

## **Appendix G: Supplemental Water Supply Information**

- Solano County Water Agency and Solano Irrigation District 2011 Groundwater Management Plan
  - DWR Bulletin 118, Sacramento River HR
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# SOLANO COUNTY WATER AGENCY

## 5-YEAR WATER MANAGEMENT PLAN UPDATE

2011



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## Section 1. Description of the District

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### A. History

The Agency was formed in 1951 by an act of the State Legislature as the "Solano County Flood Control and Water Conservation District". The full text of the legislative act, as amended, is in the California Water Code Appendix Chapter 64 entitled the "Solano County Water Agency Act".

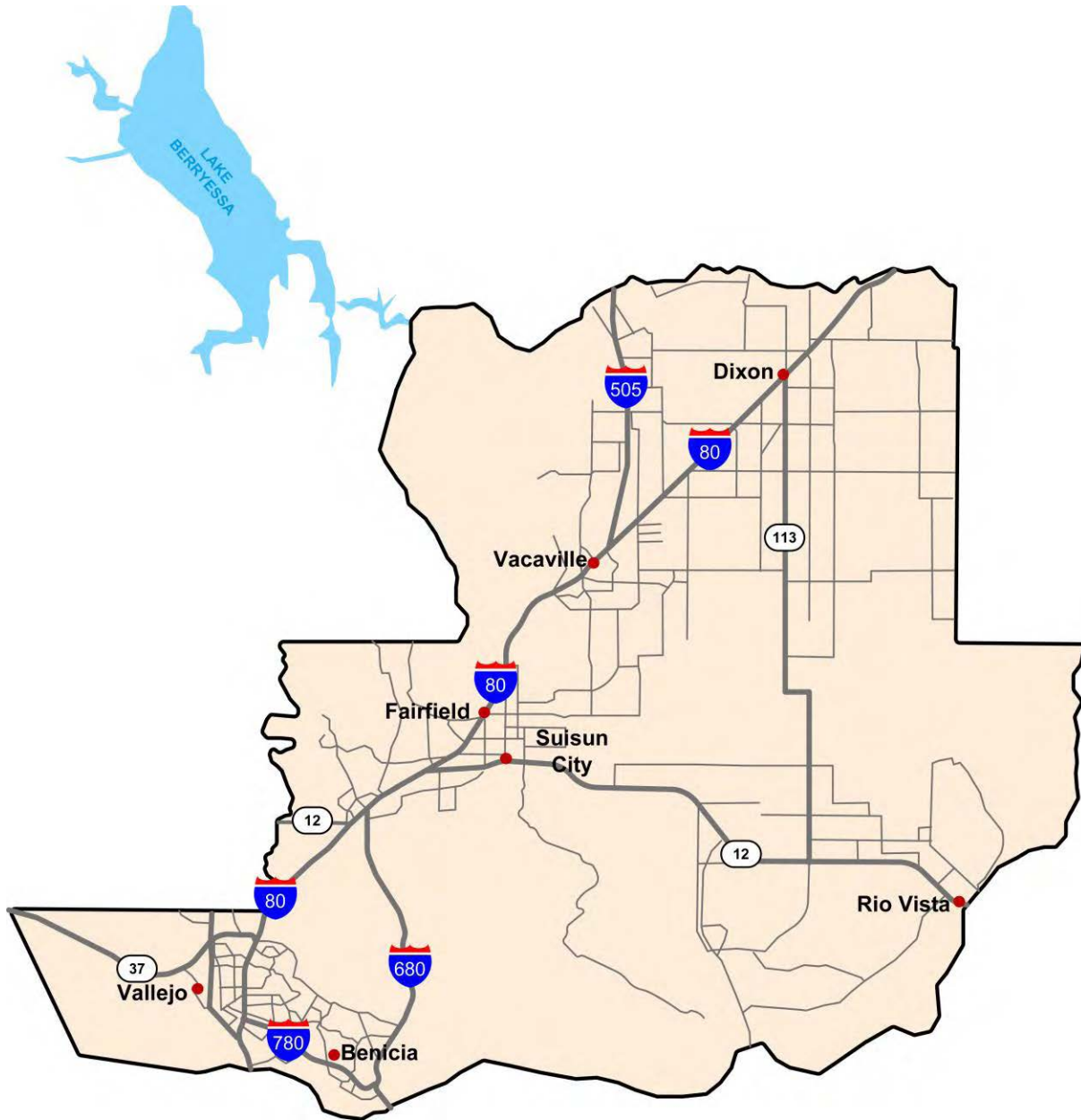
As originally established, the Board of Supervisors of Solano County was the governing board (ex-officio) of the Solano County Flood Control and Water Conservation District (SCFC&WCD). As with other countywide flood control and water conservation districts established about that same time, the SCFC&WCD was given water supply and flood control authorities. The first major action of the SCFC&WCD was to contract with the United States Bureau of Reclamation (USBR) for water supply from the Solano Project.

In 1988, the legislative act was changed to modify the governing board of the SCFC&WCD and to make other minor updates to the act. In 1989 the name of SCFC&WCD was changed to the "Solano County Water Agency" (SCWA).

The change in the governing board of SCWA was very significant. In addition to the five members of the Board of Supervisors, the mayors from all seven cities in the County as well as a board member from each of the three agricultural irrigation districts (Solano Irrigation District, Maine Prairie Water District and Reclamation District No. 2068) were added. The three agricultural districts were added because those districts provide retail water service to their constituents. During the 1988-89 time period, the governing board made a decision to hire a staff independent of the County.

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2011 5-year Water Management Plan

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1. Date district formed:	1951	Date of first Reclamation contract:	3/7/55
Original size (acres):	580,000	Current year (2010)	

2. Current size, population, and irrigated acres.

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Size (square miles)	906
Population served	413,300 <sup>1</sup>
Irrigated acres	139,055 <sup>2</sup>

3. Provide water supplies received.

<b>Water Source</b>	<b>2010</b>
Federal urban water	42,974 AF
Federal agricultural water	121,216 AF
State water	30,886 AF <sup>3</sup>
Local/other	NA
Local surface water	0
Upslope drain water	0
District ground water	0
Transferred water	0
Reclaimed water	0
Other (define)	0
<b>Total</b>	<b>195,076<sup>4</sup></b>

4. Provide annual entitlement under each right and/or contract.

	<b>AF</b>	<b>Source</b>	<b>Contract #</b>	<b>Contract Restrictions</b>
Urban AF/Yield (AF/Y)	207,350	Solano Project	14-06200-4090R	None
DWR	47,756	State Water Project	160,260	None
Other AF/Y	None			

5. Describe anticipated land- use changes (i.e., agricultural to municipal, etc.).

There has been a continual conversion of agricultural land to urban uses since the beginning of the Solano Project. The rate of conversion has varied over time.

6. Cropping patterns.

Note: SCWA does not directly deliver to agricultural customers. Please see SCWA member units' reports.

<b>Original Plan</b>		<b>Previous Plan (2005)</b>		<b>Current plan (2010)</b>	
Crop	Acres	Crop	Acres	Crop	Acres

<sup>1</sup> Source: 2010 SCWA UWMP

<sup>2</sup> Solano County 2010 Crop and Livestock Report

<sup>3</sup> SCWA 2010 UWMP Update

<sup>4</sup> This figure does not include water losses.

NA				
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7. List major irrigation methods (by acreage).

Irrigation Method	Acres
<b>Unknown – see Retail water supplier reports</b>	
All other	
Total	

## B. Location and Facilities

### 1. Incoming flow locations and measurement methods.

#### 2010 Agricultural Conveyance System

Location Name	Physical Location	Type of Measurement Device	Accuracy
Putah Diversion Dam	Lower Putah Creek	Parshall Flume	+ - 5%
Miles Unlined – Canal	Miles Lined - Canal	Miles Piped	Miles - Other
0	33	0	0

### 2. 2010 Urban Distribution System

Miles AC Pipe	Miles Steel Pipe	Miles Cast Iron Pipe	Miles –Concrete
NA	NA	NA	NA

### 3. List storage facilities.

Name	Type	Capacity (AF)	Distribution or Spill
Lake Berryessa	Reservoir	1.6 million	NA
Lake Solano	Reservoir	750	NA

### 4. Agricultural spill recovery system.

See retailer reports

### 5. Agricultural Delivery system operation.

On-demand	Scheduled	Rotation	Other (describe)
	X		

Solano Project: Map 1 shows Solano Project facilities. The main facilities are Monticello Dam, Putah Diversion Dam, Putah South Canal (PSC) and Terminal Reservoir. Flow from the Solano Project is measured at the outlet of Monticello Dam and at the entrance of the PSC at the Putah

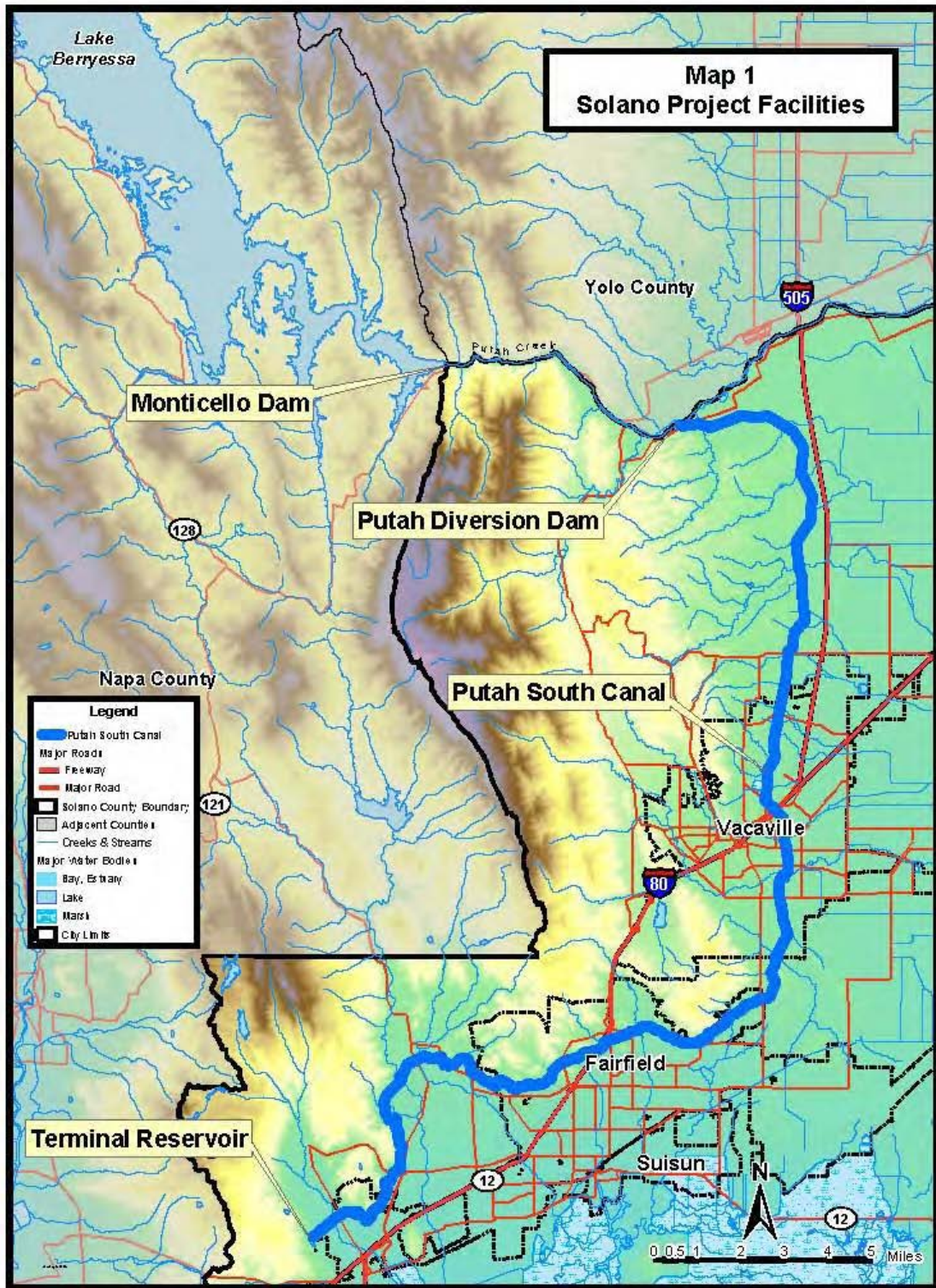


Diversion. Flow measuring devices are also located along PSC and at all turnouts on the Canal. The Putah South Canal is a 33 mile long, concrete lined channel with a maximum capacity of 956 cubic feet per second. Details of the Solano Project facilities are shown below.

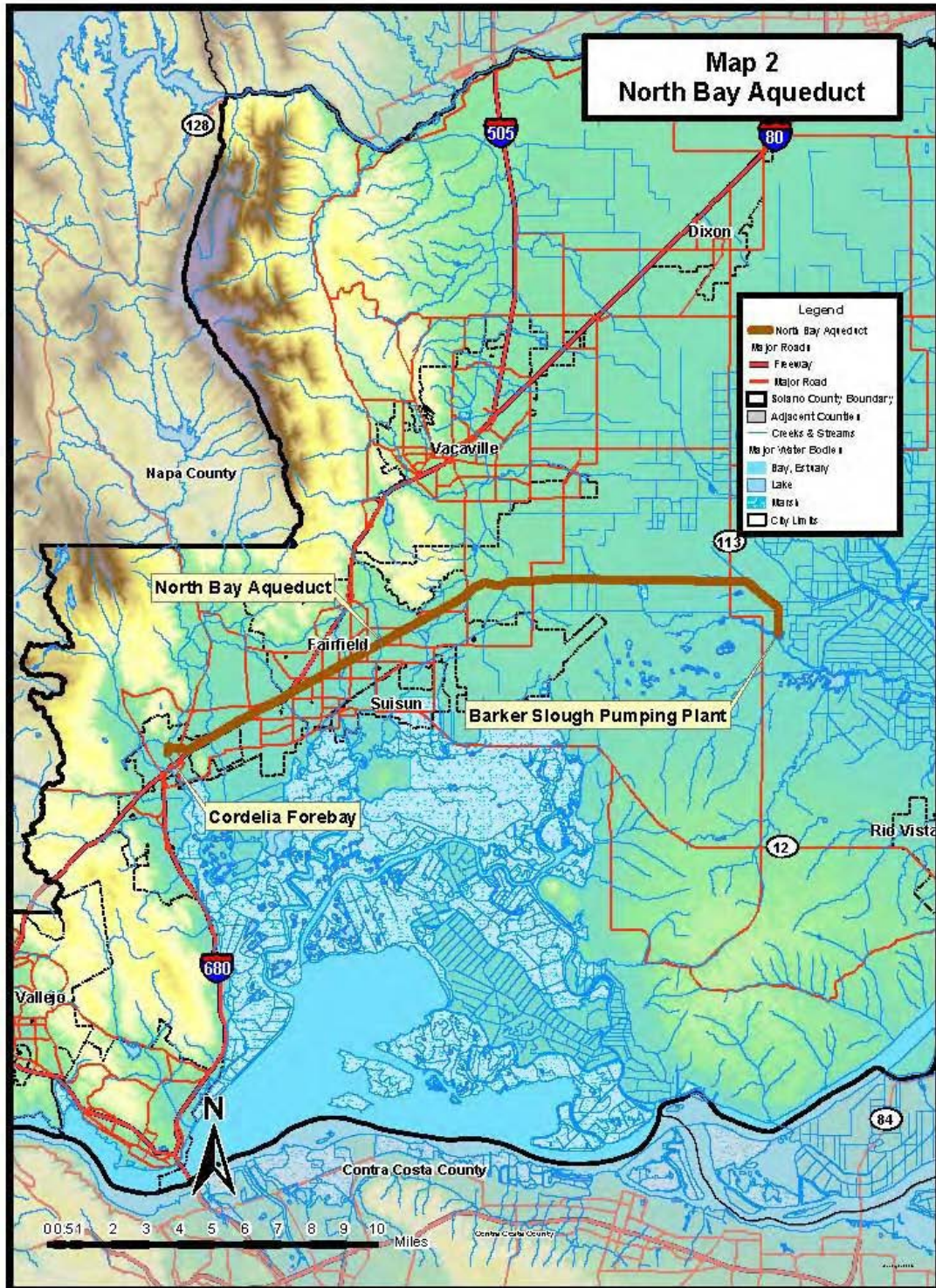
Lake Solano, which is impounded by the Putah Diversion Dam, provides some regulation storage. The only other regulatory storage is at Terminal Reservoir at the end of PSC. The PSC has checks that can be used to regulate storage along the canal to a limited extent. Customers of the Solano Project (all public agencies, no retail) must schedule their request for deliveries in advance.

State Water Project: SCWA also receives a water supply from the State Water Project through the North Bay Aqueduct. The North Bay Aqueduct is owned and operated by the California Department of Water Resources. The North Bay Aqueduct through Solano County is 27 miles of underground pipeline shown in Map 2. The size of the underground pipeline varies from 72 inches at Barker Slough to 54 inches at Cordelia Forebay. Flows are measured at the Barker Slough Pumping Plant and at the turnouts along the North Bay Aqueduct for city water treatment plants. Water deliveries are scheduled in advance by SCWA with the Department of Water Resources.









**6. Describe restrictions on the contractor's water source(s).**

Restriction	Cause of Restriction	Effect on District Operations
None		

**7. Describe proposed changes or additions to contractor's facilities and operations for the next five (5) years.**

**None – no changes planned**

**C. Topography and Soils**

**1. Describe topography of the district.**

Solano County is located within the southern portion of the Sacramento Valley and is one of the nine counties that constitute the San Francisco Bay Area Region. Solano County, despite its modest size, lies at the intersection of numerous geographical and geological provinces that, in conjunction with variations in hydrology and climate, has resulted in the formation of unique and rare biological and ecological conditions.

The following provides a brief description of the major geographical provinces of the County using a modified classification scheme utilized by the U. S. Department of Agriculture (USDA) in the Soil Survey of Solano County (Bates et al. 1977). Each major division contains important ecological subdivisions.

**Coast Range Uplands and Foothill Terraces**

The most prominent topographic features of the county are the mountains and hills that form the western boundary of the County. These features include the Vaca Mountains, West Hills and the Sulphur Spring Mountain range in the Tri-City/County Planning Area. The Vaca Mountains and other hills are part of the Coastal Ranges and form a strip of extremely steep slopes along the western border of the county that possesses a wide range in elevation, bedrock composition, and climate. Mt. Vaca is the highest point in the range at an elevation of 2,819 feet. Bedrock is dominated by Cretaceous marine sedimentary units, with smaller inclusions of Tertiary sedimentary and basic igneous rocks. These units form ridges with intervening narrow valleys that trend in a northwestern direction. Vegetation, which varies with precipitation, contains grassland, oak savanna, oak woodland, and dense chaparral shrubland.

**Montezuma Hills and Potrero Hills**

While this region, which conspicuously dominates the southeastern portion of the County, might be considered as just another upland component, several factors warrant a separate discussion of its characteristics. The elevation of this area ranges from approximately 25 to 350 feet, and annual precipitation is between 15 and 23 inches. The most distinguishing feature is the bedrock composition: poorly sorted sandy clay sediments of the Quaternary Montezuma formation. This bedrock weathers into clay soils with an exceedingly high clay content called Vertisols. The clay is dominated by the mineral Smectite. The high clay content in combination with smectite results in a high shrink/swell characteristic and deep cracking, to 50 cm or more, of the soils. The shrink/swell causes fence and utility poles to be extruded from the soils and become oriented

at an angle less than vertical. Roads become rough and rolling because of the movement of the soils. This region, because of the soils, is primarily used for dryland farming and grazing, and was likely perennial grassland, with oaks in higher elevations, in pre-agricultural conditions.

### **Alluvial Fans, Terraces, and Basins**

This province comprises a significant portion of Solano County and exhibits considerable variability related to local geological and soil characteristics and associated drainage patterns. This province is also the area that comprises most of the valley floor and is the region of the County that has been most altered from the natural conditions by agriculture and urban development. Several distinct sub-regions and associated habitats are described below:

**Well drained to poorly drained recent alluvial fans and basin deposits.** This region, lying in the northeastern quarter of the County, comprises the heart of the agricultural development of the county. This area of the County is often referred to as the Dixon Ridge region. The sediment consists of loams/silt loams to clays derived from streams draining the Coast Range. Soils are young, lack restrictive horizons, and are amenable to irrigated agricultural development, though drainage or levee systems have been required in the lower basin margin, and basin proper, positions of the landscape. These landscapes generally dip downward in a westerly to easterly direction, and the lands to the east of highway 113 were (prior to channelization) frequently flooded by the Sacramento River.

Dense oak forests reportedly once covered the plains along the major streams (such as Putah Creek) and their fans, with high fans and terraces having more open stands of grass and oaks. Lower lying basin deposits supported tules, reeds, and other water-tolerant plants.

**Well to somewhat poorly drained terraces.** With exceptions, this region consists of geologically older alluvial fan deposits that have been incised by streams and are now marginally elevated above the major drainage systems of the region (and the younger deposits described above). The age of the landscapes (Pleistocene) combined with hydrological differences, has resulted in two (in a broad-brush division) distinct divisions of ecological significance:

- **Poorly drained, somewhat acidic, clay pan landscapes.** This area lies mainly north of Vacaville. The dense subsurface “clay pan” (formed by long expanses of soil formation and clay development) restrict water penetration and create seasonally-perched water tables. This area is dominated primarily by grassland habitats and includes mixes of Northern Hardpan and Northern Claypan vernal pool habitat types.
- **Well to somewhat poorly drained, alkaline landscapes.** This area lies mainly to the north and northwest of the Montezuma Hills and includes much of the region from northern Vacaville, through the Jepson Prairie to the Potrero Hills and over into Fairfield/Suisun. These landscapes, due to their proximity to shallow ground water from the Delta (to the east) or the Suisun Bay (to the south) have experienced long-term evaporative loss of this water and the subsequent accumulation of dissolved salts. Salt types in the soils are separated by solubility and the generally upward water flow patterns (modified by the downward flow of fresh rainwater). As a result, soils contain significant amount of sodium bicarbonate (NaHCO<sub>3</sub>) and other salts

leading to high (alkaline) pHs (>8.3) in some soil horizons (not necessarily at the surface), and sometimes have high salinities (total salt content). Most of these soils have a clay-enriched subsoil (or clay pan) that restricts water movement.

Much of this area is considered too poor to support agricultural crops. While this land has not been as intensively developed for agriculture due to the combined problems of salinity, alkalinity, and clay pans, this region is important for extensive agricultural operations, primarily sheep and cattle grazing. The values associated with this economic use has helped maintain much of the vernal pool habitats remaining in this region.

