Agreement deliveries of Solano Project water are reduced based upon storage levels in Lake Berryessa. Once the storage level drops below 800,000 AF, as measured on April 1 of each year, 95% of contract amounts are delivered with 5% being stored in the reservoir as carryover. If the reservoir drops below 550,000 AF by April 1, 90% can be delivered and 10% is stored as carryover. Participating agencies have the ability to carryover more than this amount if they desire. Once the reservoir level is below 450,000 AF on April 1, the participating agencies can use their full allocation and any stored carryover.

Finally, when the storage in Lake Berryessa is less than 400,000 AF on April 1 (this is within the last stage of curtailments described above), Solano Irrigation District will prepare to implement a voluntary agricultural water marketing program for growers to sell their next-year's allocation to cities that are party to the Drought Measures Agreement to meet M&I water needs. (See section 5.8 of the Drought Measures Agreement in Appendix K.)

State Water Project Supplies

Regarding State Water Project supplies, per Section 6 of City of Suisun City's Member Unit Contract, "If at any time there occurs a shortage from any cause in the quantity of project water made available to Agency so that the total quantity made available to Agency is less than the total of all quantities of project water contracted for by this Member Unit and other member units, Agency shall apportion the project water available among all member units in such a manner as Agency shall determine to be equitable. In making such determination, Agency shall consult with all its member units and shall be guided by, but not limited to, consideration of the following factors with respect to each member unit: other supplies of water available to the member unit; the quantities of water normally used by the member unit for domestic, municipal, industrial, commercial, and other purposes, and the relative ability of the member unit to reduce the quantity of water it uses; and the impact various reductions of water supply will have on the economy, public health, and welfare."

Although there are frequent shortages in the SWP supply, SCWA has never used its authority to allocate SWP supplies during any shortages. SCWA has delivered supplies in proportion to contract amounts. SCWA has a two-stage trigger for contingency actions. Stage 1 is if there is a 25% reduction in either SWP and/or Solano Project supplies. During Stage 1 conditions, SCWA will offer to assist member agencies in any internal exchanges or transfers and also assist in securing additional water supplies from outside sources, such as drought water banks or joint efforts with other water agencies, to obtain supplies in dry years.

Stage 2 is invoked if there is a 50% reduction in SWP and/or Solano Project supplies. During Stage 2 conditions, SCWA will perform the same functions in Stage 1 as well as state its willingness to consider allocations of shortages in the SWP supply as specified in the member agency agreements.

9. DEMAND MANAGEMENT MEASURES

The goal of the Demand Management Measure (DMM) section in this 2015 UWMP is to provide a comprehensive description of the water conservation programs that have been implemented, are currently being implemented, and those planned to be implemented by SSWA to meet its urban water use target. This section additionally provides general information about the efforts SSWA plans to take to promote conservation and reduce the demand on the water supply.

9.1 Demand Management Measures for Retail Agencies

This section describes the planned efforts of SSWA in implementing various conservation measures to meet their water use targets, as well as SSWA's plans for achieving its water use targets, as described further in Section 5.

9.1.1 Water Waste Prevention Ordinances

(former 2010 UWMP DMM M, Old CUWCC BMP 13, New CUWCC Foundational BMP 1)

A water waste ordinance explicitly states that the waste of water is to be prohibited. The ordinance may prohibit specific actions that waste water, such as excessive runoff from landscape irrigation, or use of a hose outdoors without a shut off nozzle.

A water waste prevention ordinance is in place at all times and is not dependent upon a water shortage for implementation. However, a water waste ordinance may include increasingly restrictive prohibitions that may be implemented in response to shortages.

SSWA has complied with this Best Management Practice since 1992. SSWA's Water Conservation Requirements were adopted by Resolution No. 09-11 on June 16, 2009 which placed restrictions on water use during Stage 1 through Stage 4 Water Conservation Conditions. Stage 1 Minimum Water Conservation Conditions are in place regardless of the volume of water storage, even during non-drought years. Stage 1 restrictions include wasting water, landscape irrigation during the hours between noon and 6 pm, new plumbing fixtures must meet compliance requirements, and multiple shower and lavatory installations within non-residential facilities must be equipped with metering valves.

Stage 2, 3, & 4 Conditions correlate with increasing severity of water shortage, based on Lake Berryessa storage levels. Residential and commercial watering restrictions also become increasingly strict. See Table 8-3. On August 14, 2014, Resolution 14-06 was adopted, declaring a Stage 2 Drought Condition and implementation of Stage 2 water conservation measures. On June 8, 2015, Resolution 15-05 was adopted to declare a continued Stage 2 drought condition and implement updated Stage 2 water conservation measures in compliance with the State Water Resources Control Board's Emergency Regulation for Statewide Urban Water Conservation.

Method for Evaluation of Effectiveness: SSWA's Water Waste Prohibition ordinance is based on available water supplies, correlated to Stage I – IV water levels at Lake Berryessa. SSWA considers its customer water use prohibitions to be highly effective and a solid safeguard towards protecting SSWA's water supplies in the event of drought or catastrophe. The effectiveness of the ordinance is measured by analyzing the amount of production and water usage during a Stage 1 Minimum Condition compared to a Stage 2 Drought Condition. For example, during 2013, a Stage 1 condition was in place, compared to the Stage 2 condition in 2015. Water production and usage was significantly lower in 2015, attributed to the Stage 2 watering prohibitions in place.