### **Delta Marshlands**

This area, which lies roughly to the north and northeast of Rio Vista, contains a part of the prominent Sacramento-San Joaquin River Delta. Prior to human disturbance, this was a freshwater marshland dominated by river distributary channels and dense “tule” vegetation. The dense vegetation, combined with slow base level (sea level) rise, led to the accumulation in parts of the area of thick peat deposits (only small parts of the Solano County Delta have peat soils), and in the predominantly mineral-rich lands that dominate the fringe of the Delta in Solano County, relatively high organic matter content.

The combined stabilization of river distributaries through levee building, and the installation of large pumping plants, tidal gates, etc. have succeeded in lowering the ground water table and have allowed the establishment of agriculture in the region. As a result of the drainage, much of the landscape has subsided (due to peat oxidation and compaction) and is now up to 10 feet or more below sea level.

Almost this entire area has been converted to agriculture although some small areas near Cache Slough remain undisturbed and a few areas within river distributary channels remain as riparian zones.

### **Suisun Bay Marshlands**

Located adjacent to Suisun Bay, the Suisun Bay Marshlands, like the Delta Marshlands is also technically a deltaic environment. This marshland was formed in part from sediment from local streams as opposed to the main Central Valley drainage and is in contact with more brackish waters than the marshlands to the east. Tidal marsh formation within the San Francisco Estuary was initiated about 10,000 years ago during the Holocene submergence when sea water flowed into the Golden Gate, and the rate of sea-level rise slowed sufficiently for tidal marsh sediments to accrete near sea level. Prior to that time, the Estuary consisted of broad stream valleys far above glacial low sea level. Following European settlement, huge influxes of sediment associated with hydraulic gold mining in the Sierra Nevada also contributed to areas of rapid marsh growth. The Suisun Marsh region of Solano County has the most complex origin within the San Francisco Bay-Delta System, and is a composite of tidal wetlands with estuarine and riverine origins.

The more saline waters that fringe the land in this area have created somewhat differing environmental and ecological conditions. First, it contains mapable areas of peatland: Wheeler Island, Van Sickle Island, and Chipps Island, as well as a region south of Suisun City. Second, many of the non-peat soils are both strongly acidic and saline. The acidity arises from the oxidation of pyrite (or other iron sulphides) as a result of human water table lowering and the change from reducing to oxidizing conditions, creating sulfuric acids and distinctive reddish and



yellow-red oxidized iron (Fe) colors. The vegetation in this area consisted of tules, reeds, and salt-tolerant grasses and forbs.

**2. Describe district soil associations.**

Soil Association	Estimated Acres	Effect on Water Operations and Management
None – See retailer reports for more local information		

**3. Describe limitations resulting from soil problems.**

Soil Problem	Estimated Acres	Effect on Water Operations and Management
None – See retailer reports for more local information		

**D. Climate**

**1. Describe the general climate of the district.**

The climate of Solano County varies spatially depending mainly on the effects of topography on rainfall distribution. The eastern parts of the County (Sacramento Valley/Sacramento and Suisun Bay watersheds) are classified as having a Mediterranean/hot summer climate while the western portions (Napa River/San Pablo Bay watersheds) have a Mediterranean/cool summer climate. The average annual precipitation in the Central Valley lowland areas of the County is typically between 15 and 25 inches, with higher rainfall amounts reaching 25 to 40 inches in the western hills.

**Solano County ETo**

Solano County lies within two hydrologic regions with the western part of the county in the San Francisco Bay Region and the eastern portion in the Sacramento River Region. Since Solano County is part of two hydrologic regions it is not feasible to list an “average” ETo for the entire county. The eastern portion of the county has similar climatic conditions as the Sacramento Valley characterized by mild winters and hot summers with periods of above 90 °F days. In contrast the southern and western sections have more in common with the San Francisco Bay Area. The two cities in south county, Benicia and Vallejo, have inland coastal maritime climates typified by cool, wet winters with significant periods of fog and warm, dry summers with frequent cooling sea breezes. Fairfield, due to its location near the dividing line between the San Francisco Bay Region and the Sacramento River Region, has average climatic conditions that lie between the two.

This is borne out by an examination of annual ETo data (Figure 3). Dixon, located in eastern Solano County has an annual ETo of 52.1, comparable to Sacramento at 51.9. In southwest Solano County, Benicia has an annual ETo of 40.3 which is similar to the Oakland foothill’s

annual ETo of 39.6. Fairfield’s annual ETo of 45.2 is halfway between that of Dixon and Benicia.

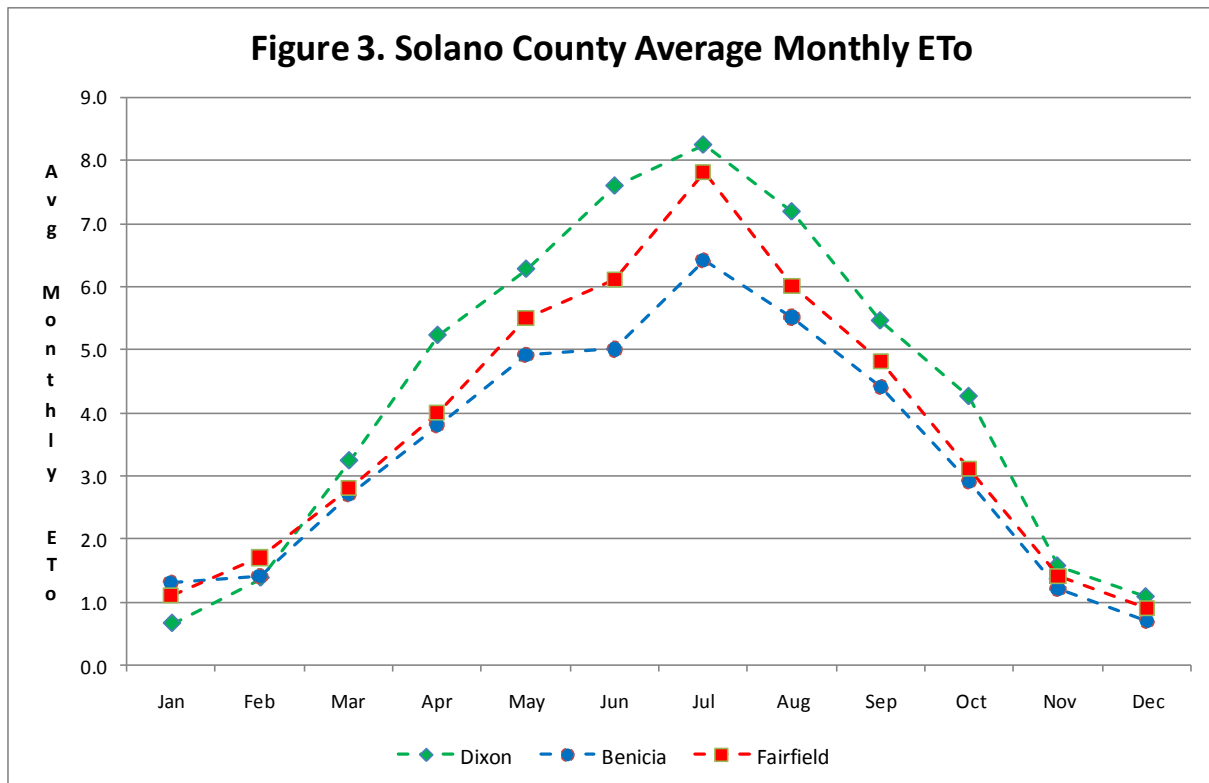


Figure 3. Average monthly ETo for selected Solano County cities.

**Average Rainfall**

The average annual precipitation in the eastern lowland areas of Solano County is typically between 15 and 25 inches, with higher rainfall amounts reaching 25 to 40 inches in the western hills. The majority of the rainfall occurs from late November to March. Average rainfall for selected Solano County cities is shown in Figure 4.



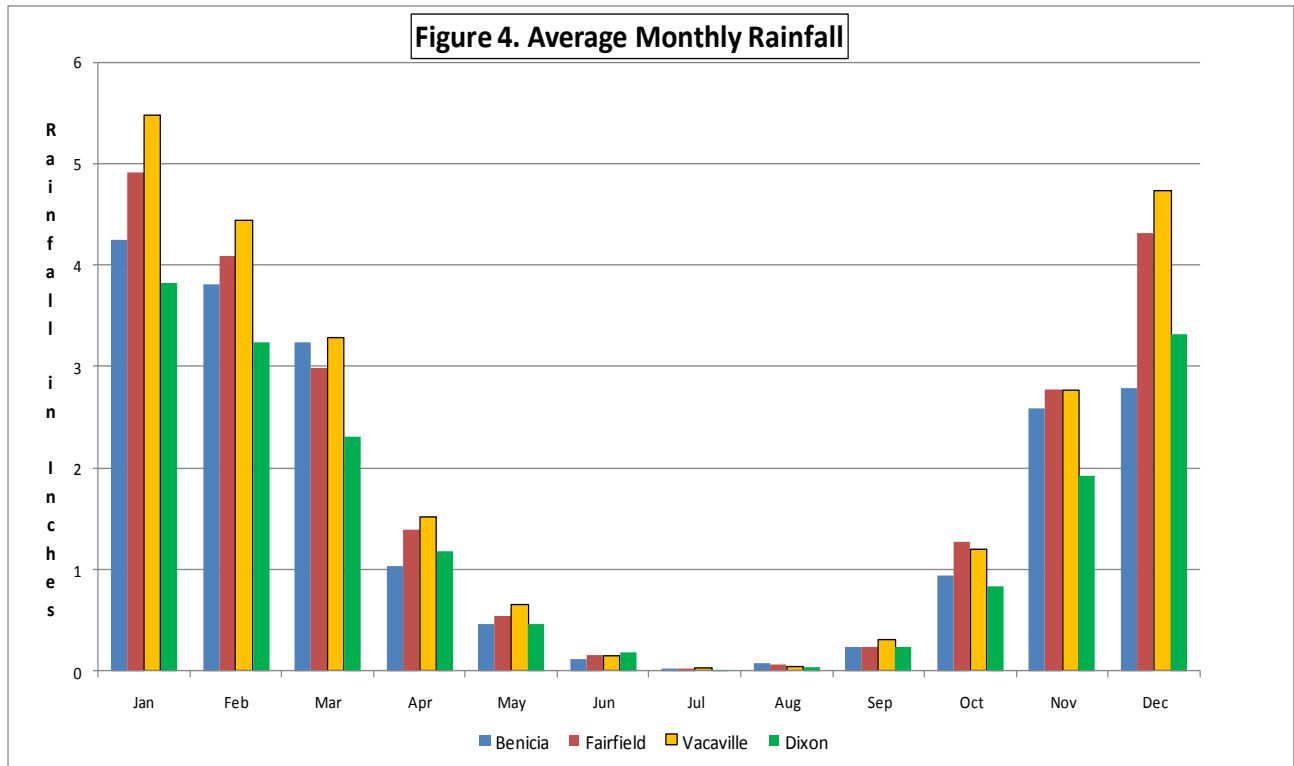


Figure 4. Average Monthly Rainfall for Selected Solano County Cities

### Average Temperatures

In the western and southern regions of Solano County the marine influence of the San Francisco Bay acts to moderate climatic conditions so that wide temperature fluctuations are not seen. Average temperatures in this part of the county range from an average of low 40's°F in January to the low to mid 80's°F in July and August. On occasion late summer temperatures can rise into the 90 °F range.

The eastern portions of the county are not as greatly influenced by the San Francisco Bay and experience greater temperature ranges. Records from the Western Regional Climate Center show an average minimum temperature in Vacaville of about 37 °F in January to an average high temperature of 95°F in July. In the summer, temperatures can rise above 100 degrees. Average frost-free season – 240-280 days<sup>5</sup>

### Average wind velocity

The average wind velocity varies within Solano County. According to data collected from 1996 – 2006 at Travis Air Force Base, the annual average wind velocity there is 12.7 mph. According to data collected from 1998-2006, the average wind velocity at Vacaville Airport is 6.0 mph.<sup>6</sup>

<sup>5</sup> Soil Survey of Solano County, Soil Conservation Service, 1977.

<sup>6</sup> Data collected at Automated Surface Observing Systems stations.

**2. Impact of any microclimates on water management within the district.**

None – see retail reports for more detail

***Natural and Cultural Resources***

SCWA is not directly involved in management of natural resources in Solano County. Since the completion of the 2005 UWMP, SCWA, along with cities and districts, completed a Habitat Conservation Plan for the conservation of endangered species in Solano County. This plan titled, *Solano Habitat Conservation Plan* was completed in June of 2009. The Habitat Conservation Plan is a requirement of the biological opinion for Solano Project contract renewal. SCWA is involved in the management of the natural resources of Putah Creek as part of the Lower Putah Creek Coordinating Committee.

There are numerous recreation and cultural resources within Solano County. SCWA is not involved in any recreational or cultural resources management. Recreational and cultural resource management is done by Solano County and its cities.

***1. Natural resources area within the district.***

Name	Estimated Acres	Description
Suisun Marsh	Unknown	Brackish Marsh
Putah Creek	Unknown	Riparian

***2. Describe management of these resources in the past or present by the district.***

**SCWA is not directly involved in management of natural resources in Solano County.**

***3. Provide the name of the recreational and/or cultural resources area.***

City	Site
Benicia	City Cemetery St. Dominics Cemetery
Dixon	Sacramento Valley National Cemetery
Fairfield	Fairfield-Suisun Cemetery Fairmont Memorial Park Green Valey Golf Course Paradise Valley Golf Course Rancho Solano Golf Course
Rio Vista	1010 Highway 12 Cemetery Dr&Main St
Vacaville	Elmira Cemetery Old Elmia Cemetery New
Vallejo	Skyview Memorial Lawn All Souls Catholic Cemetery Carquinez Cemetery St. Vincent Cemetery Trilogy Golf Course

***Operating Rules and Regulations (water related)***

Exhibit A is a copy of a typical Solano Project Water Supply Contract between SCWA and member agencies. This provides information regarding water allocation and scheduling and reflects the wholesaler (SCWA) to retailer (cities or districts) relationship. The Solano Project Water Supply Contract also has standard operating procedures for the Solano Project. There is additional information regarding some of the issues in the contract between Reclamation and SCWA for Solano Project Water Supply.

SCWA has an agreement with Solano Irrigation District (SID) for operation and maintenance of the Putah South Canal. The agreement is attached as Exhibit B.

***2. Describe contractor's agricultural water allocation policy.***

The agreements between SCWA and the member agencies call for allocation of all water supply available from the Solano Project. If there is a deficiency in supply from the Solano Project all member agencies are reduced proportionately.

SCWA is strictly a wholesale supplier of water, not a water utility. It is the responsibility of each of the member units to deal with water shortages. SCWA provides coordination assistance but is not responsible for making any decisions regarding water shortages. The only exception is that SCWA retains authority to change allocations of SWP supplies water during shortages.

The contract language is as follows: **“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 portion 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 as 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 impact various reductions of water supply will have on the economy, public health, and welfare.”**

A two-stage trigger for contingency actions is shown in the following table. Stage 1 is if there is a 25% reduction in either State Water Project 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.

**Water Supply Shortage Stages and Conditions**

<b>Stage No.</b>	<b>Water Supply Conditions</b>	<b>% Shortage</b>
1	Reduction in SWP and/or Solano Project	25%
2	Reduction in SWP and/or Solano Project	50%

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 and will also state its willingness to consider allocations of shortages in the SWP supply as specified in the member agency agreements.

***3. Describe official and actual lead times necessary for water orders and shut-off.***

NA - See retailer reports

***4. Describe contractor's policies regarding surface and subsurface drainage from farms (agricultural only)***

None - See reports from Solano Irrigation District and Maine Prairie Water District

***5. Describe contractor's policies on water transfers by the contractor and its customers.***

SCWA does not conduct exchanges or transfers on its own. The Agency has no policies regarding water transfers into or out of SCWA.

***Water Measurement, Pricing, and Billing***

SCWA has an agreement with SID for operation and maintenance of the Putah South Canal.

1) Agricultural Customers

See SID 2008 5-Year Water Management Report for complete details.

- a. Total number of customers: 3 (Wholesale only)
- b. Number of delivery points (turnouts and connections): 3
- c. Number of delivery points serving more than one farm: N/A Please see retailer reports
- d. Number of measured delivery points (meters and measurement devices): 3
- e. Percentage of water delivered that was measured at customer turnouts: 100%. Please see retailer reports for additional data

<b>Measurement Type</b>	<b>Number</b>	<b>Accuracy (+/- percentage)</b>	<b>Reading Frequency (Days)</b>	<b>Calibration Frequency (Months)</b>	<b>Maintenance Frequency (Months)</b>
Orifices					
Propeller					
Weirs					
Flumes					
Venturi					
Metered gates					
	<b>See</b>	<b>SCWA</b>	<b>Member</b>	<b>Units'</b>	<b>Reports</b>

Solano County Water Agency does not read meters. All measurements are taken by the Member Units. Since SCWA does not own, operate, or maintain any meters, we have to rely on our member units to provide water delivery data. Member units send water delivery data monthly in electronic format to SCWA. The data is then tabulated and cross-checked against water production data. See individual SCWA Member Units' Reports for additional details.

Note: SCWA does not directly deliver to agricultural customers. Please see SID and Maine Prairie annual reports for that information.

**Table 4a. Agricultural Distribution System**

Canal, Pipeline, Lateral, Reservoir	Length (ft)	Width (ft)	Surface Area (sq. ft)	Precipitation (AF)	Evaporation (AF)	Spillage (AF)	Seepage (AF)	Total (AF)
NA	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
<b>TOTAL</b>				0	0	0	0	0

2) Urban Customers

- a. Total number of customers: 6 (Wholesale only)
- b. Total number of metered connections: 6 (Wholesale only)
- c. Total number of connections not billed by quantity: 0
- d. Percentage of water that was measured at delivery point: 6
- e. Percentage of delivered water that was billed by quantity: 100%

SCWA does not own or operate any meters. Please see SID 2008 5-Year Water Management Plan for additional data regarding agricultural deliveries and City of Fairfield, City of Vacaville, and the Suisun Solano Water Authority (SSWA) reports for urban deliveries.

Meter and Type	Size	Number	Accuracy (+/-percentage)	Reading Frequency (Days)	Calibration Frequency (Months)	Maintenance Frequency (Months)
5/8-3/4"						
1"						
1 1/2"						
2"						
3"						
4"						
6"						
8"						
10"						
Compound						
Turbo						
<b>Total</b>						

**Table 4b. Urban Distribution System**

2010 Area or Line	Length (ft)	Leaks (AF)	Breaks (AF)	Flushing/Fire (AF)	Total (AF)
NA	0	0	0	0	0
	0	0	0	0	0
	0	0	0	0	0
TOTAL	0	0	0	0	0

**Agricultural and Urban Customers**

Year 2010

agricultural water charges:	\$2.65/AF, uniform block rate
urban water charges:	\$15.00/AF

b. Annual charges collected from customers (2010):

Fixed Charges – water charges are based on volume used by the retail agencies

Charges (\$/unit)	Charge units (\$/acre), (\$/ customer) etc.	Units billed during year	\$ collected (total)
NA			

c. Annual charges collected from customers (2010):

**Volumetric Charges**

Charges (\$/unit)	Charge units (\$/acre), (\$/ customer) etc.	Units billed during year	\$ collected (Solano Project total)
\$2.65/AF(ag) \$15/AF (M&I)	1 unit = 1 Acre-foot	Acre-feet	\$199,326

d. Describe contractor's water-use data accounting procedures.

**Solano County Water Agency is strictly a wholesaler and has no retail accounts.** As a wholesaler, SCWA has nine customers from the Solano Project – all are public agencies. Each turnout from the Putah South Canal is measured by the respective Member Unit and reported to SCWA. SCWA is not involved in any meter reading.



A water supply contract executed in 1955 between SCWA and USBR provided for repayment of Solano Project costs. The contract included a fixed water payment for the term of the contract. The contract was renewed for a 25-year term in 1999. The pricing of the water was kept the same as the rates set in **1955**. The rates are \$15 per acre-foot for urban water and \$2.65 per acre-foot for agricultural water. These charges offset the capital cost for the Solano Project. SCWA pays for operational losses and spills from the Putah South Canal. However, SCWA completed repayment of the Solano Project capital costs in 2006. As a result, SCWA and its member units no longer have to remit annual water entitlement payments to USBR for Solano Project water.

The contractual allocation of water supply from the Solano Project to Solano Project contracting agencies is shown in following table. SID and the Maine Prairie Water District (MPWD) have an agreement whereby SID receives 10,000 acre-feet per year of MPWD's Solano Project entitlement in return for providing a larger amount of agricultural return flows to MPWD. There have been other exchanges and transfers of Solano Project entitlements that are explained in the respective Member Unit Water Management Plans.

The University of California, Davis (UCD) has a contract right to 4,000 AF annually from the Solano Project (SP). SP water, stored in Lake Berryessa, is released down Putah Creek from Monticello Dam and re-captured by Putah Diversion Dam approximately 13 miles downstream. The water is diverted from the Putah South Canal (PSC) to UCD via a surcharged pipeline approximately 2 miles downstream of the PSC head-works. UCD uses the water for agricultural purposes only.

**Solano Project Water Contracts**

Agency	Annual Entitlement (Acre Feet)
City of Fairfield	9,200
City of Suisun City	1,600
City of Vacaville	5,750
City of Vallejo	14,600
Solano Irrigation District	141,000
Maine Prairie Water District	15,000
UC Davis	4,000
California State Prison – Solano	1,200
Project Operating Loss (average estimated)	15,000
<b>TOTAL PROJECT</b>	<b>207,350</b>

For State Water Project water delivered through the North Bay Aqueduct (NBA), agreements between SCWA and NBA contracting cities call for a price of \$20.50 per acre-foot. This price was established to roughly equate to the price of municipal and industrial water from the Solano Project. There are provisions in the NBA contract for increasing the price of water sold to cities should additional funding be necessary to pay DWR for the water. The special NBA property tax generates funding necessary to make up the difference between the current amount paid to DWR for SWP water and the \$20.50 charged to cities. The special NBA property tax of \$0.02 per \$100 assessed valuation is assessed to a zone of benefit that includes all the cities and most of the irrigated agricultural lands in the County. The property tax assessment is to be in effect as long as payments must be made for NBA water supply.

The five active NBA contracting cities (Cities of Benicia, Fairfield, Suisun City, Vacaville, and Vallejo) are billed twice annually for 50% of their Table A entitlement. Invoices are sent in April and November. November is for the upcoming calendar year.