Estimated Water Savings: While it may be possible to quantify the water savings related to the prohibitions listed above, assumptions must be made as to the performance of the equipment and the amount of equipment and fixtures that are affected.

9.1.2 Metering

This measure was DMM D is the 2010 UWMP and foundational BMP 1 in the new CUWCC measure structure.

All of SSWA's service area accounts are metered. Metering and monitoring of municipal uses is critical to fully assessing water use within the City. Quantifying distribution system water loss, leaks, revenue, and future water use projections are examples of metering benefits

Method for Evaluation of Effectiveness SSWA evaluates metering effectiveness by analyzing water usage from its different customer categories and comparing usage with previous timeframes.

9.1.3 Conservation Pricing

(former 2010 UWMP DMM K, New CUWCC Foundational BMP 1)

This section describes the conservation pricing structure that is always in place for SSWA's service area as well as the drought rate structures.

The SSWA Board adopted single-tier water rates by Resolution No. 15-02 at their April 13, 2015 meeting. The rates are presented in Figure 9-1 below. The rates were based on the *Water Rate Study for the Suisun-Solano Water Authority* dated January 30, 2015 (SSWA 2015). This study addressed the billing tier issue raised by Proposition 218 and recent court decisions, particularly the San Juan Capistrano court decision, that require a specific demonstration of increased costs to an agency to justify delivery of additional water at a higher tier. Since SSWA could not make such a demonstration, the tiered Commodity Charges of the water rates were eliminated and a single-tier water rate structure was adopted to comply with the court decisions.

Figure 9-1. Single-Tier Water Rates

Fiscal Year	2015/16	2016/17	2017/18	2018/19	2019/20
Fixed Charges by Meter Size					
5/8 x 3/4 inch	$44.11	$47.64	$50.03	$52.53	$55.15
3/4 inch	$44.11	$47.64	$50.03	$52.53	$55.15
1 inch	$70.03	$75.63	$79.41	$83.38	$87.55
1 1/2 inch	$87.30	$94.29	$99.00	$103.95	$109.15
2 inch	$173.68	$187.57	$196.95	$206.80	$217.14
3 inch	$260.05	$280.86	$294.90	$309.65	$325.13
4 inch	$346.43	$374.15	$392.85	$412.50	$433.12
6 inch	$864.69	$933.86	$980.56	$1,029.58	$1,081.06
Commodity Charges in ccf					
Single Family Residential	$1.99	$2.15	$2.26	$2.37	$2.49
Multifamily Residential & Non-Residential	$1.99	$2.15	$2.26	$2.37	$2.49

Notes:

1. Fixed charges are bi-monthly; commodity charges are per 100 cubic feet (ccf).
2. Source: SSWA. *Water Rate Study for the Suisun-Solano Water Authority*, Resolution no. 15-02, Exhibit A, January 30, 2015.

Method for Evaluation of Effectiveness: Rates can be studied to see if they change customer water use patterns.

Estimated Water Savings: No method has been identified to determine water savings from conservation pricing at this time.

9.1.4 Public Education and Outreach

Public Information

(former 2010 UWMP DMM G, New CUWCC Foundational BMP 2)

As a member of the Solano Urban Water Conservation Committee (UWCC), SSWA is involved in numerous public information activities. The lead agency for the UWCC is the Solano County Water Agency (SCWA) which has promoted regional collaboration for public information outreach and other water conservation efforts.

SSWA participates in various local media avenues to dispense water conservation information. Press releases, newspaper articles, radio announcements, and the "Solano Saves Water" website are all components of the public information program. Events include booths at Earth Day and Fourth of July events, where home water conservation items are distributed. Water conservation pamphlets and flyers are posted at City Hall counters and water conservation booths. In addition, a Water-Wise Gardening cd is promoted, and a well-received demonstration garden is in nearby Vallejo at the Six Flags Discovery Kingdom amusement park.

Marketing Strategy: The UWCC meets monthly to evaluate public information programs and to plan future water conservation activities. Announcements, flyers, newspaper ads, or website links have all been methods for marketing the program. Members of the UWCC often attend public events as exhibitors or participants, and are able to assess the effectiveness of programs.

Tracking of Participation: The numbers of attendees at public events are a gauge for tracking participation. Radio listenership, newspaper circulation, and website hits are all reviewed to assess the program's success. Furthermore, the numbers of cards, brochures, and free conservation devices distributed are tabulated to determine public interest.

Planned Implementation Schedule and Budget: SSWA will maintain the public information program through 2020 with continual evaluation of the program's viability. SCWA will apply for grants on behalf of SSWA and other member agencies grants if possible.

Method for Evaluation of Effectiveness: The popularity of public programs is a measurement of the effectiveness of the program.

Estimated Water Savings: Estimating water savings is difficult to quantify. The reduction in overall water use by SSWA in 2015 can be partly attributed to public information efforts.