**State Water Project Contracts**

Agency	Table A Amount (Acre Feet)
City of Benicia	17,200
City of Fairfield	14,678
City of Suisun City	1,100
City of Vacaville	8,978
City of Vallejo	5,600
City of Dixon (1)	
City of Rio Vista (2)	

(1) Dixon’s SWP contract will begin with 300 AF in the year 2016 and gradually increase by 300 AF annually. The contract amount reaches a maximum of 1,500 AF by 2020 and remains so each year thereafter. Dixon currently has no transmission or treatment facilities to utilize water from the NBA.

(2) Rio Vista’s SWP contract will begin with 300 AF in the year 2016 and gradually increase by 300 AF annually. The contract right reaches a maximum of 1,500 AF by 2020 remains so each year thereafter. Rio Vista currently has no transmission or treatment facilities to utilize water from the NBA. With permission from DWR (and other relevant regulatory agencies) Rio Vista could take its SWP contract water directly from the Sacramento River rather than through the NBA.

### *Water Shortage Allocation Policies*

SCWA is contractually committed to deliver the full contract amount of water supply from the Solano Project unless the water supply does not physically exist (e.g. an empty reservoir). All Solano Project contractors, whether they are municipal or agricultural, are on an equal basis for Solano Project water supply. The Solano Project contract with member agencies requires the full amount allocated by USBR be provided to the member agencies. The contract between SCWA and USBR requires allocation of the full amount of contract amounts unless that water is physically unable to be delivered from the Solano Project.

The “Solano Project Members Agreement As To Drought Measures and Water Allocation” (Exhibit C) provides for a reduction in the use of Solano Project water when reservoir levels are between 800,000 acre feet of storage (approximately half full) and 450,000 acre feet of storage. The Agreement requires a reduction of five to ten percent of Solano Project use during this storage level. The five to ten percent not utilized is stored in the reservoir as carryover to be made available when the storage is above 800,000 acre feet or below 450,000 acre feet.

As stated earlier, SCWA is contractually committed to provide the available water supply from the Solano Project to its member agencies regardless of hydrologic conditions. SCWA does not have the ability to take measures to provide incentives or disincentives for water use from SCWA. This is best addressed at the local level.

SCWA is strictly a wholesale supplier of water. Each of the member units has its own method to deal with water shortages. SCWA provides coordination assistance but is not responsible for making any decisions regarding water shortages. The only exception is that SCWA retains authority to change allocations of State Water Project supplies water during shortages.

The contract language is as follows: **“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 portion 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 as 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 impact various reductions of water supply will have on the economy, public health, and welfare.”**

A two-stage trigger for contingency actions is shown in the following table. Stage 1 is if there is a 25% reduction in either State Water Project 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.

**Water Supply Shortage Stages and Conditions**

<b>Stage No.</b>	<b>Water Supply Conditions</b>	<b>% Shortage</b>
1	Reduction in SWP and/or Solano Project	25%
2	Reduction in SWP and/or Solano Project	50%

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 and will also state its willingness to consider allocations of shortages in the SWP supply as specified in the member agency agreements.

A copy of SCWA’s Water Shortage Contingency Plan is shown in Exhibit D.

**SCWA is contractually committed to provide the available water supply from the Solano Project to its member agencies regardless of hydrologic conditions.**

## Section 2: Inventory of Water Resources

### A. Surface Water Supply

#### 1. Acre-foot amounts of surface water delivered to the purveyor by each of the purveyor sources.

Table 1 contains a summary of 2010 water supply amounts to SCWA. Solano Project (Federal) water is used for both M&I (urban) and agriculture. State Water Project supplies are only allocated for M&I use.

<b>Table 1</b>				2010		
<b>Surface Water Supply</b>						
Month	Federal Urban Water (acre-feet)	Federal Ag Water (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Other Water (define) (acre-feet)	Total (acre-feet)
January	3,154	30	49	0	0	3,233
February	3,379	12	324	0	0	3,715
March	3,949	58	204	0	0	4,211
April	3,944	2,839	614	0	0	7,397
May	3,502	15,825	3,100	0	0	22,427
June	4,416	24,286	4,258	0	0	32,960
July	4,814	31,746	5,080	0	0	41,640
August	4,651	24,002	4,952	0	0	33,605
September	4,338	16,128	4,567	0	0	25,033
October	2,932	6,212	3,911	0	0	13,055
November	1,168	58	3,012	0	0	4,238
December	2,727	20	815	0	0	3,562
<b>TOTAL</b>	<b>42,974</b>	<b>121,216</b>	<b>30,886</b>	<b>0</b>	<b>0</b>	<b>195,076</b>

### B. Ground Water Supply

1. Acre-foot amounts of ground water pumped and delivered by the contractor.

**SCWA does not supply groundwater**

**Table 2. Ground Water Supply**

2010 Month	District Groundwater (acre-feet)	Private Urban Groundwater *(acre-feet)	Private Agric Groundwater *(acre-feet)
<b>Method</b>			
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
December	0	0	0
TOTAL	0	0	0

\*normally estimated

2. Ground-water basin(s) that underlies the district.

**See member units' reports for groundwater information**

Name	Size (Square Mile)	Usable Capacity (AF)	Safe Yield (AF/Y)
NA			

3. Map of Contractor-operated wells and managed ground-water recharge areas.

**SCWA does not operate wells nor supply groundwater**

4. If there is conjunctive use of surface and ground water, describe it.

None in 2010. However, a pilot conjunctive use well was constructed with Reclamation District No. 2068 with initial testing in 2011. A description of the project will be included in the 2015 Water Management Plan.

5. For managed ground-water basins, attach a copy of the management plan.

SCWA does not supply groundwater and does not have a groundwater management plan.

Member units using groundwater have groundwater management plans.

6. For participation in ground-water banking, attach a description of the banking plan.

SCWA does not supply groundwater – SCWA is not involved in any groundwater banking dealing with Solano Project water, but is involved in groundwater banking outside the Agency with State Water Project water.

### C. Other Water Supplies

1. Acre-foot amounts of “Other” water used as part of the contractor’s water supply.

SCWA has no water supplies other than those described above, namely the North Bay Aqueduct and the Solano Project.

**Table 3. Total Water Supply**

<b>2010 Month</b>	<b>Surface Water Total (acre-feet)</b>	<b>District Groundwater (acre-feet)</b>	<b>Recycled M&amp;I Wastewater (acre-feet)</b>	<b>Total District Water Supply (acre-feet)</b>
<b>Method</b>				
January	3,233	0	0	3,233
February	3,715	0	0	3,715
March	4,211	0	0	4,211
April	6,862	0	0	6,862
May	22,248	0	0	22,248
June	32,607	0	0	32,607
July	41,582	0	0	41,582
August	34,220	0	0	34,220
September	25,832	0	0	25,832
October	13,221	0	0	13,221
November	4,244	0	0	4,244
December	3,766	0	0	3,766
<b>TOTAL</b>	<b>195,741</b>	<b>0</b>	<b>0</b>	<b>195,741</b>



*Amount of water received under each right and/or contract for the last 10 years.*

Water deliveries to SCWA for the period from 2001 to 2010 are shown in Table 8.

**Table 8. Annual Water Quantities Delivered Under Each Right or Contract**

Using USBR Water Year – March 1 to February 28/29

Year	Federal Urban Water (acre-feet)	Federal Ag Water (acre-feet)	State Water (acre-feet)	Local Water (define) (acre-feet)	Other (define) (acre-feet)	Total (acre-feet)
2001	52,136	152,276	34,606	0	0	239,018
2002	44,942	157,242	38,560	0	0	240,774
2003	43,450	132,027	33,933	0	0	209,410
2004	39,359	135,210	45,137	0	0	219,706
2005	43,516	112,385	39,979	0	0	195,880
2006	44,625	103,983	35,724	0	0	184,332
2007	34,189	140,490	47,544	0	0	222,223
2008	43,320	152,222	40,857	0	0	236,399
2009	47,820	129,667	30,477	0	0	207,964
2010	43,694	121,216	30,831	0	0	195,741
Total	437,051	1,336,718	377,648	0	0	2,151,447
Average	43,705	133,672	37,765	0	0	215,145

**D. Source Water Quality Monitoring Practices**

1. Potable Water quality (urban only)

Water quality from both the North Bay Aqueduct and the Solano Project is measured by city water treatment plants. Additionally SCWA has limited water quality monitoring along some locations on the Putah South Canal. See the Water Management Plans for the Solano Project cities for more detail on water quality monitoring. SCWA is not involved in groundwater quality monitoring. SCWA is involved in projects that could improve the water quality in the Putah South Canal such as controlling inflows into the canal and potential turbidity management projects in source water.

2. Agricultural water quality concerns:                      Yes      No      X

Agricultural water quality testing programs and the role of each participant, including the District, in the program

**Please refer to retailer reports.**

*Current water quality monitoring programs by source (agricultural only).*

**Surface water**

Analyses Performed	Frequency Range	Concentration Range	Average
<b>None by SCWA. See member units' reports</b>			

**Current water quality monitoring programs for groundwater by source (agricultural only).**

Analyses Performed	Frequency Range	Concentration Range	Average
<b>None by SCWA. See member units' reports</b>			

**E. Water Uses Within the District**

Solano Project Water Distribution – See Attachment E for Project Year 2010 monthly deliveries

Name of Agency	Year	2005 Water Distributed (Acre-Feet)	2010 Water Distributed (Acre-Feet)
Benicia		2,053	2,323
Cal State Prison - Solano		1,110	751
Fairfield		16,735	13,183
Maine Prairie Water District		6,367	10,318
Suisun City		5,021	4,030
Solano Irrigation District		106,282	114,235
University of California - Davis		1,976	1,145
Vacaville		4,880	4,879
Vallejo		12,273	14,678
<b>TOTAL :</b>		<b>156,697</b>	<b>165,542</b>

**1. Agricultural**

Complete Water Inventory Table, Table 5 Crop Water Needs  
 See member units' reports

**Table 5**

***Crop Water Needs***

<b>2005 Crop Name</b>	<b>Area (crop acres)</b>	<b>Crop ET (AF/Ac)</b>	<b>Leaching Requirement (AF/Ac)</b>	<b>Cultural Practices (AF/Ac)</b>	<b>Effective Precipitation (AF/Ac)</b>	<b>Appl. Crop Water Use (acre- feet)</b>
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0

**Table 6**

***2005 District Water Inventory***

Water Supply	Table 3		0
Riparian ET	(Distribution and Drain)	minus	0
Groundwater recharge	(intentional - ponds, injection)	minus	0
Seepage	Table 4	minus	0
Evaporation - Precipitation	Table 4	minus	0
Spillage	Table 4	minus	0
Leaks, Breaks, Flushing / Fire	Table 4	minus	0
<b>Transfers/trades/wheeling</b>		<b>plus/minus</b>	0
Water Available for sale to customers			0
<hr/>			
2005 Actual Agricultural Water Sales		From District Sales Records	0
Private Groundwater Crop Water Needs	Table 2	plus	0
	Table 5	minus	0

Drainwater outflow (tail and tile not recycled)	minus	0
Percolation from Agricultural Land (calculated)		0
M&I Actual Water Sales	From District Records	0
Inside Use	Feb urban use x 12	0
Landscape / Outside Use	(calculated)	0

**2. Types of irrigation Systems used for each crop in current year**

See Solano Irrigation District and Maine Prairie Water District’s reports for full details.

**Table 7**

***Influence on Groundwater and Saline Sink***

**2005**

Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District Influence on Groundwater Storage	0
Estimated actual change in ground water storage, including natural recharge)	0
Irrigated Acres (from Table 5)	0
Irrigated acres over a perched water table	0
Irrigated acres draining to a saline sink	0
Portion of percolation from agri seeping to a perched water table	#DIV/0!
Portion of percolation from agri seeping to a saline sink	#DIV/0!
Portion of On-Farm Drain water flowing to a perched water table/saline sink	0
Portion of Dist. Sys. seep/leaks/spills to perched water table/saline sink	0
Total (AF) flowing to a perched water table and saline sink	#DIV/0!

**3. Urban Use by customer type**

**SCWA is a wholesaler – see member units’ reports for additional detail.**

Customer Type	Number of Connections	Year 2010 Use (AF)
Single-family		
Multi-family		
Commercial		
Industrial		
Institutional	2	1,960
Landscape irrigation		
Wholesale	6	190,848
Recycled		

Customer Type	Number of Connections	Year 2010 Use (AF)
Other (specify)		
Unaccounted for		13,592
<b>Total</b>	<b>8</b>	<b>206,400</b>

**4. Urban Waste Water Collection and Treatment Systems serving the service area**

SCWA is not involved in wastewater collection or treatment. The table below lists the three wastewater plants operated by Member Units receiving Solano Project water.

Treatment Plant	Treatment Level (1, 2, 3)	Year 2010 (AF)	Disposal to
Fairfield-Suisun Sewer District	3	17,500	Boynton Slough – Suisun Bay
City of Vacaville	2 <sup>1</sup>	9,200	Alamo Creek – Cache Slough
Vallejo Sanitation District	2	12,881	Carquinez Straits
	Total	39,581	
Total discharged to ocean	Saline sink		

<sup>1</sup> Currently in construction for upgrade to Level 3.

**5. Groundwater recharge/management in current year**

**SCWA is not involved in groundwater recharge or management**

Recharge Area	Method of Recharge	AF	Method of Retrieval
NA			

**6. Transfers and exchanges.**

The agreement between the City of Benicia and the Mojave Water Agency ended in 2007. However, the City of Benicia is still contractually entitled to 2,000 AF of banked water. One thousand acre-feet must be recovered by 2014 and the remaining 1,000 Acre-feet by 2015. After the year 2015, the City of Benicia loses the entitlement to that 2,000 AF.

From Whom	To Whom	Year	(AF)	Use
Mojave Water Agency	Benicia	2010	0	Exchange program for State Water Project Water – half of the amount comes back in dry years

**7. Trades, wheeling, or other transactions.**

From Whom	To Whom	Year	(AF)	Use
none				

**8. Any other uses of water.**

Other Uses	Year	AF
None		

**F. Outflow from the District (Irrigation Drainage)**

**1. Surface and subsurface drain/return flows.**

Drain Location	Type of Use	Year ____ (AF)
See retail reports		

**2. Drainage Water Quality Testing Program Description**

**3. Outflow (surface drainage & spill) Quality Testing Program**

Analyses Performed	Concentration Range	Frequency Range	Average
None by SCWA. See retailer reports			

**4. Provide a brief description of the contractor’s involvement in Central Valley Regional Water Quality Control Board programs or requirements for remediating or monitoring any contaminants that would significantly degrade water quality in the receiving surface waters.**

SCWA is not involved in these programs.

### Section 3: Best Management Practices (BMPs) for Agricultural Contractors

SCWA is a wholesale supplier. The Solano Irrigation District and the Maine Prairie Water District are submitting separate Water Management Plans to Reclamation. Both agencies are contractually required to meet Reclamation’s requirement as part of their water supply contract with SCWA. SCWA will ensure that both agencies meet Reclamation’s Water Management Plan requirements. Agricultural BMP’s not applicable to agricultural wholesale agencies.

#### A. Critical BMPs for Agricultural Contractors

In the Fiscal Year ending June 30, 2011, Solano County Water Agency budgeted \$85,000 for agricultural water conservation programs. Those funds were provided directly to the Solano Irrigation District for agricultural water conservation programs which are then implemented by SID. Details about those programs are reported by SID in their 5-year Water Management Plan.

1. Measure the volume of water delivered by the contractor to each customer with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6 percent. NA

Total number of customer turnouts that are unmeasured or do not meet the standards listed above: 0

Number of measurement devices installed last year: NA

Number of measurement devices installed this year: NA

Number of measurement devices to be installed next year: NA

Types of Measurement Devices to be Installed	Accuracy	Total Installed During Current Year
NA		

2. Designate a water conservation coordinator to develop and implement the Plan and develop progress reports.

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

3. Provide or support the availability of water management services to water users.

a. On-Farm Evaluations

1) On farm irrigation and drainage system evaluations using a mobile lab type assessment.

	Total in district	# surveyed last year	# surveyed in current year	# projected for next year	# projected 2 <sup>nd</sup> year in future
Irrigated acres	NA				
Number of farms	NA				

2) Timely field and crop-specific water-use information to the water user.

- b. Real-time and normal irrigation scheduling and crop ET information
- c. Surface, ground, and drainage water quantity and quality data provided to water users.
- d. Agricultural water management educational programs and materials for farmers, staff, and public.

Program	Co-Funders (If Any)	Yearly Targets
NA		

4. Pricing structure – Based at least in part on quantity delivered

Describe the quantity-based water pricing structure, the cost per acre-foot, and when it became effective.

5. Evaluate and describe the need for changes in policies of the institutions to which the contractor is subject.

6. Evaluate and improve efficiencies of contractor’s pumps. Describe the program to evaluate and improve the efficiencies of the contractor’s pumps.



**B. Exemptible BMPs for Agricultural Contractors**

**Solano County Water Agency is a wholesaler only with no direct implementation of any agricultural BMPs. See member unit reports for program details.**

1. Facilitate alternative land use.

Drainage Characteristic	Acreage	Potential Alternate Use
High water table (<5 feet)		
Poor drainage		
Ground water Selenium concentration > 50 ppb		
Poor productivity		

2. Facilitate use of available recycled urban waste water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils.

Sources of Recycled Urban Waste Water	AF/Y Available	AF/Y Currently Used by Contractor
NA		

3. Facilitate the financing of capital improvements for on-farm irrigation systems.

Funding source programs

How contractor provides assistance

4. Incentive pricing.

Structure of Incentive Pricing

Related goal

5. a) Line or pipe ditches and canals-accomplished during last 5 years or planned for next 5 years.

Canal/Ditch (Reach)	Type of Improvement	Number of Miles in Reach	Estimated Seepage (AF/Y)	Accomplished/Planned Date
NA				

- b) Construction of regulatory reservoirs-accomplished during last 5 years or planned for next 5 years.

Reservoir Name	Annual Spill in Section (AF/Y)	Estimated Spill Recovery (AF/Y)	Accomplished/Planned Date
NA			

6. Increase flexibility in water ordering by, and delivery to, water users.

Note: Provide a copy of a sample bill and water order.

7. Construct and operate district spill and tailwater recovery systems with measurement.

Distribution System Lateral	Annual Spill (AF/Y)	Quantity Recovered and reused (AF/Y)
NA		

8. Plan to measure outflow: This section applies to agricultural contractors. Solano County Water Agency is a wholesaler only with no direct implementation of agricultural BMPs. See member unit reports.

Total # of outflow (surface) location/ points: \_\_\_\_\_ NA \_\_\_\_\_

Total # of outflow (subsurface) location/ points: \_\_\_\_\_ NA \_\_\_\_\_

Total # of measured outflow points: \_\_\_\_\_ NA \_\_\_\_\_

Percentage of total outflow (volume) measured during report year : \_\_\_\_\_ NA \_\_\_\_\_

Identify locations, prioritize, determine best measurement method/ cost, submit funding proposal in \$1,000s by year 2009-2013.

9. Optimize conjunctive use of surface and ground water.

10. Automate canal structures.

11. Facilitate or promote water customer pump testing and evaluation.

12. Mapping - GIS maps

**SCWA has not yet embarked on GIS mapping of its facilities.**

***C. Provide a 3-Year Budget for Expenditures and Staff Effort for BMPs***

(Current year and 2 projected years budget for all BMPs.) As stated in previous sections, SCWA is not directly involved in agricultural BMP implementation. See member unit reports for program details.

3-Year Budget and Staff Time Summary

1. Amount actually spent last year.

Year _____		Total Budget	Staff Time	
BMP #	BMP Name	(Including Staff Time)	(Hours)	(\$)
A1	Measurement	\$0	0	\$0
2	Conservation staff	\$0	0	\$0
3	On-farm evaluation/ water delivery info	\$0	0	\$0
	Irrigation scheduling	\$0	0	\$0
	Water quality	\$0	0	\$0
	Agricultural Education Program	\$0	0	\$0
4	Quantity pricing	\$0	0	\$0
5	Policy changes	\$0	0	\$0
6	Contractor's pumps	\$0	0	\$0
B1	Alternative land use	\$0	0	\$0
2	Urban recycled water use	\$0	0	\$0
3	Financing of on-farm systems	\$0	0	\$0
4	Incentive pricing	\$0	0	\$0
5	Line or pipe canals/install reservoirs	\$0	0	\$0
6	Increase delivery flexibility	\$0	0	\$0
7	District spill/tailwater recovery system	\$0	0	\$0
8	Measure outflow			
9	Optimize conjunctive use	\$0	0	\$0
10	Automate canal structures	\$0	0	\$0
11	Customer pump testing	\$0	0	\$0
12	Mapping	\$0	0	\$0

Solano County Water Agency  
 2011 5-year Water Management Plan \_\_\_\_\_

2. Projected budget and staff time summary for the next 2 years.

Year 2011		Total Budget	Staff Time	
BMP #	BMP Name	(Including Staff Time)	(Hours)	(\$)
A1	Measurement	\$0	0	\$0
2	Conservation staff	\$0	0	\$0
3	On-farm evaluation/ water delivery info	\$0	0	\$0
	Irrigation scheduling	\$0	0	\$0
	Water quality	\$0	0	\$0
	Agricultural Education Program	\$0	0	\$0
4	Quantity pricing	\$0	0	\$0
5	Policy changes	\$0	0	\$0
6	Contractor's pumps	\$0	0	\$0
B1	Alternative land use	\$0	0	\$0
2	Urban recycled water use	\$0	0	\$0
3	Financing of on-farm systems	\$0	0	\$0
4	Incentive pricing	\$0	0	\$0
5	Line or pipe canals/install reservoirs	\$0	0	\$0
6	Increase delivery flexibility	\$0	0	\$0
7	District spill/tailwater recovery system	\$0	0	\$0
8	Measure outflow			
9	Optimize conjunctive use	\$0	0	\$0
10	Automate canal structures	\$0	0	\$0
11	Customer pump testing	\$0	0	\$0
12	Mapping	\$0	0	\$0
	Total	\$0	0	\$0

Solano County Water Agency  
 2011 5-year Water Management Plan \_\_\_\_\_

Year 2012		Total Budget	Staff time	
BMP #	BMP Name	(Including Staff Time)	(Hours)	(\$)
A1	Measurement	\$0	0	\$0
2	Conservation staff	\$0	0	\$0
3	On-farm evaluation/ water delivery info	\$0	0	\$0
	Irrigation scheduling	\$0	0	\$0
	Water quality	\$0	0	\$0
	Agricultural Education Program	\$0	0	\$0
4	Quantity pricing	\$0	0	\$0
5	Policy changes	\$0	0	\$0
6	Contractor's pumps	\$0	0	\$0
B1	Alternative land use	\$0	0	\$0
2	Urban recycled water use	\$0	0	\$0
3	Financing of on-farm systems	\$0	0	\$0
4	Incentive pricing	\$0	0	\$0
5	Line or pipe canals/install reservoirs	\$0	0	\$0
6	Increase delivery flexibility	\$0	0	\$0
7	District spill/tailwater recovery system	\$0	0	\$0
8	Measure outflow			
9	Optimize conjunctive use	\$0	0	\$0
10	Automate canal structures	\$0	0	\$0
11	Customer pump testing	\$0	0	\$0
12	Mapping	\$0	0	\$0

## Section 4: BMPs for Urban Contractors

(This section is taken verbatim from the California Urban Water Conservation Council's (CUWCC) Memorandum of Understanding (MOU), March 14, 2001.)