School Education

(former 2010 UWMP DMM H)

SSWA participates in a regional program, the School Water Education Program (SWEP), which retains an education consultant to administer water conservation education. The consultant coordinates K-12 programs regionally for Suisun City, Fairfield, Benicia, Vallejo, Dixon, Vacaville, and Travis Air Force Base. The consultant visits classrooms, provides in-class education, and trains educators. State-wide curriculum teaching standards are adhered to. Activities include school assemblies, field trips, video contests, and public programs, such as Youth Ag Day. More information on the school educational program can be found on the Solano Resource Conservation District (RCD) website at http://www.solanorcd.org/resources/swep.html or in Appendix O.

The program is very successful and the education consultant has worked with the following schools located in Suisun City, or with local students that attend nearby schools:

- Crescent Elementary
- Dan O. Root Elementary
- Suisun Valley Elementary
- Crystal Middle School
- Green Valley Middle School
- Green Valley Elementary
- Tolenas Elementary
- Rodriquez High School

In 2014-2015, there were a total of (570) students reached from classroom instruction water conservation, (330) students attended a school assembly presentation in water science and conservation, and (100) students participated in a youth educational event.

Marketing Strategy: SWEP will continue to market the program by maintaining the solid relationships that the program has fostered with schools and educators, and reaching out to other educators.

Tracking of Participation: The number of students, educators, and schools are tracked to evaluate the success of programs.

Planned Implementation Schedule and Budget: SSWA will continue is partnership with SWEP program, and collaborate with other regional efforts that focus on water conservation. SSWA's share of the SWEP budget is $4,320 per year, and no changes in the budget are anticipated though 2020.

Method for Evaluation of Effectiveness: School response from educators is the greatest way to evaluate effectiveness. Comments from schools have been positive, with numerous invitations for the Education Consultant to return in subsequent school years, and expand the program.

Estimated Water Savings: Considering the difficulty of placing a numerical value for water savings, the effectiveness of the program can be the gauge for the program's success.

9.1.5 Programs to Assess and Manage Distribution System Real Loss

SSWA water losses are quantified in Section 4.3 of this 2015 UWMP. This section presents a description of routine and planned system maintenance to prevent losses. This measure represents the 2010 UWMP DMM C, oId CUWCC BMP 3, and new CUWCC Foundational BMP 1.

SSWA has a surface leak detection and repair program that is done on a passive basis where leaks are repaired when identified by staff. Historically, SSWA has not had an active leak detection and repair program. Historic water losses have been on the order of 20% of system input volume (production), although some data inconsistencies may overstate the actual losses. A system-wide audit for leak detection and repair is needed to adequately assess the extent of leaks that may be occurring in an aging infrastructure system.

Implementing a system-wide audit program is a top priority for a first stage capital improvement program for SSWA and it will be in a phased approach over the next few years as SSWA further develops the data needed to complete a full-scale audit.

Prior Work: In 2012-2013, SSWA conducted a system-wide water audit to support this effort to involve more robust data collection and management (e.g., source meter testing, random customer meter testing, SCADA system review, billing system analysis for missing accounts). A copy of the results of the Calendar Year 2011 Annual Water Balance can be found in Appendix P. SSWA and the contractor looked into the potential sources for real (leaks, tank overflows, etc.) or apparent losses (billing errors, inaccurate meter readings, etc.), in order to determine the best course of action to

address the chronic water losses. (Apparent losses can be treated as an operational expense and water loss reductions as a capital expense.)

Table 9-2 below presents information on the progress and funding of water loss program information since the 2010 UWMP.

- The water loss for CY 2011 was calculated to be 22%. In January 2013 two rounds of leak detection and repair were done in the Old Town system, resulting in repair of 13 leaks and a leak reduction of an estimated 31 gpm. Projecting this loss reduction for a full year equals 16.3 MG not lost in CY 2012 and following. This reduces the water loss to 21% of 2012 production, and this figure is the estimated loss for the rest of the report period.
- The 2012 leak detection survey of the Old Town Suisun City section of the distribution system covered approximately 11 miles of main using advanced sonic leak detection equipment. Additional surveying was to be part of the follow-on project described below.
- No main pipelines have been replaced in the distribution system. Leaks have been repaired and the repair history does not yet indicate the need of a program to replace the mains, which are still within their useful lifetimes.
- The Water Balance project occurred over three years; annual expenses are shown in Table 9-1.

Table 9-1. Actual Implementation

	2011	2012	2013	2014	2015
% of water loss as system input volume	22%	21%	21%	21%	21%
Miles of distribution lines surveyed	0	11	0	0	0
Miles of lines repaired	0	0	0	0	0
Projected expenditures - $	220	86,430	137,760	0	0

Planned Projects and Implementation Schedule:

1. Pursuant to the requirements of SB555 and following the American Water Works Association Manual of Practice M36, Water Audits and Loss Control Programs, SSWA will conduct a validated water loss audit in 2016 and 2017, with annual audits thereafter. This will help identify the highest priorities for addressing the water losses. The highest priority will focus on first addressing the non-revenue water in order to recover revenue issues that will in turn assist with paying for some of the repairs and upgrades anticipated.
2. To address non-revenue water loss, SSWA is planning conversion to an Advanced Metering Infrastructure (AMI) system in 2017. Besides reducing apparent losses, the system will contribute to improved customer service, revenue recovery and operational efficiency.
3. To address real water loss SSWA will undertake the full-system leak detection and repair (LD&R) project in 2017, and a full-system District Metered Area (DMA) project in 2018.

Planned Budget and Funding: SSWA has prepared a long-term capital improvement program (CIP) that includes the proposed AMI, LD&R and DMA projects. The Authority is preparing to sell bonds in summer 2016 to raise funds for these projects. The budget and timing for these three capital projects are shown in Table 9-2. The validated water audit is classed as an operational expense and will be funded annually in the Authority's Operations Budget.

Estimated schedule and budget will be determined as part of a work plan developed each year as the highest priorities are identified and methodically addressed. The SSWA staff and contractor plan to undertake a methodical approach over the next ten years to address both the real and apparent losses in an effort to curb the historic water losses. Grant opportunities to enhance the program will be explored. Apparently many water system capital projects are eligible for State Revolving Fund (SRF) funding.

Table 9-2. Planned Implementation*

	2016	2017	2018	2019	2020
% of water loss as system input volume	21%	19%	18%	17%	16%
Miles of distribution lines to be surveyed	3.0	3.0	3.0	3.0	3.0
Miles of lines to be repaired	0.25	0.25	0.25	0.25	0.25
Projected expenditures	$125,000	$125,000	$125,000	$125,000	$125,000
Advanced Metering Infrastructure (AMI) System	$1,000,000	$1,000,000	$1,000,000	--	--
Leak Detection & Repair Project (in FY 2016-17)	$100,000	$100,000	--	--	--
District Metered Area Project (in FY 2017-18)	--	$100,000	$100,000	--	--

*An analysis of the effects of the AMI, leak detection and repair, and metered area projects on NRW was not performed but notable improvements from the implementation of these three projects is anticipated.

Method for Evaluation of Effectiveness: According to the American Water Works Association's *Manual of Water Supply Practice, M36,* in order to achieve best practices in water loss control each year, SSWA and the contractor will conduct a Water System Audit based on the production, metered demand, and other appropriate data to determine the water losses (AWWA, 2009). It is expected that the non-revenue water will decline as more water is accounted for and real and apparent water losses are addressed. Based on the results of the previous year's audit and available funding, SSWA will set the priorities for the coming year.

As discussed in Section 5.6, implementation of this measure is a critical strategy in meeting the GPCD interim 2015 and 2020 targets. The outcomes of efforts to reduce system losses, and thus overall system production, will be closely monitored along with GPCD between 2016 and 2020.

Estimated Water Savings: Actual water savings from individual leaks are difficult to measure or estimate given the leak has been running an indeterminate amount of time. The measurement of water savings for this measure will be estimated based on the results of the annual water system audit. It is anticipated that the audit will show a declining non-revenue water component that indicates real or apparent water losses have been reduced or alternatively measurements of reductions in real losses due to actions taken (e.g., leak repairs, main replacement). It is envisioned that implementation of this water loss control program could provide the greatest water savings of all SSWA's water conserving measures.

9.1.6 Water Conservation Program Coordination and Staffing Support

(former 2010 UWMP DMM L, New CUWCC Foundational BMP 1)

This section includes the contact information of SSWA's water conservation coordinator as well as a description of the support staff and program funding. The current water conservation coordinator is:

Paul Lum
Suisun-Solano Water Authority
810 Vaca Valley Parkway, Suite 201
Vacaville, CA 95688
Phone: (707) 455-4024
E-mail: LumP@sidwater.org

Mr. Lum is a Solano Irrigation District (SID) employee and serves on the Solano Urban Water Conservation Committee, which manages and coordinates water conservation programs. Mr. Lum is a certified Level 1 Water Conservation Practitioner, and is assisted in BMP implementation by Kevin King, SID's Manager of Water and Power Operations, and James Daniels, SID's District Engineer.

Additional internal staff and outside consultants are added as necessary to assist SSWA in meeting our commitment in reaching our water conservation targets, goals and objectives.

9.1.7 Other Demand Management Measures

SSWA recognizes the need to explore additional opportunities to increase water conservation savings. The following efforts listed below are managed on a trial basis, enabling staff time to assess the effectiveness of the programs.

Water Efficiency Landscape Program (Turf Replacement Rebate Program)

The turf replacement program provides rebates to residential and commercial customers who replace turf with drought tolerant plants. In 2015, 8 rebates were distributed at $1 per square foot replaced. College age interns perform inspections to ensure that applicants meet pre-project and post-project criteria. The renovated area must not include artificial turf products or non-permeable surfaces. Plantings must cover at least 50% of the project area when mature. Rebates are offered once per customer, on a first-come-first served basis, and subject to funding availability. The program is projected to continue through 2020 at the same level of participation as in 2015.

See Appendix Q for a screen shot of the Turf Replacement Rebate program website.

Water Survey Programs for Single Family and Multifamily Residential Customers

(former 2010 UWMP DMM A, New CUWCC BMP 3)

Suisun-Solano Water Authority offers a comprehensive water survey program, in place from spring through fall of each year, which is free to its customers. The program includes both Single Family and Multifamily Account holders. A Water Conservation Representative provides on-site checks for leaks and indoor plumbing flow rates, evaluates irrigation system efficiency, and advises on irrigation scheduling and irrigation timer adjustments. In addition, water conservation information and water efficient plumbing devices are distributed to homeowners.