Please note that the CUWCC MOU and BMPs were revised in 2008.

SCWA is a wholesale supplier. The cities of Vallejo, Vacaville, Fairfield and Suisun City are submitting separate Water Management plans to the Bureau of Reclamation. The cities are contractually required to meet Reclamation's requirement as part of their water supply contract with SCWA. SCWA will ensure that both agencies meet Reclamation's Water Management Plan requirements.

SCWA manages and provides 75% of the program funding for several Solano County water conservation programs. SCWA implements a regional water use efficiency program covering the entire county. SCWA is the program lead for the Residential Water Survey, High-Efficiency Clothes Washer Rebate, High-Efficiency Toilet Rebate, and Commercial, Industrial, and Institutional Water Conservation Programs. Additionally, the Agency implemented rebate programs for turf-replacement and installation of a Weather-Based Irrigation Controller (Smart controller). To avoid "double counting", details of the programs, including numbers of rebates disbursed, will be provided by SCWA member units.

In December, 2010, SCWA became the lead agency for the Bay Area Integrated Regional Water Management Plan conservation grant. This grant will provide over \$9,000,000 to water agencies throughout the Bay Area to implement a series of water use efficiency measures. As the lead agency, SCWA is responsible for collecting program data, administering grant funds, and providing required progress reports.

Provided in Exhibit F is the 2010 California Urban Water Conservation Council Report for SCWA which identifies compliance with urban BMP's for a wholesale agency.

### 1. Water Survey Programs for Single-Family and Multi-Family Residential Customers

SCWA administers this program regionally on behalf of its member units. See member units' reports for detailed program data.

The program includes the following actions:

- a. Contact via letter or telephone single-family and multi-family residential customers.
- b. Provide surveys to single-family and multi-family unit residential customers.
- c. Instruct customers in meter reading.
- d. Check for leaks, including toilets/faucets and, if necessary, provide toilet flappers/faucet washers.
- e. Check showerhead and aerator flow rates, and provide low-flow models, as necessary.
- f. Check toilet flow rates, and when appropriate, recommend a ultra-low flow toilet

(ULFT) replacement.

- g. Check irrigation system for leaks/overlap and determine timer functioning and current schedule.
- h. Measure landscaped area and develop irrigation schedule.
- i. Provide customer with evaluation results, water saving recommendations, and other information.

The contractor will annually collect and submit the following information:

- a. Of single-family and multi-family residential accounts in service area.
- b. Number of single-family residential surveys offered during reporting period.
- c. Number of single-family residential surveys completed during reporting period.
- d. Number of multi-family residential surveys offered during reporting period.
- e. Number of multi-family residential surveys completed during reporting period.
- f. Monitor annual water-use changes in consumption at surveyed accounts, individually and as a group.

## 2. Residential Plumbing Retrofit

The program includes the following actions:

- a. Retrofit kits will consist of high-quality, 2.5 gpm or less showerheads and 2.2 gpm or less faucet aerators.
- b. Distribution to not less than 10 percent of single-family and 10 percent of multi-family units each year, until 75 percent of single-family and 75 percent of multi-family units are retrofitted.
- c. Track the location, type and number of retrofits completed, devices distributed, and program costs.

The contractors will annually collect and submit the following information:

- a. The total number of non-retrofitted pre-1992 single-family residences and multi-family units.
- b. The number of retrofit kits distributed and installed during previous reporting period.
- c. The estimated percentage of pre-1992 single-family residences and multi-family units in service area fitted with low-flow showerheads and faucet aerators.

## 3. System Water Audits, Leak Detection, and Repair

SCWA is responsible for maintaining the Putah South Canal (PSC) of the Solano Project. The PSC is a 33 mile concrete lined channel. PSC losses are calculated by taking measured flows (measured by Parshall flume) at the PSC headworks and subtracting our deliveries. SCWA has developed a multi-year program to better quantify whether losses are from leakage, accounting errors or measurement errors – or a combination of both. Several major leaks were identified by taking in canal flow measurements and were repaired in 2002. Other areas in the PSC were checked, but no other such major leaks were identified. In 2003 rating curves for weirs



delivering PSC to large agricultural turnouts were recalibrated after it was discovered that the rating curves were not accurate. There is an ongoing program to install improved water measurement devices in the PSC to provide a more accurate mass balance of water.

The other conveyance facility serving SCWA, the North Bay Aqueduct (NBA) is an underground pipeline (22 miles) operated and maintained by the California Department of Water Resources. DWR reports that there are no significant losses from the NBA.

The program includes the following actions:

- a. Annually complete a prescreening system audit to determine the need for a full-scale system audit. The prescreening system audit is calculated as follows:
  - 1) Determine metered sales.
  - 2) Determine other system verifiable uses.
  - 3) Determine total supply into system.
  - 4) Divide metered sales plus other verifiable uses by total supply into the system. If this quantity is less than 0.9, a full-scale system audit is indicated.
- b. When indicated, the contractors will complete a water audit of its distribution system using methodology consistent with that described in the American Water Works Association's (AWWA) Water Audit and Leak Detection Guidebook.
- c. The contractor also advises customers whenever it appears possible that leaks exist on the customer's side of the meter, performs distribution system leak detection when warranted and cost effective, and repairs leaks when found.

The contractor will annually collect and submit the following information:

- a. Prescreening audit results and supporting documentation.
- b. Maintain in-house records of audit results, or the completed AWWA audit worksheets for each completed audit period.

#### 4. Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections (NOT EXEMPTIBLE)

All SCWA water sales are metered – there are no unmetered connections. However, none of those meters belong to SCWA. Therefore, SCWA does not handle any operations or maintenance of the meters, that becomes the responsibility of the respective member units.

The BMP also requires the identification of intra- and inter-agency disincentives or barriers to retrofitting mixed use commercial accounts with dedicated landscape meters and conducting a feasibility study to assess the merits of a program to provide incentives to switch mixed use accounts to dedicated landscape meters. This portion of the BMP is more appropriately implemented by the member units.

The program includes the following actions:

- a. Install meters at new connections before those connections receive water.
- b. Install meters at existing unmetered connections at a consistent rate so all unmetered connections will be metered within the specified time stated in your contract.
- c. Bill all metered connections based on commodity rates.
- d. Conduct a study to identify any barriers or disincentives to retrofitting mixed-use commercial, industrial, and institutional (CII) accounts with dedicated landscape meters and assess the merits of a program to provide incentives to switch mixed-use CII accounts to dedicated landscape meters.

The contractor will annually collect and submit the following information:

- a. Confirmation that all new connections are metered and are being billed by volume of use.
- b. Total number of unmetered connections and number of previously unmetered connections which were metered during 1998 and 1999.
- c. Number of CII accounts with mixed-use meters.
- d. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.
- e. Impact of subsidized rates on water use.

## 5. Large Landscape Conservation Programs and Incentives

This BMP is not applicable since SCWA does not directly serve any large landscape customers. However, just as is the case with the other non-applicable BMPs, SCWA will support the member units' efforts to implement this BMP.

The program includes the following components:

### Customer Support, Education, and Assistance

Provide non-residential customers with support and incentives to improve their landscape water-use efficiency. This program will provide:

#### Accounts with Dedicated Irrigation Meters

- a. The landscaped area at accounts with dedicated irrigation meters will be measured and ETo-based water-use budgets equal to no more than 100 percent of reference ET per square foot of landscape area will be assigned to each account.
- b. Notices will be provided each billing cycle to accounts with water-use budgets showing the relationship between the budget and the actual consumption.

Mixed-Use Meters or Not Metered

- a. Mixed-use CII accounts with landscaping will be identified.
- b. A strategy targeting and marketing large landscape water-use surveys to accounts with mixed-use meters will be developed.
- c. Cost-effective measures will be identified and offered, such as:
  - 1) Landscape water-use analysis/survey
  - 2) Voluntary water-use budgets.
  - 3) Installation of dedicated landscape meters.
  - 4) Training (multi-lingual, where appropriate) in landscape maintenance, irrigation system maintenance, and irrigation system design.
  - 5) Financial incentives to improve irrigation system efficiency such as loans, rebates, and grants for the purchase and/or installation of water-efficient irrigation systems.
  - 6) Follow up water-use analyses/surveys with a letter, phone call, or site visit, where appropriate.
- d. Survey elements will include: Measurement of landscape area; measurement of total irrigable area; irrigation system check and distribution uniformity analysis; review or develop irrigation schedules, as appropriate; and provision of a customer survey report and information packet.

New or Change of Service Accounts

New customers and change-of-service CII customer accounts will be provided information on climate-appropriate landscape design and efficient irrigation equipment/-management.

The contractor will annually collect and submit the following information:

Dedicated Landscape Irrigation Accounts

- a. Number of dedicated irrigation meter accounts.
- b. Number of dedicated irrigation meter accounts with water budgets.
- c. Aggregate water use for dedicated landscape accounts with budgets.
- d. Aggregate budgeted water use for dedicated landscape accounts with budgets.

Mixed-Use Accounts

- a. Number of mixed-use accounts.
- b. Number, type, and dollar value of incentives, rebates, and no- or low-interest loans offered to, and received by, customers.
- c. Number of surveys offered.
- d. Number of surveys accepted.

- e. Estimated annual water savings by customers receiving surveys and implementing recommendations.

## 6. High-Efficiency Washing Machine Rebate Programs

SCWA administers this program on a regional basis on behalf of its member units. See member unit reports for program results for their respective service areas.

The program includes the following components:

- a. Determination of whether local energy providers have a high-efficiency machine rebate program. Determination of cost-effective rebate amount.
- b. If cost-effective rebate is \$50 or more, establishment of a cooperative rebate program with energy providers.
- c. If cost-effective rebate is less than \$50, or local energy providers do not have a high-efficiency washing machine rebate program, information on high-efficiency washing machines (and, if appropriate, local energy provider rebate program) will be provided to customers
- d. Support for local, State, and Federal legislation to improve efficiency standards for washing machines.

The contractors will annually collect and submit the following information:

- a. Customer incentives to purchase high-efficiency washing machines being offered by local energy service providers, if any.
- b. Data to determine the amount of a high-efficiency washing machine incentive that would be cost effective for the contractor to provide its customers.

## 7. Public Information Programs

See attached BMP reports for program results.

The program includes the following components:

Providing speakers to employees, community groups, and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills showing use in gallons per day for the last billing period compared to the same period the year before; providing public information to promote water conservation practices; and coordinating with other government agencies, industry groups, public interest groups, and the media.

The contractor will annually collect and submit the following information:

- a. Number of public speaking events relating to conservation during reporting period.
- b. Number of media events relating to conservation during reporting period.

- c. Number of paid or public service announcements relating to conservation produced or sponsored during reporting period.
- d. Types of information relating to conservation provided to customers.
- e. Annual budget for public information programs directly related to conservation.

## 8. School Education Programs

See attached BMP reports for program results.

The program includes the following components:

Working with school districts and private schools in the water suppliers' service area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Education materials shall meet the State education framework requirements and grade-appropriate materials shall be distributed to grade levels K-3, 4-6, 7-8, and high school.

The contractors will annually collect and submit the following information:

- a. Number of school presentations made during reporting period.
- b. Number and type of curriculum materials developed and/or provided by water supplier, including confirmation that curriculum materials meet State education framework requirements and are grade-level appropriate.
- c. Number of students reached.
- d. Number of in-service presentations or teacher's workshops conducted during reporting period.
- e. Annual budget for school education programs related to conservation.

## 9. Conservation Programs for CII Accounts

SCWA administers this program on a regional basis on behalf of its member units. They will provide program results for their respective service areas.

The program includes the following components:

- a. Identify CII customers by standard industrial classification (SIC) codes.
- b. Rank CII customers according to annual water use.
- c. Provide audits to the targeted number of CII accounts.
- d. Replace the targeted number of high-water-using toilets with ULFTs.
- e. Monitor the effectiveness of implemented audit recommendations.
- f. Identify incentives programs, which would encourage the implementation of cost-effective audit recommendations that were not implemented.

The contractor will annually collect and submit the following information:

- a. The number of customers and amount of water use within the CII customer classes.
- b. Number of CII customers offered a survey during the year.
- c. Number of CII surveys completed during the year.
- d. Number of follow-up audits completed during the year
- e. The type and number of water saving recommendations implemented.
- f. Incentive program budget and customer outlays.

## 10. Wholesale Agency Assistance Programs

See attached BMP reports for program results.

The program includes the following components:

### Financial Support

- a. Provide yearly budget and staff to support cooperative pilot programs and county-wide public information and school education programs with the retail water agencies. All cooperative programs are designed to advance local water conservation efforts and effectiveness.
- b. All BMPs implemented by retail water agency customers which can be shown to be cost effective in terms of avoided cost of water from the wholesaler's perspective, using CUWCC cost-effectiveness analysis procedures, will be supported.

### Technical Support

The contractor provides conservation-related technical support and information to all retail agencies for which they serve as a wholesale supplier. This support includes:

Conduct or fund workshops addressing the following topics:

- a. Procedures for calculating program savings, costs, and cost-effectiveness.
- b. Retail agencies and BMP implementation reporting requirements.
- c. The technical, programmatic, strategic, or other pertinent issues and developments associated with water conservation activities in each of the following areas: ULFT replacement, residential retrofits, CII surveys, residential and large turf irrigation, and conservation-related rates and pricing
- d. Have the necessary staff or equivalent resources available to respond to retail agencies' technical and programmatic questions involving Reclamation's BMPs and their associated reporting requirements.

### Program Management

- a. When mutually agreeable and beneficial, the contractor may operate all or any part of the conservation-related activities that a given retailer is obligated to implement under the BMP's cost-effectiveness test. The contractor, operating under a Reclamation contract, recognizes and accepts the obligation to fully satisfy the requirements of the Reclamation water conservation requirements.

#### BMP Implementation Actions

- a. Cost-effectiveness assessments will be completed for each Exemptible BMP. The methodology used will conform to Reclamation standards and procedures, and the information reported will be sufficient to permit independent verification of the cost-effectiveness calculations and of any exemptions claimed on cost-effectiveness grounds.
- b. The methodology used to calculate avoided cost per AF of new water supplies will conform to Reclamation standards and procedures, and the information reported will be sufficient to permit independent verification of the avoided cost calculations.
- c. Provision of financial incentives and equivalent resources to retail members to assist, or to otherwise support, the implementation of BMPs.
- d. The total amount of verified water savings achieved by each wholesaler-assisted BMP.

The contractor will annually collect and submit the following information:

- a. The total monetary amount of financial incentives and equivalent resources provided to retail members to assist, or to otherwise support, the implementation BMPs, subtotaled by BMP.
- b. The total amount of verified water savings achieved by each wholesaler-assisted BMP.

#### 11. Conservation Pricing

SCWA is contractually obligated to charge a fixed rate for water from the Solano Project. In regards to the Solano Project, contracts between SCWA and its member units that use this water source call for a price of \$2.65 per acre-foot for agricultural water and \$15.00 per acre-foot for M&I water.

The program includes the following components:

- a. Eliminating non-conserving pricing.
- b. Adopting conserving pricing.
- c. If contractor supplies both water and sewer service, this BMP applies to pricing of both water and sewer service.
- d. If contractor does not provide sewer service, it shall make good faith

efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.

- e. The contractors next rate study will include consideration of incentive-rate structures for all customer types: Seasonal rates; increasing block rates; connection fee discounts; grant or loan programs to help finance conservation projects; financial incentives to change landscapes; variable hook-up fees tied to landscaping; and interruptible water service to large industrial, commercial, or public customers.

The contractor will annually collect and submit the following information:

- a. Report annual revenue generated by customer class for the reporting period.
- b. Report annual revenue derived from commodity charges by customer class for the reporting period.
- c. Report rate structure by customer class for water service and sewer service, if provided.

## 12. Conservation Coordinator

The program includes the following components:

- a. Designation of a water conservation coordinator and support staff (if necessary), whose duties shall include the following:
  - 1) Coordination and oversight of conservation programs and BMP implementation.
  - 2) Preparation and submittal of Reclamation's Annual Update (CUWCC BMP Implementation Report).
  - 3) Communication and promotion of water conservation issues to agency senior management; coordination of agency conservation programs with operations and planning staff; and preparation of annual conservation budget.

The contractor will annually collect and submit the following information:

- a. Water conservation coordinator name, staff position, and years on job.  
Andrew Floendo  
Senior Water Resources Specialist  
At SCWA since 9/2006
- b. Number of water conservation coordinator staff.  
1 FTE & 8 intern positions
- c. Duties of water conservation coordinator and staff.



## Implementation of the Agency Water Use Efficiency Program

### 13. Water Waste Prohibition

Not directly applicable to SCWA but the Agency will support the BMP to the extent practical. Again, this BMP is more appropriately carried out by the retail agencies (see individual member units' Water Mgt. Plans).

The program includes the following components:

Enactment and enforcement of a water waste ordinance prohibiting gutter flooding, single-pass cooling systems in new connections, non-recirculating systems in all new conveyer car wash and commercial laundry systems, and non-recycling decorative water fountains.

The contractor will annually collect and submit the following information:

- a. Number of customers contacted about water waste violations.
- b. Number of customers cited for repeat water waste violations.

### 14. Residential ULFT Replacement Programs

SCWA administers this program on a regional basis on behalf of its member units. They will provide program results for their respective service areas.

**Please note that the SCWA's program replaces high-water-using toilets with HETs. HETs use on average 20% less than ULFT, or 1.28 gpf. SCWA does not rebate ULFTs.**

The program includes the following components:

- a. Implementation of programs for replacing existing high-water-using toilets with ULFT (1.6 gallons or less) in single-family and multi-family residences.
- b. Programs shall be at least as effective as requiring toilet replacement at time of resale.

The contractor will annually collect and submit the following information:

- a. The average number of toilets per single-family and multi-family unit.
- b. The average persons per household for single-family residences and for multi-family residences.
- c. The housing resale rate for single-family and multi-family residences in service area.
- d. The number of ULFT installations credited to the agency's replacement program, by year.
- e. Estimated cost per ULFT replacement.
- f. Estimated water savings per ULFT replacement.



***Provide a 3-Year Budget for Expenditures and Staff Effort for BMPs***  
 (Current year and 2 projected budget years for all urban BMPs.)

The Solano County Water Agency’s current urban water conservation program budget, as well as the budget for 2010-2011 and 2011-2012, is provided below. The total budget for FY 2012-2013 includes Proposition 84 grant funding. The FY 2012-13 budget was determined based on results from previous year’s programs.

**FY 2010-11 Budget and Staff Time Summary**

BMP	Actual	Estimated Staff Time (hrs)
1 Residential Water Audits	\$77,162	3,000
2 Residential Plumbing Retrofit	\$23,186	
3 System Water Audit and Leak Detection	---	
4 Metering w/Commodity Rates	---	
5 Landscape Water Audits (1)	\$12,969	1,000
6 Washing Machine Rebates	\$61,323	500
7 Public Information	\$25,140	100
8 School Education Program	\$85,340	100
9 CII Conservation Programs (2)	\$81,548	120
10 Wholesale Agency Programs (3)	---	
11 Conservation Pricing	---	
12 Conservation Coordinator	\$82,771	1,150
13 Water Waste Prohibition	---	
14 CII HET and HEU Program	\$179,870	120
<b>TOTAL</b>	<b>\$629,309</b>	<b>6,090</b>

[1] This includes the budgets for the turf replacement and irrigation controller rebate programs.

[2] This budget item includes CII water audits, large landscape programs, and the water savings incentive program.

[3] The wholesale program funding and staff time dedication is spread among the various BMPs.

FY 2011-12 Budget and Staff Time Summary

BMP	Actual	Estimated Staff Time (hrs)
1 Residential Water Audits	\$43,380	2,500
2 Residential Plumbing Retrofit	\$7,442	
3 System Water Audit and Leak Detection	---	
4 Metering w/Commodity Rates	---	
5 Landscape Water Audits (1)	\$37,945	1,000
6 Washing Machine Rebates	\$86,900	500
7 Public Information	\$17,257	100
8 School Education Program	\$88,000	100
9 CII Conservation Programs (2)	\$105,644	120
10 Wholesale Agency Programs (3)	---	
11 Conservation Pricing	---	
12 Conservation Coordinator	\$83,000	1,200
13 Water Waste Prohibition	---	
14 CII HET and HEU Program	\$353,838	120
<b>TOTAL</b>	<b>\$823,406</b>	<b>5,640</b>

[1] This includes the budgets for the turf replacement and irrigation controller rebate programs.

[2] This budget item includes CII water audits, large landscape programs, and the water savings incentive program.

[3] The wholesale program funding and staff time dedication is spread among the various BMPs.

SCWA does not project budgeting in two-year cycles therefore the following budgets are estimates. Because the Proposition 84 grant funds are for a two year period, it is assumed that the water conservation budget for fiscal years 2012-2013 and 2013-2014 will be approximately the same. The budget amounts are based on goals set in the Prop 84 IRWMP Bay Area conservation grant proposal.

FY 2012-13 Budget and Staff Time Summary

BMP	Budget	Estimated Staff Time (hrs)
1 Residential Water Audits	\$50,000	3,000
2 Residential Plumbing Retrofit	\$15,000	
3 System Water Audit and Leak Detection	---	
4 Metering w/Commodity Rates	---	
5 Landscape Water Audits (1)	\$170,000	1,000
6 Washing Machine Rebates	\$200,000	500
7 Public Information	\$40,000	100
8 School Education Program	\$105,000	100
9 CII Conservation Programs (2)	\$120,000	120
10 Wholesale Agency Programs (3)	---	
11 Conservation Pricing	---	
12 Conservation Coordinator	\$83,000	1,200
13 Water Waste Prohibition	---	
14 CII HET and HEU Program	\$525,000	120
<b>TOTAL</b>	<b>\$1,308,000</b>	<b>6,140</b>

1[1] This includes the budgets for the turf replacement and irrigation controller rebate programs.

1[2] This budget item includes CII water audits, large landscape programs, and the water savings incentive program.

1[3] The wholesale program funding and staff time dedication is spread among the various BMPs.

FY 2013-14 Budget and Staff Time Summary

BMP	Budget	Estimated Staff Time (hrs)
1 Residential Water Audits	\$50,000	3,000
2 Residential Plumbing Retrofit	\$15,000	
3 System Water Audit and Leak Detection	---	
4 Metering w/Commodity Rates	---	
5 Landscape Water Audits (1)	\$170,000	1,000
6 Washing Machine Rebates	\$200,000	500
7 Public Information	\$40,000	100
8 School Education Program	\$105,000	100
9 CII Conservation Programs (2)	\$120,000	120
10 Wholesale Agency Programs (3)	---	
11 Conservation Pricing	---	
12 Conservation Coordinator	\$83,000	1,200
13 Water Waste Prohibition	---	
14 CII HET and HEU Program	\$525,000	120
<b>TOTAL</b>	<b>\$1,308,000</b>	<b>6,140</b>

[1] This includes the budgets for the turf replacement and irrigation controller rebate programs.

[2] This budget item includes CII water audits, large landscape programs, and the water savings incentive program.

[3] The wholesale program funding and staff time dedication is spread among the various BMPs.

**See Exhibit G for examples of SCWA public outreach material.**

## **Section 5: Plan Implementation**

Pursuant to water service and settlement contract terms, contractors must report on Plan implementation annually.

Agricultural contractors can complete an annual update by filling in the information for BMPs on the WaterShare web site at [www.usbr.gov/mp/watershare/](http://www.usbr.gov/mp/watershare/).

Urban contractors can complete an annual update by filling in the information for urban BMPs on the CUWCC website. Contractors who are signatories of the CUWCC are currently submitting annual reports via the CUWCC's *BMP Reporting Database* located on their web site at [www.cuwcc.org](http://www.cuwcc.org). Through an agreement with the CUWCC, Reclamation's urban non-signatories may now submit their Annual Reports through the CUWCC's web site using "guest accounts." Urban BMPs are reviewed based on the CUWCC's MOU (amended March 14, 2001).

## **Section 6: Exemption Process**

Some BMPs are not appropriate or possible for a contractor to implement. To document an exemption, refer to the guide for methods of justification and insert justifications here.

## **Section 7: Regional Criteria**

There are no Regional Criteria at this time. If in the future regional criteria are considered, they will be developed as a separate document.

## **Section 8: Five-Year Plan Revision Procedure**

No data required. Refer to Guidebook for explanation.

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# ATTACHMENTS

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## **EXHIBIT A**

### **SOLANO COUNTY WATER AGENCY AGREEMENT WITH THE XXXX FOR PARTICIPATING AGENCY CONTRACT FOR SOLANO PROJECT WATER SERVICE**

THIS CONTRACT, made and entered into this \_\_\_\_\_ day of March, 1999, by and between SOLANO COUNTY WATER AGENCY, a public corporation, created and existing under and by virtue of Chapter 578 of the 1989 Statutes of the State of California, as amended, hereinafter referred to as “the Agency”, and the xxxxxx, hereinafter referred to as “the Participating Agency.”

#### **EXPLANATORY RECITALS**

WHEREAS, the predecessor in interest to the Agency and the Secretary of the Interior entered into an agreement for water service in 1955 whereby the Agency has been furnished water service by the United States from the Solano Project for the use and benefit of the Agency’s Participating Agencies; and

WHEREAS, the Participating Agency and the Agency entered into a water service contract for an allocation of the water service provided to the Agency by the United States in 1964; and

WHEREAS, the Board of Directors of the Agency on behalf of the Agency and the Secretary of the Interior have executed an agreement entitled “Renewal Contract Between the United States and Solano County Water Agency Providing for Project Water Service” dated March 1, 1999, and Numbered 14-06-200-4090, whereby the Agency will

be furnished by the United States water service consisting of a water supply from the Solano Project for the use and benefit of the Agency's Participating Agencies, including this Participating Agency; and

WHEREAS, the lands and inhabitants of the Participating Agency continue to be in need of water for beneficial uses, and the Participating Agency desires to renew its contract with the Agency; and

WHEREAS, the Agency desires to continue to make available to its Participating Agencies, including this Participating Agency, all the water made available to the Agency from the Solano Project under such terms and conditions which, as far as practical and consistent with the ultimate use of the water, shall be fair and equal for all Participating Agencies, and consistent with the amount of Project Water which has been received from the Agency by the Participating Agency.

WITNESSETH:

In consideration of the mutual and dependent covenants herein contained, the parties hereto agree as follows:

Section 1. Definitions. When used herein, unless otherwise distinctly expressed or manifestly incompatible with the intent hereof, the term:

(a) "Act" shall mean the Solano County Water Agency Act, being Chapter 578 of the 1989 Statutes of the State of California as the same may hereafter be amended or re-enacted.

(b) "Calendar Year" shall mean the period from January 1 through December

31, both dates inclusive.

(c) “The Canal” shall mean the Putah South Canal.

(d) “Contract Year” or “Year” shall mean the period from and including the first day of March of each Calendar Year through and including the last day of February of the following Calendar Year.

(e) “Irrigation Water” shall mean Project Water which is primarily used in the production of commercial agricultural crops or livestock, including domestic use incidental thereto, and watering of livestock. “Irrigation Water” shall also include Project Water furnished to the Participating Agency for use on land that the Contracting Officer determines the Participating Agency uses primarily for non revenue producing functions.

(f) "M&I Water" shall mean Project Water other than Irrigation Water. M&I Water shall include water used for purposes such as the watering of landscaping or pasture for animals (e.g., horses) which are kept for personal enjoyment or water delivered to landholdings operated in units of less than two (2) acres, or such larger landholding size, if any, specified in a water service contract between a Participating Agency and the United States, unless the Agency or Participating Agency establishes to the satisfaction of the Contracting Officer that the use of water delivered to any such landholding is a use described in subdivision (e) of this Section;

(g) “The Master Contract” shall mean that contract between the United States of America and the Agency entitled “Contract between the United States and Solano County Water Agency Providing for Project Water Service” dated March 1, 1999, and Numbered 14-06-200-4090, and the same as it may hereafter be revised, amended, supplemented or replaced by a similar contract between the same parties.

(h) "Participating Agency" shall mean any water district, reclamation district, irrigation district, water conservation district, municipality, flood control district, other public entity, city or political subdivision of the state empowered by law to appropriate water and to deliver water to water users, the territory of which lies principally within Solano County, or any state agency, which Participating Agency enters into a contract with the Agency for (a) the repayment in whole or in part to the Agency or any other person, corporation, public agency, or the United States of any or all of the construction costs of the Project (b) the underwriting in whole or part of any or all of those construction costs, (c) the repayment in whole or in part to the Agency or any other person, corporation, public agency, or the United States of any or all of the cost of furnishing Project Water to the Participating Agency or the underwriting in whole or in part of the cost, or (d) the payment in whole or in part for Project Water to be furnished or sold to that Participating Agency by the Agency, or the United States.

(i) "Project" shall mean the Solano Project, California, of the Bureau of Reclamation, consisting of Monticello Dam and Reservoir, Putah Diversion Dam and Reservoir, and Putah South Canal, substantially as described and set forth in the House Document No. 65, 81st Congress, 1<sup>st</sup> Session.

(j) "Project Water" shall mean all water that is developed, diverted, stored, or delivered by the United States and made available through the Agency to the Participating Agency in accordance with the statutes authorizing the Project and in accordance with the terms and conditions of applicable water rights permits and licenses acquired by and/or issued to the United States and/or the Agency and Participating

Agencies pursuant to California law for the Solano Project which are now in effect and as may in the future be modified.

(k) “Secretary” or “Contracting Officer” shall mean the Secretary of the United States Department of the Interior or his or her duly authorized representative.

Section 2. Term of Contract. This contract shall become effective on March 1, 1999, and shall remain in effect until the end of the term of the Master Contract; provided, that in the event that the Agency, at its option, extends or renews the Master Contract, then the Participating Agency, at its option, may extend or renew this contract, subject to the terms of the Master Contract as so extended or renewed and subject to such rates for water service as shall then be established by the Agency; provided further, that whenever the Master Contract is terminated, or suspended, in the manner and for a cause or causes specified in the Master Contract, this contract shall be similarly terminated or suspended.

Section 3. Quantities of Water to be Furnished. The Agency shall furnish to the Participating Agency, and the Participating Agency shall pay to the Agency for, a water service consisting of up to 1,200 acre feet per year for water from the Project. The Agency will not enter into any new contracts, or amend any existing contracts, with any Participating Agencies if such new contract or amendment would cause the total amount of water to be furnished to all Participating Agencies to exceed 192,350 acre feet per year, which is the current amount of Project Water currently contracted for with the

existing Participating Agencies, without the prior written concurrence of all other existing Participating Agencies.

Section 4. Time for Delivery of Water. The Participating Agency shall submit, in writing, to the Agency, prior to February 15 of each Contract Year during the term thereof, a schedule, in a form satisfactory to the Agency, of water deliveries to be made to the Participating Agency during the following Contract Year.

Section 5. Rate and Method of Payment.

(a) The Participating Agency shall pay the Agency for all water furnished from the Project, which shall be announced each year by the Agency. The rate shall consist of the following parts: (1) the applicable rate charged to the Agency by the Contracting Officer pursuant to Article 5(a) and 5(b) of the Master Contract. (2) a charge determined by the Agency if the rates for Project Water charged to the Agency by the Contracting Officer, as identified in Article 5(a) and 5(b) of the Master Contract, increase beyond \$2.65 per acre foot for Irrigation Water or \$15.00 per acre foot for M&I Water, where the Agency may adjust the rates identified in this subdivision, for all Participating Agencies, to recover all or part of the new rates so charged to the Agency by the Contracting Officer. Such adjustment will result in new rates, but the ratio between M&I Water and Irrigation Water rates shall be the same as between \$15.00 and \$2.65. The new rates under this subdivision will be applied uniformly to M&I Water users and Irrigation Water users, meaning that all Participating Agencies using M&I Water will pay the same rate and all Participating Agencies using Irrigation Water will pay the same rate.

It is the intent of the Agency that rates under this Section 5(a) be the same as the rates charged to the Agency by the Contracting Officer pursuant to Articles 5(a) and 5(b) of the Master Contract, including the expectation that after payout of Project capital costs the rates in Article 5(a) and 5(b) will be adjusted or eliminated, except if additional funding is needed from the Participating Agencies for replacement and improvement of Solano Project facilities. Any increase in the rates in this Section 5(a) shall only be imposed, consistent with applicable law, after consultation with the Participating Agencies and review and comment by the Agency's Advisory Commission. (3) an additional charge to the Participating Agency to pay for improvements, modifications, and/or additions to the Project, as described in Article 5(f) of the Master Contract, assessed to the Agency by the Contracting Officer. The Agency will determine how this charge will be apportioned to Participating Agencies, consistent with applicable law, and after consultation with Participating Agencies and review and comment by the Agency's Advisory Commission. The Agency shall spread this additional charge to the Participating Agency over a reasonable period of repayment. (4) An amount to be determined annually by the Agency, for each acre foot of Project Water allocated to the Participating Agency to pay for a proportionate share of non-capital Project costs including operation, maintenance and replacement of Project facilities; engineering; legal; environmental compliance; and a share of Agency administrative costs. The component specified in 5(a)(4) shall be generally calculated by dividing non-capital Project expenses, less revenue from Project Water sales and less other Project revenues but excluding property tax related revenues, for the Contract Year and the preceding four years by the amount of Project Water allocated, including operational losses in the Putah



South Canal, by the Agency during the Contract Year and the preceding four years. The Agency shall determine this charge by November 1 to be assessed during the forthcoming Contract Year using budgeted income and expenditures and projected Project Water schedules. The Agency shall make an adjustment to the charges at the end of the Contract Year to reflect actual Project expenditures and revenues and actual Project Water deliveries during the Contract Year and the preceding four years. Any amounts due or to be refunded will be factored into the next Contract Year charges. The charge under this subdivision for Contract Year 1999-2000 will be \$11.67 per acre foot.

(b) In addition to the rate described in subdivision (a) of this Section, the Agency may assess an additional charge to the Participating Agency to pay for an Administrative Charge, as described in Article 1(b) of the Master Contract, assessed to the Agency by the Contracting Officer, if the annual Administrative Charge is estimated, through the process described in Article 5(d) of the Master Contract, to be greater than \$100,000 per year. This additional charge will be apportioned to Participating Agencies such that the ratio between M&I Water and Irrigation Water rates under this subsection shall be the same as between \$15.00 and \$2.65. The new rates under this subdivision will be applied uniformly to M&I Water users and Irrigation Water users, meaning that all Participating Agencies using M&I Water will pay the same rate and all Participating Agencies using Irrigation Water will pay the same rate.

(c) Each Contract Year, the Participating Agency will pay to the Agency, the amount due to the Agency for the quantities of water to be made available to the Participating Agency pursuant to the terms hereof, excluding any Project Water stored in the Project pursuant to Section 11 of this Agreement which has already been paid for, as

follows: the Participating Agency shall pay one-half of the amount payable for each Contract Year on or before February 1 preceding such Contract Year, and shall pay the remainder of said amount on or before August 1 of said Contract Year.

Section 6. Point of Delivery, Measurement and Responsibility for Distribution.

(a) The Project Water to be furnished to the Participating Agency pursuant to this contract shall be made available to the Participating Agency at such turnout or turnouts from the Canal, and any additional point or points of delivery either on Project facilities or another location or locations mutually agreed to in writing by the Agency and the Contracting Officer, which writing shall also address measuring points and obligations of additional location or locations.

(b) All water furnished pursuant to this contract shall be measured either by the Agency or the Participating Agency at each point of delivery established pursuant to Section 6(a) hereof, with equipment satisfactory to the Agency which, if not provided by the United States, shall be installed, operated and maintained at the expense of the Participating Agency. For equipment provided by the United States or the Agency, all determinations relative to the measurement of water shall be made by the Agency and upon request of the Participating Agency, the accuracy of such measurements will be investigated by the Agency. Any error appearing therein will be adjusted. The Participating Agency may inspect such measuring equipment for the purpose of determining the accuracy thereof. For equipment provided by the Participating Agency, all determinations relative to the measurement of water shall be made by the Participating Agency and upon the request of the Agency, the accuracy of such measurements will be

investigated by the Participating Agency. Any errors appearing therein will be adjusted. The Agency may inspect such measuring equipment for the purposes of determining the accuracy thereof.

(c) The Agency shall not be responsible, beyond the aforesaid points of delivery, for the control, carriage, handling, use, disposal, or distribution of water which may be furnished hereunder, and the Participating Agency shall hold the Agency and the United States, their officers, agents and employees harmless from legal liability for damages of any nature whatsoever arising out of any actions or omissions by the Participating Agency, its officers, agents and employees related to the control, carriage, handling, use, disposal, or distribution of water beyond the aforesaid points of delivery. The Agency waives all right, title, and interest in or to any water, seepage, drainage, over-flow or return flow derived from water furnished under this contract, provided, however, that nothing herein shall in any manner affect the right of the United States of America, to waste, seepage and return flow which escapes or is discharged beyond the boundaries of the Agency, as specified in Article 10(c) of the Master Contract.

#### Section 7. Sales, Transfers and Exchanges of Project Water.

(a) The Participating Agency may deliver or cause to be delivered any water furnished hereunder, including a sale, transfer or exchange of Project Water to another Participating Agency, or any other public agency in Solano County, for use on lands within Agency's Service Area as defined in Article 1(c) of the Master Contract upon prior written notification to the Agency and subject to the restrictions in this Section.

(b) The Participating Agency shall not, directly or indirectly, deliver or cause to be delivered any water furnished hereunder, including a sale, transfer or exchange of Project Water, for use on lands outside the Agency's Service Area as defined in Article 1(c) of the Master Contract.

(c) Notwithstanding subsection (b) above, a Participating Agency may deliver or cause to be delivered any water furnished hereunder, including a sale, transfer or exchange of Project Water, outside the Agency's Service Area as defined in Article 1 (c) of the Master Contract, under the following conditions:

(1) The Participating Agency shall cause the lands to which the water is to be delivered to be added to the Agency's Service Area, in accordance with California Law, including obtaining approval of the Agency and, if necessary, the Contracting Officer, and at the cost of the Participating Agency. The contents of the petition to the State Water Resources Control Board, and any terms and conditions to be imposed upon the grant of any such petition, shall be approved by the Agency.

(2) The Participating Agency must first offer the water proposed to be delivered, under substantially the same terms and conditions, to all other Participating Agencies. The Participating Agencies shall have 30 days to respond in writing to the proposing Participating Agency as to their intention to exercise this right of first refusal. Any Participating Agency exercising its right of first refusal will then have an additional 60 days to complete a transaction to exercise this right of first refusal. Any exercise of this right of first refusal must be for the full amount of the proposal. If

more than one Participating Agency exercises the right of first refusal, water to be made available by the proposal will be apportioned, among the Participating Agencies exercising the right of first refusal, upon the basis of the amount of Project Water each Participating Agency is entitled to receive pursuant to its contract with the Agency, or some other apportionment agreed to by the Participating Agencies exercising the right of first refusal. This subsection (2) does not apply to annexations of lands by a Participating Agency inside Solano County.

(d) Any existing sales, transfers or exchanges of Project Water existing as of the date of this Contract that have been approved by the Agency shall be deemed approved under this Contract.

Section 8. Water Shortages. There may occur at times, during any year, a shortage in the quantity of water available for furnishing to the Agency for distribution to Participating Agencies. If there is a reduction in the Project Water available to the Agency during any Year because of errors in physical operations of the Project, drought, other physical causes beyond the control of the Contracting Officer, or actions taken by the Contracting Officer to meet legal obligations, no liability shall accrue against the Agency or the United States or any of its officers, agents, or employees for any damage, direct or indirect, arising therefrom, so long as actions based upon the opinions or determinations of the Contracting Officer are consistent with the standards in Article 23 of the Master Contract. 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 entitled to receive water from the Project, in proportion to their contractual entitlements to Project Water, as specified in Section 3 of the agreement for each Participating Agency. Within seven (7) days of the receipt by the Agency from the Contracting Officer of notice of an actual or probable shortage, the Agency will transmit a true copy of such notice to all Participating Agencies.

Section 9. Adjustments. The amount of any overpayment by the Participating Agency, by reason of the amount of water actually available hereunder from the Project during any Contract Year having been less than the quantity of such water which the Participating Agency otherwise would have been required to pay for under the provisions of this contract, shall be applied first to any accrued indebtedness arising out of this contract, then due and owing to the Agency by the Participating Agency, and any amount of such overpayment thereafter remaining shall, at the option of the Participating Agency, be refunded to the Participating Agency or credited upon amounts to become due to the Agency from the Participating Agency under the provisions of this contract in the ensuing Contract Year.

Section 10. Non-responsibility for Quality of Water. Neither the Agency nor the United States assumes any responsibility with respect to the quality of the water to be furnished pursuant to this contract, and neither the Agency nor the United States warrants the quality of any such water. The Agency shall continue to cooperate with the

Contracting Officer and Participating Agencies on programs and projects to improve the quality of water delivered by the Project including, but not limited to, measures to control erosion, sedimentation, and pollutants in the watershed of Monticello Reservoir.

Section 11. Storage of Water.

(a) To the extent that storage space in Monticello Reservoir is available, the Agency, upon the request of the Participating Agency, shall withhold delivery of and store in Monticello Reservoir, for and on behalf of the Participating Agency, any such unused quantities of water required to be furnished to the Participating Agency by the Agency pursuant to this contract. To the extent that such water can be delivered without impacting the delivery of Project Water to any Participating Agency for the current Water Year, such water shall therefore be made available to the Participating Agency in accordance with a schedule to be furnished by the Participating Agency. If two or more Participating Agencies request storage of water in Monticello Reservoir, the available storage space will be apportioned each year upon the basis of the amount of water each of such Participating Agencies is entitled to receive pursuant to its contract with the Agency.

(b) In the event any water is so stored by any Participating Agency, and it becomes necessary to release water from Monticello Reservoir because of the lack of storage capacity or in the event that water spills from Monticello Reservoir, water so released or spilled shall, up to the amount stored for and on behalf of the Participating Agencies, be deemed to be water stored for and on behalf of such Participating Agencies. If only a portion of the stored water is released or spilled, the amount of such release or

spill shall be apportioned to each Participating Agency in proportion to the amount of stored water each Participating Agency possessed immediately prior to the release or spill.

(c) No payment to the Agency is required when stored water is released to the Participating Agency because the stored water is paid for, during the Year of allocation, as part of the Participating Agency's annual Project Water supply pursuant to Section 5(a) of this agreement.

Section 12. Measurement of Water within the Participating Agency.

(a) Within five (5) years of the effective date of this contract, the Participating Agency shall ensure that, unless the Participating Agency establishes an alternative measurement program satisfactory to the Contracting Officer, all Irrigation Water delivered within each of the Participating Agency's service areas is measured at each agricultural turnout and all M&I Water delivered within each of the Participating Agency's service areas is measured at each municipal and industrial service connection. All water measuring devices or water measuring methods of comparable effectiveness must be acceptable to the Contracting Officer. The Participating Agency shall be responsible for installing, operating, and maintaining and repairing all such measuring devices and implementing all such water measuring methods at no cost to the Agency or the United States. The Participating Agency shall use the information obtained from such water measuring devices or water measuring methods to ensure proper management of the water; to bill water users for water delivered by the Participating Agency; and, if applicable, to record M&I Water delivered by customer class as defined in its water



conservation plan. Nothing herein contained, however, shall preclude any Participating Agency from establishing and collecting any charges, assessments or other revenues authorized by California law.

(b) All new surface water delivery systems installed within the Participating Agency's service area after the effective date of this contract shall comply with the measurement provisions described in subdivision (a) of this Section.

### Section 13. Water Conservation.

(a) The parties acknowledge that, as of the date of execution of this contract, the Agency and each Participating Agency that is obligated to do so have developed and are implementing water conservation plans (i) which contain definite water conservation goals, appropriate economically feasible water conservation measures, and a time schedule for meeting the water conservation goals, (ii) which meet or exceed (a) the requirements of Federal law and (b) the criteria entitled "U.S. Bureau of Reclamation , Mid-Pacific Region Criteria for Evaluating Water Management Plans," and (iii) and which shall be updated at least every five (5) years.

(b) The Participating Agency shall, promptly upon its adoption, submit to the Agency a copy of any material revision to the Participating Agency's water conservation plan for the Agency's submittal to the Contracting Officer.

(c) The Participating Agency shall submit to the Agency by February 1, of each Calendar Year, a report of the status of implementation of its water conservation plan for the Agency's submittal to the Contracting Officer.

(d) (1) If at any time the Contracting Officer concludes that the Participating Agency's water conservation plan does not substantially conform to the

requirements of Federal law or rules or regulations promulgated by the Contracting Officer pursuant to Federal law, then the Participating Agency shall amend its respective water conservation plan as necessary to meet the requirements of such law, rule, or regulation.