SSWA cost shares the program expenses with SCWA. SSWA provided $2,200 in funding toward the program in 2015.

Marketing Strategy: The program is marketed by identifying the top 10-20% of water users, and sending direct mail letters, promoting the program and informing customers of the scope of the surveys. Flyers are also distributed at City Hall, public events, and on the Solano County Water Agency's water conservation website at www.solanosaveswater.com. Interested customers are reached by phone to schedule appointments or answer questions. Follow-up is made by mail or phone. Staff reviews the response rate and may re-send letters or consider expanding the mailing list to the top 20% of water users.

A baseline has been developed to analyze annual participation, determine potential water savings, and evaluate the effectiveness of the program. In 2015, 39 surveys were performed. The past five-year average number of surveys is 32 surveys per year. Projected expenditures through 2020 are planned at $3,000 per year. SSWA will continue to offer surveys and target the top 10-20% water users. SSWA plans to continue the program and projects 30 surveys conducted per year through 2020.

Method for Evaluation of Effectiveness: The purpose of the program is to introduce homeowners to modest water conserving practices. SSWA evaluates the program by assessing the participation and the acceptance of the program by residents.

Estimated Water Savings: Water savings for this category is difficult to quantify. SSWA could estimate conservation values by comparing pre-survey metering data with post-survey metering data but variables affect the savings

calculations such as changes in weather patterns, behavioral changes due to the drought, and, and the homeowner's willingness to implement the survey recommendations.

Residential Plumbing Retrofit to pre-1992 single family and multifamily residences

(former 2010 UWMP DMM B, New CUWCC BMP 3)

The distribution of water-saving devices to single family and multifamily homes occurs on a year-round basis. The program includes the distribution of indoor plumbing kits, each containing a low-flow shower head, kitchen and bathroom faucet aerators, and a toilet leak detection dye tablet, all free-of charge.

This measure is very popular among residents. Based on replacement rates since 2002, both single family and multifamily residences have reached the 75% target figure for retrofit. In 2015, 477 devices were distributed. The 5-year average number of devices distributed since 2011 is 421 per year.

Marketing Strategy: The indoor kits are available at the City Hall's front counter, public events, and distributed as part of the residential water survey program. The kits and other devices such as hose shut-off nozzles, shower timers, and garden hose timers are also promoted as part of the Solano Saves Water website, and listed on flyers and cards.

Tracking of Participation: The numbers of devices are tracked, and a baseline has been developed to analyze participation. In addition, the number of requests for kits are noted.

Planned Implementation Schedule and Budget: Due to the popularity of the program since 1992, this measure is completed. SSWA's target for future distribution is (500) devices per year through 2020 at a budget of $1,300 in 2016 with a gradual increase to $1,500 per year in 2020.

Method for Evaluation of Effectiveness:

SSWA evaluates the effectiveness by assessing the level of popularity of the devices. The distribution of water conservation kits over a period of many years demonstrates a strong willingness by residents to install the devices and conserve water.

Estimated Water Savings: Water savings can be estimated if the total number of units distributed is multiplied by the projected water savings for the device being replaced, although consideration must be given for unknown factors such as the performance of the older devices being replaced, the willingness of the homeowner to install the devices, and behavioral changes in water use due to the drought.

Large Landscape Conservation Programs and Incentives

(former 2010 UWMP DMM E, Old CUWCC BMP 5, New Programmatic BMP 5)

Large Landscape Surveys

SSWA offers free large landscape site surveys for commercial and institutional accounts with dedicated irrigation meters. The surveys are conducted by a certified irrigation consultant, and includes an evaluation of water use and irrigation system performance, with recommendations given to improve irrigation efficiency. Landscaped areas are measured by aerial photo or by hand measurement. Water budgets are then developed by comparing actual water use with local evapotranspiration (ETo)[1] rates. As part of the program, a Smart Irrigation Controller rebate is also offered

[1] ETo is defined to be the amount of water needed by well-watered cool season turf grass, normally expressed as inches/week or per month or per year.

(see web site: http://solanosaveswater.org/). An example of a completed irrigation system water survey is contained in Appendix R. In 2015 -2015, two large landscape surveys were conducted at a cost to SSWA of $3,000, and a majority of costs funded by SCWA.

Marketing Strategy: The program is marketed to large landscape accounts. Commercial and institutional customers are the major participants. Examples of recent municipal survey sites include city parks such Independence Park and McCoy Creek Park. Promotion is by phone calls, site visits, direct mail, website, and flyers distributed at public events.

Tracking of Participation: The number of large landscape surveys conducted is utilized to track participation, assess outcomes, and form a component of a water savings formula. The surveys performed demonstrated that significant water savings were possible; SSWA reviews pre-survey and post-survey customer account metered water use.

Planned Implementation Schedule and Budget: SSWA will continue implementing its large landscape conservation programs and incentives. SSWA continues to increase outreach efforts to gain greater participation among its customer base. Grant opportunities to enhance the program will be explored. SSWA plans to provide one large landscape survey per year at a cost of $3,500 per year.

Method for Evaluation of Effectiveness: SSWA evaluates the effectiveness of large landscape audits and incentives by making site visits and comparing metering data between pre-survey customer usage and post-survey usage. Follow-up visits to surveyed sites are conducted.

Estimated Water Savings: Pre-audit metering data are compared with post-audit data to estimate water savings. The final audit large landscape audit reports, prepared by consultants, also estimate potential water savings.

Large Landscape Water Budget Program

SSWA implements a monthly water budget program for (18) large landscape accounts, primarily city parks and schools. Water budgets are developed for each account whereby water use is compared to evapotranspiration rates from the nearest CIMIS station in Concord, CA.

Staff reads water meters on a monthly basis, and a Water Conservation Specialist prepares a monthly report for each account. The report provides account holders with valuable information for reducing water use and meeting water conservation targets. SSWA will continue to gauge the effectiveness of the program by comparing pre- budget and post-budget water usage.

The program is marketed to all large landscape account holders through phone calls and the SCWA website. SCWA provides the primary funding for the program, and SSWA's cost-share was $3,000/year in 2015. Projected budgets are set at $3,000 per year through 2020.

Effectiveness is determined by tracking pre-budget and post-budget water use for each account holder. SSWA plans to continue the program through 2020.

High-efficiency Washing Machine Rebate Programs

(former 2010 UWMP DMM F, Old CUWCC BMP 6, New CUWCC Programmatic BMP 3)

A clothes washer rebate program is ongoing and has been popular program. Goals for the program include providing incentives for homeowners to replace older inefficient washers with models that use up to 70% less water and energy than conventional models. SCWA administers the program on behalf of SSWA and other member agencies, and PG&E's rebate program for energy conserving washers allows homeowners to benefit from a combination of rebates. In 2015, there were no rebates paid, but the average number of participants for the past 5 years dating back to 2011 is 55 per year. In 2015, the rebate amount was $150.00, and plans are in place for $100.00 rebates for 2016-2020.

Marketing Strategy: Information for the program is posted on the Solano Saves Water website at http://solanosaveswater.org/. Flyers are posted at City Hall, public events, and articles have been published in local newspapers.

Tracking of Participation: SSWA compiles participation and rebate data annually and develops baseline levels of participation.

Planned Implementation Schedule and Budget: SSWA will *c*ontinue the existing program, and SCWA will apply for additional grant funding on SSWA's behalf.

Method for Evaluation of Effectiveness: The program's participation is an intangible measurement of the public's interest in conserving water and energy, and a way to assess effectiveness.

Estimated Water Savings: Water savings are difficult to quantify due to the lack of data for the older replaced washers. Tracking the ratings of the old washers could provide an estimated water savings per household, but many variables exist, including behavioral changes in water usage due to the drought.

Commercial, Industrial and Institutional Conservation Programs

(former 2010 UWMP DMM I, New CUWCC Programmatic BMP 4)

SSWA, in conjunction with SCWA and the UWCC, implements a water conservation program for its CII customers. The program is regionally based and a Water Conservation Specialist is retained to manage the effort. The CII program consists of complimentary indoor water use surveys, outdoor irrigation system audits, and direct installation of efficiency fixtures, such as showerheads, and high efficiency toilets.

Financial incentives to upgrade irrigation systems, plumbing fixtures, and/or water using appliances are offered through the Water Savings Incentives Program (WSIP). Up to $10,000 in rebates may be available to public service agencies, and a maximum of $5,000 is available to commercial and customers. Customers must agree to a water survey as part of eligibility. In 2015, two city parks qualified for WSIP rebates of $5,000 each to upgrade large landscape irrigation systems. It is anticipated that both sites will be retrofitted in 2016.

Marketing Strategy: SSWA conducts outreach and researches grants to strengthen its programs. Current marketing components include:

- Making telephone calls and site visits to CII customers
- Marketing the program on the Solano Saves Water website (http://solanosaveswater.org/)
- Generating and distributing flyers that advertise the program
- Conducting audits as requested

Tracking of Participation: SSWA tracks the number of customers participating in its CII programs, and CII projects are thoroughly monitored. SSWA sets a participation target of three account holders per year, and plans to continue its CII and WSIP programs through 2020.

*Planned Implementation Schedule and Budget: SSWA plans to c*ontinue the implementation of the CII program. Staff plans to administer two CII or WSIP projects per year through 2020, at a cost of $2,500 per year.

Method for Evaluation of Effectiveness: The effectiveness of the program is determined by reviewing the numbers of participants, analyzing costs versus benefits, and estimating water savings.

Estimated Water Savings: SSWA can estimate water savings from CII programs by calculating pre-installation water demand compared to post-installation demand. However, CII customers have reduced water use due to the drought, especially outdoor irrigation, and therefore water savings estimates are challenging.

Residential HET Replacement Program

(former 2010 UWMP DMM N, New CUWCC Foundational BMP 3)

In 2015, SSWA offered economic incentives for the purchase and installation of high efficiency toilets (HETs). The HETs must meet the current Water Sense Specifications (WSS) or updated standards using 1.28 gallons per flush. Qualifying HETs must have replaced units using 3.5 gallons or more per flush (gpf). Residential rebates were $100 each, with a maximum of one HET. Commercial rebates are available through the Water Savings Incentive Program (WSIP), and the criteria and rebated amount are managed on a case by case basis. Replacements through the WSIP are completed by a professional plumbing contractor at no cost to the owner.