(2) If at any time the Contracting Officer concludes that the Participating Agency's water conservation plan is materially inconsistent with any water conservation criteria adopted by the Contracting Officer pursuant to Reclamation law then in effect, the Contracting Office shall promptly notify the Participating Agency of his conclusion and the reasons for it. Thereafter, the Contracting Officer and the Participating Agency shall promptly confer for the purpose of reaching agreement as to any changes that will be made to the water conservation plan in light of such criteria.

Section 14. Agreed Charges a General Obligation. The obligations of the Participating Agency arising out of or pursuant or incidental to this contract or the Master Contract including, without limiting the generality of the foregoing, the obligations of the Participating Agency to pay to the Agency the sums becoming due the Agency for water furnished hereunder, shall constitute a general obligation of the Participating Agency and the Participating Agency shall use all the powers and resources available to it under the law, including but not limited to causing to be levied, imposed and collected all necessary taxes, assessments, tolls and charges, to collect the funds necessary for and to pay its obligations to the Agency under this contract. The general obligations of the Participating Agency to pay to the Agency the sums due the Agency, pursuant to this

contract shall not in any way be reduced, postponed or otherwise affected by the individual default in the payment to the Participating Agency by individual water users of assessments, tolls, or other charges levied or owing to the Participating Agency.

Section 15. Defaults. Should the Participating Agency fail to make any payment to the Agency when the same shall become due for water to be furnished to the Participating Agency pursuant to this contract, the Agency may thereafter take actions to enforce the terms of the contract .

Section 16. Penalty for Late Payment. The Agency shall bill Participating Agencies at least 60 days prior to February 1 and August 1 of each year. If full payment is not received by the Agency by February 1 and August 1, the Participating Agency shall remain obligated to pay the full amount due, plus pay the Agency interest on the full amount due at the annual interest rate equivalent to the interest earned on investments in the State of California Treasurer's Office Local Agency Investment Fund plus two percent (2%), based on the most current reported interest rate, for the time period the payment is not paid beyond applicable February 1 or August 1 date.

Section 17. Participating Agency to Keep Books, Records and Other Data. The Participating Agency shall establish and maintain account and other books and records sufficient to enable the Agency to furnish to the United States reports and statements, to such extent and in such manner and form as may be prescribed by the United States.

Section 18. Service Area of the Participating Agency. Upon request by the Agency, the Participating Agency will furnish the Agency with maps showing the service area or areas of its water distribution system. The Participating Agency will not serve Project Water outside of the Agency's Service Area, as defined in Article 1(c) of the Master Contract.

Section 19. Limitations on Obligation of Agency to Furnish Water.

(a) Notwithstanding any provisions of this contract to the contrary, the obligation of the Agency to furnish water hereunder shall be limited to the times and to the extent that water and facilities necessary for furnishing the same are available to the Agency as determined by the Contracting Officer.

(b) The Agency shall not be liable for failure to perform any portion of this contract to the extent that such failure is caused by the failure of the United States to perform any obligation imposed on the United States by the Master Contract; provided, however, that the obligations of the Participating Agency hereunder shall be reduced to the extent that the Agency is prevented from performing as aforesaid; and provided, further, that the Agency shall diligently and promptly pursue all rights and remedies available to it to enforce the rights of the Agency, this Participating Agency and other Participating Agencies against the United States under the Master Contract relative to such failure to perform.

Section 20. Applicability of Master Contract. This contract is subject to the obligations and limitations imposed by the Master Contract. The Master Contract is

hereby incorporated herein by this reference to all respects as though set forth in full at this point. The Participating Agency hereby expressly agrees to the provisions of the Master Contract imposing obligations and limitations upon it, including the Biological Opinion, referenced in Section 3 (b) of the Master Contract which will impose requirements on the Participating Agency. If there is any conflict between the Master Contract and this Participating Agency Contract, the Master Contract will govern.

Section 21. Duties of Agency. The Agency hereby covenants and agrees promptly and completely to fulfill its obligations under this contract and the Master Contract and to apply and to pay to the United States for credit against obligations of the Agency for the Participating Agency under the Master Contract all sums received by the Agency from the Participating Agency hereunder, as long as these financial obligations still exist pursuant to the Master Contract.

Section 22. Existing Water Rights. The provisions of this contract shall not be applicable to or affect water or water rights now owned or hereafter acquired, other than from the United States or the Agency, by the Participating Agency or by any landowner therein, nor shall this contract be construed as limiting or curtailing any rights which the Participating Agency or any landowner therein acquires or has available to it or him under the Federal Reclamation laws.

Section 23. Contingent Upon Appropriations or Allotments of Funds. The expenditure of any money or the performance of any work or service by the United States

provided for in the Master Contract which may require appropriations of money by Congress or the allotment of funds, shall be contingent upon such appropriations or allotments being made. The failure of Congress to so appropriate funds or the failure of an allotment of funds shall not relieve the Participating Agency from any obligations under this contract and no liability shall accrue to the Agency in case such funds are not so appropriated or allotted: Provided, that in the event that water deliveries are halted or curtailed, as a result of such failure to appropriate or allot funds, the obligation of the Participating Agency to make payments pursuant to this contract shall be reduced to the extent of such halting or curtailment of service.

Section 24. Notices. All notices that are required, either expressly or by implication, to be given by any party to the other under this contract shall be delivered or mailed, United States first-class postage prepaid, addressed as follows:

For the Agency:	SOLANO COUNTY WATER AGENCY
	508 Elmira Road
	Vacaville, California 95687
	Attention: General Manager

For the Participating Agency	XXXXXXXX
	XXXX
	XXXX
	XXXX

Notice shall be deemed given (a) two calendar days following mailing via regular or certified mail, returned receipt requested, (b) one business day after deposit with any one day delivery service assuring “next day” deliver, (c) upon actual receipt of notice, or (d) upon transmission, if by facsimile, whichever is earlier. The parties shall promptly give

written notice to each other of any change of address and mailing or shipment to the addresses stated herein shall be deemed sufficient unless written notification of a change of address has been received; provided, however, that this Section shall not preclude the effective service of any such notice or announcement by other means.

Section 25. Waiver of Breaches. Any waiver at any time by either party to this contract of its rights with respect to a breach or default, or any other matter arising in connection with this contract, shall not be deemed to be a waiver with respect to any subsequent breach, default or matter.

Section 26. Assignment Prohibited. The provisions of this contract shall apply to and bind the successors and assigns of the respective parties, but no assignment or transfer of this contract, or any part thereof or interest therein, excepting transfers and exchanges of Project Water pursuant to Section 7 of this agreement, shall be valid until and unless approved by the Agency in writing.

Section 27. Reasonableness of Determination. Where the terms of this contract provide for action to be based upon the opinion or determination of either party to this contract, or of the Contracting Officer, said terms shall not be construed as permitting such actions to be predicated upon arbitrary, or unreasonable opinions or determinations.

Section 28. Equal Opportunity. During the performance of this contract, the Participating Agency agrees as follows:

(a) The Participating Agency will not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. The participating Agency will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; lay-off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Participating Agency agrees to post in conspicuous places, available for employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

(b) The Participating Agency will, in all solicitations or advertisements for employees placed by or on behalf of the Participating Agency, state that all qualified applicants will receive consideration for employment without discrimination because of race, color, religion, sex, or national origin.

(c) The Participating Agency will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Contracting Officer, advising the said labor union or workers' representative of the Participating Agency's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.



(d) The Participating Agency will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Participating Agency will furnish all information and reports required by said amended Executive Order and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Contracting Officer and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Participating Agency's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and the Participating Agency may be declared ineligible for further Government contracts in accordance with procedures authorized in said amended Executive Order, and such other sanctions may be imposed and remedies invoked as provided in said Executive Order, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The Participating Agency will include the provisions of subdivisions (a) through (g) in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of said amended Executive Order, so that such provisions will be binding upon each subcontractor or vendor. The Participating Agency will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event the Participating Agency becomes involved in, or is

threatened with, litigation with a subcontractor or vendor as a result of such direction, the Participating Agency may request the United States to enter into such litigation to protect the interests of the United States.

The provisions of this section do not refer to or cover any activities of the Participating Agency which are not related to or involved in the performance of the Master Contract.

Section 29. Federal Reclamation Law. The Participating Agency acknowledges and agrees that the delivery of water or use of federal facilities pursuant to this Contract is subject to Federal Reclamation law, as defined in the Master Contract.

Section 30. Levy of Taxes and Assessments. The Participating Agency shall cause to be levied, imposed and collected, as a term of this renewal agreement, all taxes, assessments, tolls and charges to pay the amounts required herein, and will use all of the authority and resources of the Participating Agency to make in full all payments to be made to the Agency pursuant to this contract on or before the date such payments become due and to meet its other obligations hereunder.

Section 31. Validation. The Agency, with the cooperation of the Participating Agency, after the execution of this contract, shall promptly seek to secure a decree of a court of competent jurisdiction of the State of California, confirming the execution of this contract. The Agency shall furnish the Participating Agency a certified copy of the final decree, the validation proceedings, and all pertinent supporting records of the court

approving and confirming this contract, and decreeing and adjudging it to be lawful, valid, and binding on the Participating Agency.

Section 32. Entire Agreement. This contract constitutes the entire agreement between the Participating Agency and the Agency, and supersedes the preceding Participating Agency Contract between the parties dated July 18, 1955, any oral agreement, statement or promise between them relating to the subject matter of this contract. Any amendment, including oral modification, must be reduced to writing and signed by both parties to be effective.

IN WITNESS WHEREOF, the parties hereto have hereunto affixed their names the day and first year hereinabove written.

SOLANO COUNTY WATER AGENCY

By \_\_\_\_\_  
George Pettygrove, Chairman

Attest: \_\_\_\_\_  
David Okita, Secretary and  
General Manager

**SOLANO COUNTY WATER AGENCY  
CONTRACT WITH SOLANO IRRIGATION DISTRICT  
FOR OPERATIONS AND MAINTENANCE OF  
SOLANO PROJECT WORKS**

THIS CONTRACT, made and entered into this 1<sup>st</sup> day of March, 1999, by and between SOLANO COUNTY WATER AGENCY, created and existing under and by virtue of Chapter 573 of the 1989 Statutes of the State of California, as amended, herein referred to as "SCWA", and the SOLANO IRRIGATION DISTRICT, an irrigation district organized and existing under and by virtue of Division 11 of the Water Code of the State of California, herein after referred to as "SID".

EXPLANATORY RECITAL

WHEREAS, on May 1, 1959, the Solano County Flood Control and Water Conservation District, the predecessor agency to SCWA, and SID entered into a contract, which was subsequently amended on February 8, 1990, which provided for the operations and maintenance of the Putah South Canal; and

WHEREAS, SCWA had the authority to contract for operations and maintenance of the Putah South Canal pursuant to a contract between the United States and the Solano County Flood Control and Water Conservation District for water service from the Solano Project date March 7, 1955; and

WHEREAS, SID has been operating Monticello Dam and the Putah Diversion Dam on behalf of the United States Bureau of Reclamation since March, 1981, pursuant to a contract with the United States and later pursuant to a contract with the United States and SCWA; and

WHEREAS, Reclamation has executed a new contract with SCWA for operations and maintenance of Solano Project Works dated March 1, 1999, Contract No. 14-06-200-4090R

which delegates to SCWA operations and maintenance responsibility for the Solano Project Works; and

WHEREAS, SCWA desires to contract with SID for operations and maintenance of Solano Project Works as allowed for in the SCWA/USBR O&M Contract and as is provided for in the SCWA Act;

NOW, therefore, the parties hereto mutually agree to as follows:

1. Previous Contracts Superseded.

The "Amended Contract between Solano County Water Agency and Solano Irrigation District for Operations and Maintenance of Putah South Canal", dated February 8, 1990 and the "Contract among the United States, the Solano County Water Agency, and the Solano Irrigation District for Operation and Maintenance of Solano Transferred Works", dated November 20, 1996 are hereby rescinded and superseded by this Contract.

2. Definitions.

When used herein, unless otherwise distinctly expressed or manifestly incompatible with the intent thereof, the term:

- (a) "Master Contract" shall mean that certain Contract between the United States and SCWA for water service from the Solano Project dated February 28, 1999 and bearing the identification number 14-06-200-4090R.
- (b) "Non-Project Water" shall mean water other than water conveyed or delivered pursuant to the Master Contract which the United States has a legal or contractual obligation to store, convey or and/or deliver through the Project Works. Non-Project Water includes, without limitation, water to be stored in or conveyed through Project Works (1) pursuant to contracts authorized under the Warren Act (43 USC 523, et seq.), as may be amended or supplemented; (2) under any other storage/wheeling or conveyance agreements which may now or in the future be

binding on the Secretary; and (3) to satisfy other legally imposed obligations of the Secretary.

- (c) "OM&R" shall mean the complete operation and maintenance of the Project Works including such repairs and replacements as normally considered part of annual OM&R functions, and shall include the performance of emergency or unusual OM&R of extraordinary repair or replacement costs, and betterment costs.
- (d) "Participating Agency" shall mean any water district, reclamation district, irrigation district, water conservation district, municipality, flood control district, other public entity, city or political subdivision of the state empowered by law to appropriate water and to deliver water to water users, the territory of which lies principally within Solano County, or any state agency, which Participating Agency enters into a contract with SCWA for (a) the repayment in whole or in part to SCWA or any other person, corporation, public agency, or the United States of any or all of the construction costs of the Project (b) the underwriting in whole or part of any or all of those construction costs, (c) the repayment in whole or in part to SCWA or any other person, corporation, public agency, or the United States of any or all of the cost of furnishing Project Water to the Participating Agency or the underwriting in whole or in part of the cost, or (d) the payment in whole or in part for Project Water to be furnished or sold to that Participating Agency by SCWA, or the United States.
- (e) "Party Entitled to Utilize or Receive Non-Project Water" shall mean the party required to pay SCWA the amounts described in Article 7 of the SCWA/USBR O&M Contract for the storage, conveyance and/or delivery of Non-Project Water through the Project Works.
- (f) "Project" shall mean the Solano Project constructed by the United States and consisting of Monticello Dam and Lake Berryessa, Putah Diversion Dam and Lake Solano, the Putah South Canal, the headworks of the Putah South Canal, and Parshall Flume at Milepost 0.18 of the Putah South Canal.
- (g) "Project Works" shall mean Monticello Dam, Putah Diversion Dam, the headworks of the Putah South Canal, Putah South Canal, and the Parshall Flume

located at Milepost 0.18 of the Putah South Canal and all Federal lands or real property immediately adjacent to the Project Works downstream of the log-boom across Lake Berryessa excluding the recreation area at the upper end of Lake Solano.

- (h) "SCWA Act" Chapter 573 of the 1989 Statutes of the State of California, as amended which establishes SCWA.
- (i) "SCWA/USBR O&M Contract" shall mean the "Contract Between the United States and the Solano County Water Agency for Operation and Maintenance of Solano Project Works", executed in 1999, and bearing the Contract No. 9-07-20-X0358.
- (j) "Secretary" or "Contracting Officer" shall mean the Secretary of the United States Department of the Interior or his/her duly authorized representative.
- (k) "SOP" shall mean the Standing Operating Procedures for the Solano Project prepared by the Contracting Officer.

3. Basis of Contract.

This Contract is made pursuant to Article 26(b) of the SCWA/USBR O&M Contract and is subject to all applicable terms and conditions of the SCWA/USBR O&M Contract. The Parties shall cooperate to the end that SCWA shall be able to discharge its obligations contained in the SCWA/USBR O&M Contract, the Master Contract and all of SCWA's Participating Agency contracts. SID acknowledges receipt of a copy of the SCWA/USBR O&M Contract and acknowledges that it is familiar with the terms and conditions of that contract. In the event of any conflict between the SCWA/USBR O&M Contract and Contract, the provisions of the SCWA/Master O&M Contract shall prevail.

4. Term of Contract.

The term of this Contract shall commence on March 1, 1999 and shall continue throughout the term of the SCWA/USBR O&M Contract unless sooner terminated as provided in Section 12 hereof.

5. SID to Operate and Maintain the Project Works.



SID, under the general direction of SCWA, shall OM&R the Project Works in such a manner as is necessary to meet all existing and future obligations of the Contracting Officer and SCWA to convey water through the Project Works and in full compliance with the terms of this Contract, applicable Federal laws, rules and regulations, applicable water rights permits and licenses issued for the Project by the State Water Resources Control Board, and the applicable SOP. SID shall also OM&R the Project Works in such a manner that said Project Works will remain in good and efficient condition for the storage, diversion and carriage of water as on the effective date of this Contract, excepting normal deterioration and ordinary and reasonable wear. Any proposed deviations from or changes to the SOP shall be submitted to SCWA for transmittal to the Contracting Officer. Any deviations from, or changes to the SOP must be approved in writing by the Contracting Officer. In addition thereto, SID shall OM&R the Project Works in a reasonable, efficient and economical manner and shall use all reasonable, practical methods to obtain the maximum beneficial use of water furnished by the United States from the Project with a minimum of loss thereof from seepage, spillage or other cause within the control of SID, and with the view that the water service and delivery obligations of SCWA as set forth in all of its Participating Agency contracts are fully and faithfully performed without default or delay.

Article 2(b) of the SCWA/USBR O&M Contract provides for SCWA to correct deficiencies identified by the Contracting Officer within ninety days of a written notice from the Contracting Officer. SID shall cooperate with SCWA in correcting such deficiencies within the specified time limit.

Article 3(f) of the SCWA/USBR O&M Contract provides for SCWA to provide a plan of correction to the Contracting Officer within sixty days if SCWA is found to be operating the Project Works in violation of the SCWA/USBR O&M Contract. SID shall cooperate with SCWA in developing the plan of correction within the specified time limit.

Article 4(a) of the SCWA/USBR O&M Contract requires SCWA to prepare emergency action plans for the Project Works as required by governmental agencies with jurisdiction over SCWA operations. SID shall prepare the required emergency action plans in coordination with SCWA.

Pursuant to Article 4(b) of the SCWA/USBR O&M Contract, SID shall notify the Contracting Officer and SCWA as soon as reasonable practicable after initial observation by

SID of any event or situation which threatens (1) the safety of the Project Works, or (2) the well-being of humans or property located adjacent to the Project Works. Such notification shall be made by telephone or by facsimile transmission rather than by mail.

6. Delivery of Water.

SID shall convey and distribute water in and from the Project Works in accordance with the directives of SCWA so that the Contracting Officer and SCWA can satisfy all valid water delivery obligations of the United States and SCWA from the Project Works, including water delivery obligations of the United States and SCWA under the Master Contract and Participating Agency Contracts and for delivery of Non-Project Water. SID shall deliver water to each party entitled thereto from the Project Works through turnouts or diversion facilities as specified in then-existing Participating Agency contracts or other arrangements or agreements relating to Non-Project Water which specifies such turnouts and delivery points, or as may be agreed to by such Party Entitled to Utilize or Receive Non-Project Water, SCWA and the Contracting Officer. SCWA shall provide to SID copies of all of its Participating Agency contracts, all amendments and supplements thereto, any other agreement which requires or permits the conveyance of water through any of the Project Works and all delivery schedules submitted by Participating Agencies pursuant to the Participating Agency contracts or other agreements. SID shall, as far as possible, and reasonably practical, make deliveries in accordance with all of said contracts and schedules. In the event of a water supply shortage, deliveries shall be made in accordance with allocations established by SCWA pursuant to the terms of the Participating Agency contracts.

7. Computation and Payment of Costs.

SCWA shall pay SID monthly upon receipt of invoices for the actual cost incurred by SID in OM&R the Project Works pursuant to this Contract. Said costs shall be the actual costs reasonably and necessarily incurred by SID computed in accordance with generally accepted principles of accounting consistently applied. As used herein, the actual costs incurred by SID shall include expenses of labor, materials, equipment, superintendence, book keeping, administration, and overhead fairly allocable to the OM&R of the Project Works. SID shall submit to SCWA on or before the sixtieth day of the following month a statement

of costs, itemized to a level of details satisfactory to SCWA, incurred by SID during the operation of this Contract during the preceding month. In addition, SID shall include in its invoices to SCWA a proportion of insurance coverage costs identified in Section 10 of this Contract.

8. Books and Records.

SID shall establish and maintain books and records of its costs reimbursable by SCWA pursuant to Section 7 hereof. Authorized officers and agents of SCWA shall have full and ready access to such books and records at all reasonable times and shall have the right to make copies thereof.

9. Exchange of Information.

SCWA shall transmit to SID requested water delivery schedules for Project Water when the same are received by SCWA from its Participating Agencies. SID shall report to SCWA on or before the last day of the following month the amounts and recipients of all water diverted from the Project Works, together with such other data as may be reasonably required by SCWA to properly administer the Master Contract and its Participating Agency contracts. SID shall from time to time as requested by SCWA transmit to SCWA such data and information as may be reasonably necessary to enable SCWA to discharge its obligations to the United States pursuant to the SCWA/USBR O&M Contract and the Master Contract.

10. Insurance, Indemnification and Holding Harmless

SCWA agrees, to the fullest extent permitted by law, to indemnify and hold SID, its directors, officers, employees, or authorized volunteers harmless from any damage, liability, or costs (including attorneys fees and costs of defense) to the extent caused by SCWA's negligent acts, errors, or omissions in the performance of work under this Contract including such negligent acts, errors or omissions by subcontractors or others for whom SCWA is legally liable.

SID agrees, to the fullest extent permitted by law, to indemnify and hold SCWA, its directors, officers, employees, or authorized volunteers harmless from any damage, liability, or costs (including attorneys fees and costs of defense) to the extent caused by SID's

negligent acts, errors, or omissions in the performance of work under this Contract including such negligent acts, errors or omissions by subcontractors or others for whom SID is legally liable. SID's obligation to indemnify and hold SCWA harmless under this section shall include assumption of SCWA's obligations to the United States pursuant to Section 15 of the SCWA/USBR O&M Contract.

Both SID and SCWA are members of the Association of California Water Agencies Joint Powers Insurance Authority (JPIA) and have liability coverage through the JPIA. Should either Party withdraw from liability coverage from the JPIA, this article shall be renegotiated.

SID is currently a participant in a self-insurance plan with the JPIA. The costs of that plan, including any retentions and assessments or charges, have been divided equitably between the activities of SID as constituting two-thirds (2/3) of the risks and the activities of SCWA as constituting one-third (1/3) of the risks. This apportionment shall continue as to the retentions and assessments or charges, including any other charges or increased premiums which may occur as a result of losses incurred during the term of this agreement which are charged to SID after termination of this agreement, unless modified as follows.

The parties agree that from time to time either of the parties may request that a reappraisal of the comparative risks be performed. Upon such a request being made, a reappraisal of the comparative risks shall be made by a panel of three skilled liability insurance raters whose majority decision shall be final and binding upon the parties. One member of the panel shall be appointed by SCWA, one member shall be appointed by SID, and the two members so selected shall appoint the third member. The costs for the panel and its determination shall be payable by SCWA. Notwithstanding the above, a reappraisal shall not be made more frequently than every five years commencing with the effective date of the Contract, unless mutually agreed upon by the parties.

#### 11. Right of Way and Access to Project Works.

- (a) Nothing herein shall be deemed to limit or restrict in any matter the right of access to the Project Works by the United States or SCWA or their respective officers, agents or employees. The Contracting Officer has granted to SCWA, and SCWA and hereby grants to SID, the right to enter upon and into to the

- Project Works. The Contracting Officer and SCWA shall at all times have access to the Project Works to observe the general condition and SID's OM&R thereof.
- (b) The Contracting Officer with SCWA may conduct periodic, no more than one each year, on site examinations of the Project Works to evaluate the condition of the Project Works and adequacy of the SID's OM&R program. SID shall participate in all such examinations, provide access to the Project Works, and operate mechanical and electrical equipment as requested. The examinations may include reviews of the SOP, maintenance records and operations reports.
  - (c) The lands and rights-of way acquired and/or withdrawn by the United States for the purposes of the construction, care, operation, and/or maintenance of the Project Works may be used by SID for such purposes without being charged any administrative fees therefor. The SID shall not issue rights-of-way across such lands or issue any other rights, leases, licenses, permits, or special-use agreements involving such lands. All such land use instruments shall only be issued by the Contracting Officer.
  - (d) SID shall regularly inspect the Project Works lands to identify any trespass, and determine the general condition of the real property itself. Cases of trespass shall be corrected, where possible, by SID. Trespass cases which SID feels may require undue time and/or expense to correct shall be referred without delay to the Contracting Officer and SCWA for resolution.

## 12. Termination.

- (a) This Contract shall terminate in the event that the United States takes back the OM&R of the Project Works pursuant to Article 2 or Article 3(f) of the SCWA/USBR O&M Contract. If thereafter the United States re-transfers the OM&R of the Project Works to SCWA, this Contract may be reinstated upon agreement of the Parties.
- (b) As provided for in SCWA Act, SCWA may terminate this Contract at any time upon a two thirds (2/3) vote of the SCWA Board of Directors finding that SID has failed to perform the required services in a competent, economic or expeditious manner, and by giving written notice to SID of its intention so to terminate and

stating the effective date thereof, which shall not be earlier than ninety (90) days after delivery of such notice.

- (c) SID may terminate this Contract at any time by giving written notice to SCWA of its intention to so terminate and stating the effective date thereof, which shall not be earlier than ninety (90) days after delivery of such notice.
- (d) In the event of termination of this Contract by SCWA pursuant to subdivision (b) of this section, SCWA shall purchase any of SID's capital equipment used principally in the OM&R of the Project Works which SID desires to sell to SCWA at the original cost thereof, less such portion of said cost as has been reimbursed to SID by SCWA by reason of the payments made pursuant to Section 7 hereof, less the reasonable value of the use thereof to SID for purposes other than the performance of this Contract. In the event the Parties are unable to agree upon the purchase price of said capital equipment, then the same shall be determined in accordance with the provisions of this Contract by a board of three arbitrators, one of whom shall be designated by SCWA, one by SID, and one by the two thus designated. The decision of a majority of said board shall be binding upon the Parties.
- (e) In the event of the termination of this Contract pursuant to subdivision (a) of this section, SID shall transfer to the United States title to all tools, vehicles, supplies, and equipment previously transferred by the United States (to the extent still on hand) for the purpose of this Contract or purchased by SID to replace tools, vehicles, supplies, and equipment previously transferred for the purposes of this Contract as provided for in Article 2(d) and Article 3(f) of the SCWA/USBR O&M Contract.
- (f) Termination for any reason shall not remove the obligation of SCWA to pay those costs or expenses incurred by SID pursuant to this Contract during the term of the Contract.

13. Hazardous Material.

- (a) SID shall comply with all applicable Federal, State, and local laws and regulations, and policies and instructions of the Secretary, existing or hereafter

enacted or promulgated, concerning use, storage, release, transportation, and disposal of any hazardous material, pollutant, or contaminant used, produced, or otherwise handled by SID, or by its agents, during the course of OM&R the Project Works.

- (b) SID shall take reasonable precautions to prevent the deposit or release of hazardous material, contaminates or pollutants by third parties in or on the Project Works and in the waters located within the Project Works if such deposit or release would violate applicable laws and regulations or would interfere with, or impair the OM&R of the Project Works or the quality of waters located within the Project Works.
- (c) SID shall initiate immediate remedial action upon discovery of any deposit or release of hazardous materials, contaminants, or pollutants in or on the Projects Works or in the waters located within the Project Works. Within one (1) hour of the discovery of any such deposit or release, SID shall report such deposit or release to the Contracting Officer and SCWA with full details of the corrective actions taken and/or planned to be taken.

14. Quality of Water.

The OM&R of the Project Works shall be performed in such a manner as is practical to maintain the quality or raw water made available through such facilities at the highest level reasonably obtainable as determined by the Contracting Officer.

15. Water and Air Pollution Control.

SID, in carrying out this Contract, shall comply with all applicable water and air pollution laws and regulations of the United States and the State of California.

16. Equal Opportunity.

During the performance of this Contract, SID agrees as follows:

- (a) SID will not discriminate against any employee or applicant for employment because of race, religion, color, sex, or national origin. SID will take affirmative

action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; lay-off or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. SID agrees to post in conspicuous places, available for employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this nondiscrimination clause.

- (b) SID will, in all solicitations or advertisements for employees placed by or on behalf of SID, state that all qualified applicants will receive consideration for employment without discrimination because of race, color, religion, sex, or national origin.
- (c) SID will send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Contracting Officer, advising the said labor union or workers' representative of SID's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (d) SID will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.



- (e) SID will furnish all information and reports required by said amended Executive Order and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Contracting Officer and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (f) In the event of SID's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and SID may be declared ineligible for further Government contracts in accordance with procedures authorized in said amended Executive Order, and such other sanctions may be imposed and remedies invoked as provided in said Executive Order, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- (g) SID will include the provisions of subdivisions (1) through (7) in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of said amended Executive Order, so that such provisions will be binding upon each subcontractor or vendor. SID will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event SID becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, SID may request the United States to enter into such litigation to protect the interests of the United States.

The provisions of this section do not refer to or cover any activities of SID which are not related to or involved in the performance of this Contract.

17. Assignment Prohibited.

The provisions of this Contract shall apply to and bind the successors and the assigns of the respective Parties, but no assignment or transfer of this Contract, or any part thereof or interest therein, shall be valid until and unless approved by SCWA in writing.

18. Waiver of Breaches.

Any waiver at any time by either party to this Contract of its rights with respect to a breach or default, or any other matter arising in connection with this contract, shall not be deemed to be a waiver with respect to any subsequent breach, default or matter.

19. Reasonableness of Determination.

Where the terms of this Contract provide for action to be based upon the opinion or determination of either party to this Contract, or of the Contracting Officer, said terms shall not be construed as permitting such actions to be predicated upon arbitrary, or unreasonable opinions or determinations.

20. Entire Agreement.

This Contract constitutes the entire agreement between the SID and SCWA. Any amendment, including oral modification, must be reduced to writing and signed by both parties to be effective.

21. Notices.

All notices that are required, either expressly or by implication, to be given by any party to the other under this Contract shall be delivered or mailed, United States first-class postage prepaid, addressed as follows:

For SCWA:

Solano County Water Agency  
508 Elmira Road  
Vacaville, CA 95687  
Attention: General Manager


For SID:

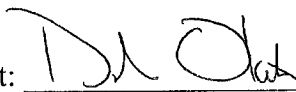
Solano Irrigation District  
508 Elmira Road  
Vacaville, CA 95687  
Attention: Secretary - Manager

Notice shall be deemed given (a) two calendar days following mailing via regular or certified mail, returned receipt requested, (b) one business day after deposit with any one day delivery service assuring "next day" deliver, (c) upon actual receipt of notice, or (d) upon transmission, if by facsimile, whichever is earlier. The parties shall promptly give written notice to each other of any change of address and mailing or shipment to the addresses stated herein shall be deemed sufficient unless written notification of a change of address has been received; provided, however, that this Section shall not preclude the effective service of any such notice or announcement by other means.

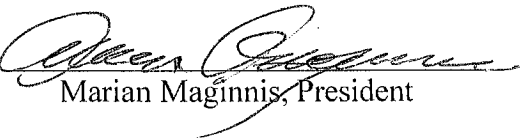
IN WITNESS WHEREOF, the parties hereto have hereunto affixed their names the day and first year hereinabove written.

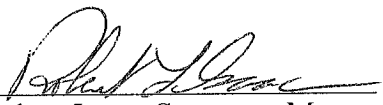
SOLANO COUNTY WATER AGENCY

By   
George Pettygrove, Chairman

Attest:   
David B. Okita, General Manager & Secretary

SOLANO IRRIGATION DISTRICT

By   
Marian Maginnis, President

Attest:   
Robert Isaac, Secretary-Manager

Masters/SID-SCWAO&M.DOC

EXHIBIT C

DROUGHT IMPACT REDUCTION PROGRAM ELEMENTS

The Program will include the following elements:

1.0 The District's Contract with the Parties requesting Municipal and Industrial Water:

1.1 Proportions in Program: On or about April 1 when it is determined that the amount of water in Storage in Lake Berryessa is less than 400,000 AF, excluding water which is in dead storage and water which is in the voluntary carryover accounts of the Parties to the Agreement, the Parties, including SID, delivering municipal and industrial water in proportion to the average annual amounts of municipal and industrial water ordered and paid for from the Solano Project by those Parties during the preceding five (5) full water years, shall be entitled to participate in the SID Drought Impact Reduction Program ("The Program").

1.2 No Assignment of Proportion of Program Water: All Parties seeking water under the Program for municipal and industrial use shall be entitled to their proportional share of the water made available by the Program. If a Party desires less than their proportional share of the Drought Impact Reduction Program water, they may not assign their relinquished portion of the Program water to any other Party, and the relinquished portion of the water will be divided in accordance with the percentage of the Program water requested by Parties, if any Party requests less than their proportional share.

1.3 District Target Price: On or before May 1, SID will establish and announce a target price per AF for the amount of water which will be deemed relinquished by a Landowner and/or Tenant within SID for the Program in the following water year.

1.4 Additional Costs: In addition to the target price payable to the Landowner and/or Tenant for each acre foot, SID shall establish the additional amounts payable to SID for its operation and maintenance costs, lost water revenues and other reasonable costs to be incurred in implementing the Program. SID will establish the amounts of water which will be allocated to each acre of land under the rules and regulations in the following water year in which the Program is to be implemented and to which the target price and charges of SID would apply if the Landowner and/or Tenant elect to participate in the Program.

1.5 Contract with District: Upon establishing the economic terms of the Program, ninety (90) days notice shall be provided to the Parties serving Municipal and Industrial water of their right to subscribe and contract to the terms of the Program and their right to purchase upon those terms their proportionate share of the Program water in the following water year. The Program water to be made available to the Parties providing for municipal and industrial water service, including SID, shall not exceed twenty thousand (20,000) AF in a water year, or the water allocation from 7,500 acres of SID land, whichever sum is less. A Party declining to or omitting to subscribe to its proportionate share of the Program water may subscribe to a lesser amount of water, or if no election to subscribe is made, their proportionate share shall be divided among the other participants in proportion to requests of the remaining Parties limited by those Parties' proportions established under Paragraph 1.1 above (five years' historic ordering of M & I water from Solano Project). All subscription requests shall be submitted in writing.

1.6 Solicitation Period: Because the terms will be announced and the subscriptions sought approximately 9 months before the relinquishment would commence to take effect, a period of at least 45 days beginning on or before August 1 will be provided for Landowners and Tenants within the boundaries of SID to offer in writing the amounts of water specified and committed to be purchased by the Parties for municipal and industrial purposes in the following water year under the Program.

1.7 Solicitation Complete - Finalization of Contract Amounts: If sufficient Landowner and/or Tenant participants are received within the initial 45-day period by SID, a final binding contract for these amounts shall be delivered by the Parties to SID for the purchases, and SID will submit contracts to the participating SID landowners and/or tenants for the relinquishment to take effect in the following water year.

1.8 Insufficient or Excessive Landowner Offers: If insufficient lands subscribe to the SID Program in the solicitation, and insufficient amounts of water are obtained to meet the total demand of the requesting Parties, which demand shall not exceed 20,000 AF or water from 7,500 acres, whichever is less in any water year, the Parties shall nevertheless be bound to purchase those amounts tendered by landowners and/or tenants from SID.

If the participating landowners and/or tenants offer amounts of water in excess of subscriptions of the Parties, the amounts tendered by each participant will be reduced by a factor representing the excess amount as a percent of the subscribed amount.

Final contracts with participants and the subscribing Parties shall be delivered to SID for approval on or before October 15.

1.9 Payment to District: The monies due to SID from the Parties shall be paid on or before October 15, and shall be obtained by SID and distributed by SID in accordance with its contractual terms with the Landowners and Tenants. Interest earned upon the payments prior to disbursement shall be credited to the Parties participating in the Program. The participating Parties shall pay to SCWA the municipal and industrial rate for the water so assigned by SID to the Parties prior to the Parties participating in the Program ordering and delivery of the water in the following water year.

1.10 No Upset Price: The provisions of the Parties' agreement with SID and the Landowner/Tenant agreement with SID will not provide for an upset price, and thus if the following water year is a plentiful water year, nevertheless the water to be transferred by SID to the Parties will be transferred on the first day of the subsequent water year and will be added to the account of the participating Parties in the Program on that day. Participating Parties should recognize that it is possible that spills of Lake Berryessa may occur after March 1, and thus it is theoretically possible to obtain water pursuant to the Program and to lose it forthwith without the ability to use it or hold it in a carryover account. Water transferred by SID to participating Parties will be treated as voluntarily added to the Party's carryover account if not utilized in the water year.

1.11 No Waiver or Transfer of Water Outside Solano Project Service Areas: As a condition of participating in the Program, no Party participating in the receipt of water from the Program shall directly or indirectly in the water year that deliveries are made under the Program (i) waive the ability to receive water from other sources available to it, or (ii) transfer directly or indirectly the amounts held by the Party in their Solano Project account or held by them pursuant to their State Water Project contracts or held as other water rights to any non-Party, or (iii) allow amounts to be received by the Party pursuant to the Solano Irrigation District Drought

# Exhibit D

## WATER SHORTAGE CONTINGENCY PLAN

### Stages of Action

SCWA is strictly a wholesale supplier of water. SCWA is not a water utility. It is the responsibility of each of the cities within Solano County to deal with water shortages. SCWA provides coordination assistance but is not responsible for making any decisions regarding water shortages. The only exception is that SCWA retains authority to change allocations of SWP supplies water during shortages.

The contract language is as follows: “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 portion 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 as 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 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.

Table 9 shows 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.

### Water Supply Shortage Stages and Conditions (Table 9)

Stage No.	Water Supply Conditions	% Shortage
1	Reduction in SWP and/or Solano Project	25%
2	Reduction in SWP and/or Solano Project	50%



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 and will also state its willingness to consider allocations of shortages in the SWP supply as specified in the member agency agreements.

### **Estimate of Minimum Supply For 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.

SCWA has two water supply sources: the SWP and the Solano Project. These two projects have different historic dry year sequences. The three worst years for the SWP supply are 1990-1993. The three worst years for the Solano Project supply are 1929-1931. These are reflected in Table 10. Note that the use of different dry year sequences in Table 10 results in a very conservative depiction of the estimated minimum supply for the next three years as it is unlikely that extreme dry period for both the Solano Project and SWP will coincide, especially since reductions in the Solano Project is based on reservoir levels while reductions in SWP supplies are based on current year hydrologic conditions.

#### **Three-Year Estimated Minimum Water Supply – AF/Year worst separate 3 year series (Table 10)**

<b>Source</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Normal</b>
State Water Project*	12,773	12,313	16,592	38,358
Solano Project	196,983	196,983	186,615	206,240
<b>Total</b>	<b>209,756</b>	<b>209,296</b>	<b>203,207</b>	<b>244,598</b>

**\*does not include Article 21 Water**

Note that Table 10 does not include Article 21 water that could supplement SWP supplies. As mentioned previously, the NBA contractors have access to Article 21 water on a more frequent basis than those SWP contractors relying upon the SWP Banks pumping plant. The 2005 SWP Delivery Reliability Data Report shows no Article 21 supply available during 1990-1993, however is likely that some Article 21 would be available to NBA contractors, but that amount cannot be modeled or quantified.

### **Catastrophic Supply Interruption Plan**

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

## **Solano Project**

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

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

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

Landslide: The Putah South Canal is susceptible to a landslide which could either block or damage the Putah South Canal's ability to deliver water. SCWA recently invested in a \$3 million project to provide an underground pipeline bypass of an area most susceptible to a landslide. However, in an event of a landslide that blocks the Putah South Canal, Solano Project city water users would shift to a SWP supply. The SWP supply would not be available to agricultural water users.

## **State Water Project**

Earthquake: Should an earthquake result in a disruption of SWP supplies through the NBA, the member agencies would switch to Solano Project Water supplies. All the NBA water users have access to Solano Project supplies in such an emergency.

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

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

Landslide: The NBA is an underground pipeline and therefore would not be subject to any landslide risks.

## **Prohibitions, Penalties and Consumption Reduction Methods**

SCWA is purely a water wholesaler and does not implement any of the actions contemplated in this subsection. SCWA is contractually committed to provide the available water supply from the SWP and the Solano Project to its member agencies regardless of hydrologic conditions (with the exception of having the authority to allocate NBA water supplies in a manner different than contractual amounts during a water shortage). SCWA does not have the ability to take measures to provide incentives or disincentives for water use from SCWA.

## **Analysis of Revenue Impacts of Reduced Sales During Shortages**

### **Solano Project**

In a shortage situation, there would be a reduction in revenue to SCWA from member agencies. However, the amount charged to member agencies for Solano Project water supply is equal to the amount used to purchase the supplies from the U.S. Bureau of Reclamation. Therefore, there would be no net impact to SCWA revenues during a water shortage.

### **State Water Project**

The contract between SCWA and its SWP member agencies require full payment of water supply costs regardless of shortages. Therefore, there would be no financial impact to SCWA from shortages.

## **Draft Ordinance and Use Monitoring Procedure**

### **Solano Project**

The Solano Project contract with member agencies requires the full amount allocated by the USBR be provided to the member agencies. The contract between SCWA and the USBR requires allocation of the full amount of contract amounts unless that water is physically unable to be delivered from the Solano Project.

“The Solano Project Members Agreement As To Drought Measures and Water Allocation” is an agreement that provides for a reduction in the use of Solano Project water when reservoir levels are between 800,000 acre feet of storage (approximately half full) and 450,000 acre feet of storage. The Agreement requires a reduction of five to ten percent of Solano Project use during this storage level. The five to ten percent not utilized is stored in the reservoir as carryover to be made available when the storage is above 800,000 acre feet or below 450,000 acre feet.

## **State Water Project**

SCWA does have the ability to allocate SWP water to member agencies during a shortage. SCWA has not invoked this provision to date. SCWA has determined that it will consider invoking this provision at the request of a member agency on a case by case basis. We have not predetermined any shortage allocations.