In 2015, there were 60 rebates paid. The five-year average of the number of HET's replaced from 2011-2015 was 59 replacements per year. The program was discontinued in mid-2015 due the passage of AB715, which required all new toilets sold in California to use 1.28 gallons per flush or less

9.2 Implementation over the Past Five Years

The nature and extent of each measure that has been implemented by SSWA over the past five years, from 2010 through 2015, is presented by measure in the previous section.

9.3 Planned Implementation to Achieve Water Use Targets

SSWA's plans for achieving its water use targets are presented by measure in the previous section as well as in Section 5.

Actual Current Year Budget

Table 9-1 is the SSWA Fiscal Year 2014-2015 budget for expenditures and staff effort to implement the DMMs.

Table 9-3. SSWA Fiscal Year 2014-2015 Budget for DMM Implementation

Name	Estimated Budget
Residential Water Audits	3,000
Residential Retrofit	1,300
System Water Audit and Leak Detection	50,000
Metering w/Commodity Rates	500
Landscape Water Audits and Landscape Budgets	7,000
Washing Machine Rebates	3,500
Public Information	4,500
School Education Program	4,320
CII Conservation Programs	5,000
Wholesale Agency Programs	N/A
Conservation Pricing	500
Conservation Coordinator	(included in other items)
Water Waste Prohibition	10,000
ULFT Program	4,000
Total	**$138,300**

Projected Next Year Budget

Table 9-2 is the SSWA Fiscal Year 2015-2016 projected budget for expenditures and staff effort to implement the DMMs.

Table 9-4. SSWA Fiscal Year 2015-2016 Budget for DMM Implementation

Name	Estimated Budget
Residential Water Audits	3,000
Residential Retrofit	1,300
System Water Audit and Leak Detection	100,000
Metering w/Commodity Rates	500
Landscape Water Audits	7,000
Washing Machine Rebates	3,500
Public Information	4,500
School Education Program	4,320
CII Conservation Programs	5,000
Wholesale Agency Programs	N/A
Conservation Pricing	500
Conservation Coordinator	(included in other items)
Water Waste Prohibition-also includes Letters to customers, water cop, reporting?	10,000
ULFT Program	4,000
Total	**$257,000***

* Budget significantly increased due to the addition of the System Water Audit and Leak Detection of $100,000 and an approximate doubling of conservation efforts from $88,000 to $157,000 in order to meet conservation targets.

Table 9-3 summarizes the implementation schedule of the DMMs for SSWA.

Table 9-5. DMM Implementation Schedule

BMP	How Implemented	How Staffed	How Funded	5-year goal 2016-2020
Residential Water Audits	Regional w/ City of Fairfield	Interns coordinated by the City of Fairfield	SSWA Budget & SCWA Budget	On-going implementation.
Residential Retrofit	SSWA/SCWA project	SSWA Staff	SSWA Budget & SCWA Budget	Multifamily & single family completed at 75%. On-going implementation.
System Water Audit and Leak Detection	SSWA project	SSWA Staff + Consultant	SSWA Budget	Study and implement water loss program.
Metering w/Commodity Rates	Completed		SSWA Budget	
Landscape Water Audits	SSWA/SCWA project	SSWA Staff + Consultant	SSWA Budget and SCWA Budget	On-going implementation, apply for grant funding.
Washing Machine Rebates	SSWA/SCWA project	SSWA Staff + SCWA Staff	SSWA Budget & SCWA Budget	On-going implementation, apply for grant funding.
Public Information	SSWA/SCWA project	SSWA Staff SCWA Staff	SSWA Budget & SCWA Budget	On-going implementation.
School Education Program	SSWA + SCWA Regional project	SSWA + SCWA Consultant	Regional Budget School Water Education Program	Continue existing program. Investigate regional cost sharing options with interested agencies.
CII Conservation Programs	SSWA/SCWA Regional project	SSWA + SCWA Staff/Consultant	SSWA Budget & SCWA Budget	On-going implementation, investigate grant funding and local cost sharing options.
Wholesale Agency Programs	Completed			
Conservation Pricing	Completed		SSWA Budget	
Conservation Coordinator	Completed		SSWA Budget	
Water Waste Prohibition, also includes letters to customers, water cop, reporting?	Completed		SSWA Budget	
ULFT Program	SSWA/SCWA project	SSWA Staff + SCWA Staff	SSWA Budget & SCWA Budget	On-going implementation, apply for grants.

9.4 Members of the California Urban Water Conservation Council

SSWA is not a member of the California Urban Water Conservation Council (Council). However, SSWA has submitted annual reports to the Council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, as amended.

10. PLAN ADOPTION, SUBMITTAL, AND IMPLEMENTATION

This 2015 UWMP also includes a Water Shortage Contingency Plan (WSCP) as required under the provisions of AB 11X of (1991) and addresses changes required by subsequent legislation including the Water Conservation Act of 2009 (SB X7-7). The WSCP also incorporates the water conservation initiatives that the Solano Irrigation District (District) has implemented.

This 2015 UWMP was presented to the Water District's Board of Directors for review and adoption. Once adopted, it supersedes the existing plan prepared in 2010. It was filed with the Water Efficiency Office in the Department of Water Resources, the California State Library, the Bay Area Water Supply and Conservation Agency, the Suisun-Solano Water Authority offices, Solano County, and the Cities of Benicia, Dixon, Fairfield, Rio Vista, Suisun, Vacaville, and Vallejo, as required by law, and will be used by the District staff during the current five-year planning cycle. As required by Section 10621 (a) of the Water Code, the District will update the UWMP again by December 2020.

10.1 Notice of Public Hearing

A public hearing before the SSWA Board of Directors to discuss and receive comments regarding SSWA's 2015 UWMP demand reduction targets, selected method and economic impacts was held on June 13th, 2016. The public hearing was advertised in the Daily Republic newspaper at least 60 days prior to the meeting. See Appendix S for a copy of the newspaper notice. At the June 13th, 2016 SSWA meeting, it was decided to extend the public review period and consider adoption of the plan at the August 8th, 2016 SSWA meeting.

10.1.1 Notice to Cities and Counties

This section describes the notices to cities and counties that SSWA distributed. Table 10-1 lists the specific entities notified.

Table 10-1. Notification to Cities and Counties

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
City of Benicia	☑	☑
City of Dixon	☑	☑
City of Fairfield	☑	☑
City of Rio Vista	☑	☑
City of Suisun	☑	☑
City of Vacaville	☑	☑
City of Vallejo	☑	☑
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Solano County	☑	☑

Figure 10-1 is a copy of the letter sent to the cities and county notifying them of SSWA's intent to update the UWMP. A copy of this letter is also included in Appendix S.

Figure 10-1. Notification Letter to Cities and Counties

SUISUN-SOLANO WATER AUTHORITY

BOARD OF DIRECTORS
Pete Sanchez, President
Jane Day
Michael A. Segala
Mike Hudson
Lori Wilson

BOARD OF DIRECTORS
Glen Grant, Vice President
Guido Colla
John D. Kluge
Bob Bishop
Mike German

December 23, 2015

Ron Anderson, Assistant City Manager
City of Suisun
701 Civic Center Blvd.
Suisun City, CA 94585

Re: Suisun-Solano Water Authority – Notice of Intent to Update Urban Water Management Plan (UWMP)

Dear Mr. Anderson:

This letter serves as a notice that the Suisun-Solano Water Authority intends to update its current Urban Water Management Plan (UWMP). Updates are required every five (5) years. This effort helps ensure we can provide the communities we serve with a reliable supply of high-quality water to meet current and future demands.

To ensure sufficient opportunity of public feedback and suggestions, Suisun-Solano Water Authority (SSWA) UWMP will be available on both the city of Suisun's website www.suisun.com as well as www.sidwater.org by April 11th, 2016 for public review. The plan will be considered for adoption on June 13th, 2016 at SSWA's regular Board Meeting. You may submit comments in writing to:

Kevin L. King
Suisun-Solano Water Authority
810 Vaca Valley Parkway Suite 201
Vacaville, CA 95688

Should you have any questions, please feel free to contact me at either, kking@sidwater.org or at (707) 455-4013. Thank you.

Sincerely,

Suisun-Solano Water Authority

Kevin L. King
Water & Power Operations Manager

810 VACA VALLEY PARKWAY, SUITE 201, VACAVILLE, CA 95688 • TELEPHONE (707) 448-6847 • FAX (707) 448-7347

WWW.SIDWATER.ORG • @WE_ARE_SID

10.1.2 Notice to the Public

The public was notified 60 days prior to the adoption meeting via the Daily Republic newspaper and by posting the 2015 UWMP on the following websites by April 11th, 2016:

- City of Suisun: http://www.suisun.com/
- Solano Irrigation District: http://www.sidwater.org/

The notice from the Daily Republic is shown in Appendix S.

10.2 Public Hearing and Adoption

10.2.1 Adoption

The plan was adopted on August 8, 2016 at SSWA's Regular Board meeting. A copy of the resolution adopting the 2015 UWMP is provided in Appendix T.

10.3 Plan Submittal

To satisfy Water Code Section 10635(b), within 30 days of adoption, SSWA was required to submit a copy of the 2015 UWMP to the DWR, the California Library Records Hall (Sacramento), and to any city or county to which SSWA provides water.

Documentation confirming SSWA's 2015 UWMP submittal can be found in Appendix U.

10.4 Public Availability

The 2015 UWMP was made available for public review at the Solano Irrigation District office, the public library, and at the Suisun City Hall.

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12. APPENDICES

A. UWMP Checklist
B. 1985 Suisun City State Water Project (North Bay Aqueduct) Contract
C. 2015 SID Agricultural Water Management Plan
D. 2014 & 2015 SSWA Water Conservation Requirements
E. Demand & Passive Savings Methodology
F. City of Suisun City 2015-2023 Housing Element
G. SB X7-7 Verification Form
H. 1992 Central Solano Dual Water Systems Master Plan
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M. Drought Measures & Fines Notice
N. 2015 SSWA Water Rate Study
O. Solano County School Education Programs
P. Water Audit Method
Q. Rebate Programs Screen Shots
R. Irrigation System Water Conservation Survey Example – Independence Park
S. Public Notice of UWMP Hearing
T. Adoption Resolution
U. Documentation of 2015 UWMP Submittal
V. 2015 DWR State Water Project Final Delivery Capability Report
W. Project Contact List