EXHIBIT E

FINAL SOLANO PROJECT WATER USE SUMMARY - PROJECT YEAR 2010 - 2011  
(all quantities in acre-feet)

AGENCY and WATER TYPE	TOTAL AVAILABLE SUPPLY	USED IN Mar-10	USED IN Apr-10	USED IN May-10	USED IN Jun-10	USED IN Jul-10	USED IN Aug-10	USED IN Sep-10	USED IN Oct-10	USED IN Nov-10	USED IN Dec-10	USED IN Jan-11	USED IN Feb-11	TOTAL FOR YEAR	CARRY- OVER	CHECK
<b>Benicia</b>																
Exchange-Vacaville (M&I)														0		
Exchange-Vallejo (M&I: 1,100 AF)	1,100 <sup>h,i</sup>										373	419	308	1,100		
Exchange-Vallejo (M&I Carryover)	0 <sup>h,i,s</sup>													0		
Exchange-SID (M&I Carryover)	0 <sup>j,s</sup>	599												599		
Exchange-SID (M&I)	0 <sup>j,p</sup>													0		
Transfer-SID (M&I: 2,000 AF)	2,000 <sup>o</sup>													0	2,000	
Transfer-SID (M&I Carryover)	1,271		387	167	0	0	0	0	0	0	0		70	624	647	
<b>Subtotal</b>	<b>4,371</b>	<b>599</b>	<b>387</b>	<b>167</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>373</b>	<b>419</b>	<b>378</b>	<b>2,323</b>	<b>2,048</b>	2,647
<b>CSP Solano</b>																
Entitlement (M&I)	1,019								32	29	50	35	32	178	841	
Entitlement (Ag)	181													0	181	
Carryover (Ag)	237	8	7	8	7	9	8	7	7	5	15	9	5	95	142	
Carryover (M&I)	478 <sup>b</sup>	68	65	61	60	66	69	72	17					478	0	
<b>Subtotal</b>	<b>1,915</b>	<b>76</b>	<b>72</b>	<b>69</b>	<b>67</b>	<b>75</b>	<b>77</b>	<b>79</b>	<b>56</b>	<b>34</b>	<b>65</b>	<b>44</b>	<b>37</b>	<b>751</b>	<b>1,164</b>	1,164
<b>Fairfield</b>																
Entitlement (M&I)	9,200 <sup>c,k,l</sup>					518	1,300	1,215	1,016	721	1,053	1,055	953	7,831	1,369	
Carryover (M&I)	0 <sup>b</sup>													0	0	
Exchange-SID (M&I Carryover)	1,171 <sup>d,s</sup>	1,171												1,171		
Exchange-SID (M&I: 16,018 AF)	2,181 <sup>i</sup>		1,224	957										2,181		
Transfer-SID (M&I: 2,000 AF)	2,000 <sup>o</sup>				1,143	857								2,000	0	
Transfer-SID (M&I Carryover)	0													0	0	
<b>Subtotal</b>	<b>14,552</b>	<b>1,171</b>	<b>1,224</b>	<b>957</b>	<b>1,143</b>	<b>1,375</b>	<b>1,300</b>	<b>1,215</b>	<b>1,016</b>	<b>721</b>	<b>1,053</b>	<b>1,055</b>	<b>953</b>	<b>13,183</b>	<b>1,369</b>	1,369
<b>Maine Prairie</b>																
Entitlement (Ag)	5,000	0	0	2,517	1,632	851								5,000	0	
Carryover (Ag)	0 <sup>b</sup>													0	0	
Exchange-SID	5,318					1,227	1,607	2,178	306	0	0	0	0	5,318		
<b>Subtotal</b>	<b>10,318</b>	<b>0</b>	<b>0</b>	<b>2,517</b>	<b>1,632</b>	<b>2,078</b>	<b>1,607</b>	<b>2,178</b>	<b>306</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,318</b>	<b>0</b>	0
<b>SID</b>																
Entitlement (Ag)	131,000					28,102	22,057	13,826	5,888	53	5	2	9	69,942	55,740	151,000
Entitlement (M&I)	20,000 <sup>k</sup>		89	285	741	752	687	657	405	147	200	212	177	4,352	4,800	
Carryover (Ag)	39,699 <sup>b</sup>	50	2,832	13,295	22,385	1,137								39,699	0	
Carryover (M&I)	3,043 <sup>b,d,e</sup>	132	110											242	599	
Exchange (M&I Carryover)	-2,202 <sup>s</sup>															
Exchange (M&I)-Fairfield	-2,181															
Exchange (Ag)-MPWD	-5,318															
Exchange (M&I)-Suisun	-2,167															
Transfer (M&I)-Vacaville	-2,500 <sup>r</sup>															
Transfer (M&I)-Benicia	-2,000 <sup>o</sup>															
Transfer (M&I)-Fairfield	-2,000 <sup>o</sup>															
<b>Subtotal</b>	<b>175,374</b>	<b>182</b>	<b>3,031</b>	<b>13,580</b>	<b>23,126</b>	<b>29,991</b>	<b>22,744</b>	<b>14,483</b>	<b>6,293</b>	<b>200</b>	<b>205</b>	<b>214</b>	<b>186</b>	<b>114,235</b>	<b>61,139</b>	61,139
<b>Suisun City</b>																
Entitlement (M&I)	1,600 <sup>c</sup>		256	321	443	511	69							1,600	0	
Exchange-SID (M&I Carryover)	263 <sup>d,l,s</sup>	263												263		
Exchange (M&I)-SID	2,167						429	456	386	253	200	231	212	2,167		
<b>Subtotal</b>	<b>4,030</b>	<b>263</b>	<b>256</b>	<b>321</b>	<b>443</b>	<b>511</b>	<b>498</b>	<b>456</b>	<b>386</b>	<b>253</b>	<b>200</b>	<b>231</b>	<b>212</b>	<b>4,030</b>	<b>0</b>	
<b>SCWA</b>																

**FINAL SOLANO PROJECT WATER USE SUMMARY - PROJECT YEAR 2010 - 2011**  
(all quantities in acre-feet)

<b>Carryover (M&amp;I)</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>UC Davis</b>																
Entitlement (Ag)	4,000															4,000
Carryover (Ag)	8,095 <sup>b</sup>	0	0	5	262	420	330	117	11	0	0	0	0	0	1,145	6,950
<b>Subtotal</b>	<b>12,095</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>262</b>	<b>420</b>	<b>330</b>	<b>117</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,145</b>	<b>10,950</b>
<b>Vacaville</b>																
Entitlement (M&I)	5,750										279	454	455	1,188	4,562	
Carryover (M&I)	9,793 <sup>b,n</sup>											536	416	952	8,841	
Exchange-SID (M&I Carryover)	527 <sup>d,s</sup>	527													527	
Transfer-SID (M&I: Escalate)	2,500 <sup>f</sup>		534	178	342	399	410	349	0	0	0	0	0	0	2,212	288
Transfer-SID (M&I Carryover)	0														0	0
<b>Subtotal</b>	<b>18,570</b>	<b>527</b>	<b>534</b>	<b>178</b>	<b>342</b>	<b>399</b>	<b>410</b>	<b>349</b>	<b>0</b>	<b>0</b>	<b>279</b>	<b>990</b>	<b>871</b>	<b>4,879</b>	<b>13,691</b>	
<b>Vallejo</b>																
Entitlement (M&I)	14,600									670	18	572	1,201	1,137	3,598	9,902
Carryover (M&I)	10,839 <sup>b</sup>	948	1,279	1,533	1,686	1,711	1,687	1,589	406						10,839	0
Exchange-SID (M&I Carryover)	241 <sup>a,t</sup>	241													241	
Exchange (M&I Carryover)	0 <sup>s</sup>															
Exchange (M&I)-Benicia	-1,100 <sup>h</sup>															
<b>Subtotal</b>	<b>24,580</b>	<b>1,189</b>	<b>1,279</b>	<b>1,533</b>	<b>1,686</b>	<b>1,711</b>	<b>1,687</b>	<b>1,589</b>	<b>1,076</b>	<b>18</b>	<b>572</b>	<b>1,201</b>	<b>1,137</b>	<b>14,678</b>	<b>9,902</b>	
<b>Total by Source</b>																
Entitlement (M&I)	52,169	0	345	606	1,184	1,781	2,056	1,872	2,123	915	2,154	2,957	2,754	18,747	21,474	18,747
Entitlement (Ag)	140,181	0	0	2,517	1,632	28,953	22,057	13,826	5,888	53	5	2	9	74,942	59,921	74,942
Carryover (M&I)	24,153 <sup>q,u</sup>	3,949	1,841	1,761	1,746	1,777	1,756	1,661	423	0	0	536	486	15,936	10,087	15,936
Carryover (Ag)	48,031 <sup>u</sup>	58	2,839	13,308	22,654	1,566	338	124	18	5	15	9	5	40,939	7,092	40,939
Transfer (M&I)	6,500 <sup>o,r</sup>	0	534	178	1,485	1,256	410	349	0	0	0	0	0	4,212	2,288	4,212
Net Ag Entitlement Exchanges	0 <sup>g,u</sup>	0	0	0	0	1,227	1,607	2,178	306	0	0	0	0	5,318		5,318
Net M&I Entitlement Exchanges	0 <sup>g,u</sup>	0	1,224	957	0	0	429	456	386	253	573	650	520	5,448		5,448
Canal Losses	15,000 <sup>f</sup>	880	508	1,682	4,006	2,785	2,502	638	161	486	211	112	-12	13,959		13,959
<b>Grand Total</b>	<b>286,034</b>	<b>4,887</b>	<b>7,291</b>	<b>21,009</b>	<b>32,707</b>	<b>39,345</b>	<b>31,155</b>	<b>21,104</b>	<b>9,305</b>	<b>1,712</b>	<b>2,958</b>	<b>4,266</b>	<b>3,762</b>	<b>179,501</b>	<b>100,263</b>	<b>179,501</b>

**Notes:**

- [a] Includes 241 AF owed to Vallejo by SID from Tolenas/Green Vally Exchange from PY09.
- [b] Lake Berryessa did not spill.
- [c] Water delivered to SS by FF treated as if still delivered to FF.
- [d] SID had a total of 5,971 AF of M&I Carryover from PY08.
- [e] 0 AF Ag c/o converted to M&I c/o to cover SID, FF, SS, VV use to minimize carryover loss.
- [f] Losses scheduled for PY10 = 15,000 AF.
- [g] Available supply for exchange is zero, zero sum gain.
- [h] Available supply for exchange 1,100 AF (1962), includes carryover. If not fully exchanged, reverts to Vallejo M&I carryover.
- [i] Max. usage per agreement includes "Exchange-SID (M&I Carryover)". Ammended in 2010.Total increases annually to 10,050 in 2040.
- [j] Available supply for exchange to BEN from SID = 0 AF.
- [k] In Feb. 2009 1AF transferred from SID to FF per March 24, 2009 letter from Rick Wood.
- [l] Fairfield totals adjusted to include deliveries to Business Center Drive.
- [m] Benicia obtained 1,333 AF of SP water in exchange for 1,333 AF SWP with Vacaville in 2008
- [n] Total adjusted to include 1,333 AF exchange with Benicia referred to in footnote "m"
- [o] May 09 agreement. From its Entitlement, SID transferred 2,000 AF to Benicia & 2,000 AF to Fairfield. Per 2nd ammendment increases by 125 AF/year.
- [p] At SID's request, Benicia pumped 69 AF SP water from October 23-25 to expedite PSC cleaning.
- [q] Includes Transfer Carryover
- [r] Second ammendment to SID-Vacaville agreement. Increases incrmently every year to a maximum of 10,050 AF in 2050.
- [s] Typically only used to maximize use of carryover before eminent spill.
- [t] only used to payback [a]
- [u] Exchange carryover included in carryover totals

**EXHIBIT F**

Enter District ID No. **207**

Data File Name

BASE Year

2009 WBMP 1.1

2010 WBMP 1.1

2009 BMP 1.2

2010 BMP 1.2

2009 BMP 1.3

2010 BMP 1.3



**CUWCC BMP COVERAGE REPORT FOR WHOLESALE AGENCIES**

**Foundation Best Management Practices for Urban Water Efficiency**

Agency: **Solano County Water Agency** District Name: **Solano County Water Agency** CUWCC Unit #: **207**

Primary Contact **Andrew Florendo**

Email: [aflorendo@scwa2.com](mailto:aflorendo@scwa2.com)

Base Year:  Calendar or Fiscal Year Reporting

Report Date: **26-Sep-11**

**Foundational BMPs**

**BMP 1.1.3 Wholesale Agency Assistance Programs**

Date of 2009 Data Download **July 5, 2011**

Date of 2010 Data Download **July 5, 2011**

a) Financial investments and building partnerships Value of resources provided to retailers for: <b>2009</b>	<b>2009 Monetary Amount for Financial Incentives</b>	<b>2009 Monetary Amount for Equivalent Resources</b>
Residential BMP	\$ 342,000	\$ 145,000
CII BMP	\$ 138,500	\$ 18,500
<b>Total Value of Resources</b>	<b>\$ 480,500</b>	<b>\$ 163,500</b>

a) Financial investments and building partnerships Value of resources provided to retailers for: <b>2010</b>	<b>2010 Monetary Amount for Financial Incentives</b>	<b>2010 Monetary Amount for Equivalent Resources</b>
Residential BMP	\$ 326,250	
CII BMP	\$ 94,520	
<b>Total Value of Resources</b>	<b>\$ 420,770</b>	<b>\$ -</b>

**On Track**

"On Track" if Retailer accepted offer and Wholesaler provided resources. "Not on Track" if Retailer accepted offer and Wholesaler did not provide resources.

**On Track**

Agency: **Solano County Water Agency**

District Name: **Solano County Water Agency**

CUWCC Unit #: **207**

b) Technical Support	<b>2009 Technical Support Description</b> Technical support and program management for CII BMP compliance, HEW and HET rebate program and HET direct install program.  Technical support offered and accepted by member agencies.  <b>On Track</b>	<b>2010 Technical Support Description</b> Technical support and program management for CII BMP compliance, HEW and HET rebate program and HET direct install program. Technical support offered and accepted by member agencies.  <b>On Track</b>	" On Track" if Retailer accepted and Wholesaler provided and described Technical Support
c) Retail Agency	<b>2009 Programs Managed for Retailers</b> City of Benicia BMP 3; BMP 4 City of Fairfield BMP 3; BMP 4 City of Vacaville BMP 3; BMP 4 City of Vallejo BMP 3; BMP 4 City of Suisun City BMP 3; BMP 4 City of Dixon BMP 3; BMP 4  <b>On Track</b>	<b>2010 Programs Managed for Retailers</b> City of Benicia BMP 3; BMP 4 City of Fairfield BMP 3; BMP 4 City of Vacaville BMP 3; BMP 4 City of Vallejo BMP 3; BMP 4 City of Suisun City BMP 3; BMP 4 City of Dixon BMP 3; BMP 4  <b>On Track</b>	" On Track" if Retailer accepted and Wholesaler provided and lists programs managed for retailers
d) Water Shortage Allocation	<b>2009</b> Has Water shortage plan or policy been adopted? December 6, 2006 Water Shortage Contingency Plan  <b>On Track</b>	<b>2010</b> Adoption Date December 6, 2006 File Name Water Shortage Contingency Plan  <b>On Track</b>  Comment by Solano CWA: This BMP is not directly applicable to Solano County Water Agency. The Agency has a water conservation clause in its master contract that calls for the support of water conservation practices.	"OnTrack" if plan /policy adopted and document provided. "Not on Track" if no water shortage plan or policy adopted or document not provided.
e) Non signatory Reporting of BMP implementation by non-signatory agencies	n/a	n/a	Report if possible
f) Encourage CUWCC Membership List Efforts to recruit retailers	List Efforts to recruit retailers Solano CWA has been actively encouraging its retailing agencies to join CUWCC for several years. Support is positive from staff  <b>On Track</b>	Solano CWA has been actively encouraging its retailing agencies to join CUWCC for several years. Support is positive from staff  <b>On Track</b>	"On Track" if efforts listed or dues paid.



Agency: **Solano County Water Agency**

District Name: **Solano County Water Agency**

CUWCC Unit #: **207**

**BMP 1.2 Water Loss Control**

	2009
Complete a prescreening Audit	No
Metered Sales AF	224,400
Verifiable Other Uses AF	
Total Supply AF	224,400
(Metered Sales + System uses)/ Total Supply >0.89	
If ratio is less than 0.9, complete a full scale Audit in 2009?	Yes
Verify Data with Records on File?	Yes
Operate a system Leak Detection Program?	Yes

On Track

Comments: SCWA has no meters or pipelines.

Date of 2009 Data Submittal: #N/A

Date of 2010 Data Submittal: May 20, 2011

On Track if Yes  
Metered sales to retail agencies

Into wholesale system

On Track if =>.89, Not on Track if No

On Track if Yes

On Track if Yes

On Track if Yes

For wholesalers AWWA methodology applies to supplies to wholesalers, sales to retail agencies or sub wholesalers, and pipelines operated by wholesalers. End use retail customers are not considered in this

	2010
Compile Standard Water Audit using AWWA Software?	No
AWWA file provided to CUWCC?	No
AWWA Water Audit Validity Score?	
Completed Training in AWWA Audit Method?	
Completed Training in Component Analysis Process?	
Complete Component Analysis?	
Repaired all leaks and breaks to the extent cost effective?	
Locate and repair unreported leaks to the extent cost effective.	
Maintain a record-keeping system for the repair of reported leaks, including time of report, leak location, type of leaking pipe segment or fitting, and leak running time from report to repair.	
Provided 7 types of Water Loss Control Info	
Leaks Value Real Value Miles Press Cost Water Lost from Repair Losses Apparent Surveyed Reduction Interventions Leaks AF	

On Track if Yes, Not on Track if No

On Track if Yes, Not on Track if No

Info only until 2012

Info only until 2012

Info only until 2012

Info only until 2012

On Track if Yes, Not on Track if No

On Track if Yes, Not on Track if No

Info only until 2012

Info only until 2012

Agency: **Solano County Water Agency**

District Name: **Solano County Water Agency**

CUWCC Unit #: **207**

**1.3 METERING WITH COMMODITY RATES FOR ALL NEW CONNECTIONS AND RETROFIT OF EXISTING CONNECTIONS**

Date of 2009 Data Submittal: July 5, 2011  
Date of 2010 Data Submittal: July 5, 2011

	2009	2010
Exemption requested?	No	No
At least as Effective As Requested?	No	No
Does Agency have Unmetered Deliveries to Retail Agencies or Other Wholesalers?	Yes	No
Metered Accounts billed by volume of use	No	No
Completed a written plan, policy or program to test, repair and replace meters	No	No

**On Track**

**On Track**

Volumetric billing required for all connections on same schedule as metering

On Track if Yes, Not on Track if No

Comment from Salano CWA: This BMP is not applicable. SCWA does not own any meters

Enter District ID No. **207**

Agency Row #

Data File Name

#N/A	57	#N/A	63
2009 BMP2.1	2010 BMP2.1	2009 BMP2.2	2010 BMP2.2



## CUWCC BMP COVERAGE REPORT FOR WHOLESALE AGENCIES

### Foundation Best Management Practices for Urban Water Efficiency

Agency: **Solano County Water Agency** District Name: **Solano County Water Agency** CUWCC Unit #: **207**  
 WHOLESAL Water Supplier Coverage Report Date: **September 26, 2011**  
 Primary Contact: **Andrew Florendo** Email: **aflorendo@scwa2.com**

#### BMP 2. EDUCATION PROGRAMS

##### BMP 2.1 Public Outreach Actions Implemented and Reported to CUWCC

date 2009 datafile downloaded: **July 5, 2011**  
 date 2010 datafile downloaded: **July 5, 2011**

Names of retail agencies for which this wholesale agency provides public outreach:

- City of Benecia City of Vallejo
- City of Fairfield Solano-Suisun Water Authority

- 1) Contacts with the public (minimum = 4 times per year)
- 2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).
- 3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).
- 4) Description of materials used to meet minimum requirement.
- 5) Annual budget for public outreach program.
- 6) Description of all other outreach programs

	2009	2010
1) Contacts with the public (minimum = 4 times per year)	yes	yes
2) Water supplier contacts with media (minimum = 4 times per year, i.e., at least quarterly).	no	no
3) An actively maintained website that is updated regularly (minimum = 4 times per year, i.e., at least quarterly).	Yes <a href="http://solanosaveswater.org">http://solanosaveswater.org</a>	Yes <a href="http://www.solanosaveswater.org">www.solanosaveswater.org</a>
4) Description of materials used to meet minimum requirement.	Website General water conservation information	Website General water conservation information
5) Annual budget for public outreach program.	\$ 58,100	\$ 36,500
6) Description of all other outreach programs	1) added waterwise gardening section 2) updated info regarding water situation 3) updated rebate info 4) water quality info	1) Addition of residential washer rebate program info. 2) Addition of CII Water Savings Incentive Program 3) WaterWise Gardening info 4) Addition of turf replacement rebate program 5) HET rebate information
	<b>On Track for 5 Actions</b>	<b>On Track for 5 Actions</b>

All 6 action types implemented and reported to CUWCC to be 'On Track')

Agency: **Solano County Water Agency**  
 WHOLESAL Water Supplier

District Name: **Solano County Water Agency**

CUWCC Unit #: **207**

Coverage Report Date: **September 26, 2011**

**2.2 School Education Programs Implemented and Reported to CUWCC**

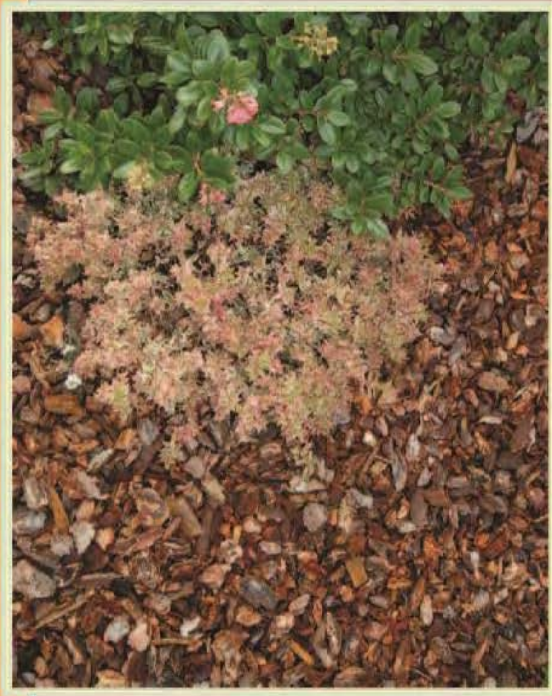
date 2009 datafile downloaded:

date 2010 datafile downloaded:

July 5, 2011

	2009	2010	
Does this wholesale agency implement School Education Programs for Sub Wholesalers or Retail unility's benefit?	Yes	Yes	
Names of Sub Wholesale and Retail Agencies benefiting from Program?	City of Fairfield, City of Vacaville, City of Dixon	City of Fairfield, City of Vacaville, City of Benicia, City of Vallejo, City of Dixon	
1) Curriculum materials developed and/or provided by wholesale agency	Classroom presentations, field trips	grade appropriate booklets, school supplies	All 5 actions types implemented and reported to CUWCC to be 'On Track'
2) Materials meet state education framework requirements and are grade-level appropriate?	Yes	Yes	
3) Materials Distributed to K-6?	n/a	Yes	Describe materials to meet minimum requirements
Describe K-6 Materials		grade appropriate booklets, school supplies	
Materials distributed to 7-12 students?	n/a	Yes	Info Only
4) Annual budget for school education program.	\$ 50,000	\$ 100,000	
5) Description of all other water supplier education programs	SCWA funds WaterWays, an outdoor education program for upper elementary school students designed to build understanding of the watershed. The agency also funds programs from the	The agency sponsors field trips to environmental education centers to allow students to see the watershed where they live. The agency also sponsors water education assemblies for K - 8 grades.	
	<b>On Track</b>	<b>On Track</b>	

# Benefits of Mulch



DROUGHT  
SURVIVAL

101



DROUGHT SURVIVAL

101

**The Benefits of Mulch**

- Mulching is essential to the survival of your landscape during a drought. Mulch will reduce the amount of water that evaporates from your soil, greatly reducing your need to water your plants.
- Mulch improves the quality of your soil by breaking up clay and allowing better water and air movement through the soil. Mulch provides nutrients to sandy soil and improves its ability to hold water.

- Mulch acts as an insulating layer on top of soil, keeping it cooler in the summer. Roots like that!
- Mulch keeps weeds down, and the weeds that do grow are much easier to pull. Gardeners like that!

**Mulch Like You Mean It**

- Before applying mulch, remove weeds and water thoroughly. This will help you get the most benefit from your new mulch.
- Replace the grass under trees with mulch to minimize competition for water and nutrients. This mimics the way trees grow in nature.
- Keep mulch 6-to-12 inches away from the base of trees and shrubs.
- Apply 2-to-4 inches of mulch in all planting areas. Finer mulches (sized a half-inch or smaller) should be applied no more than 2 inches deep. Coarser mulches, such as large bark chips, can be applied 4 inches deep.

**Shopping for Mulch**

Mulch is available by the bag or in bulk. Bulk mulch is measured in cubic yards. You can calculate the volume of mulch you need by multiplying the area (in square feet) by the depth (fraction of foot, not inches), then dividing by 27. The following table will guide you:

**Cubic Yards Needed for Depth of Mulch**

Square Footage	2"	3"	4"
200	1	2	2.5
500	3	5	6
1000	6	9	12
1500	9	14	19
2000	12	19	25

# Trees & Shrubs



DROUGHT  
SURVIVAL

101









## Basins and Subbasins of the Sacramento River Hydrologic Region

Basin/subbasins	Basin name	Basin/subbasins	Basin name
5-1	Goose Lake Valley	5-30	Lower Lake Valley
5-1.01	Lower Goose Lake Valley	5-31	Long Valley
5-1.02	Fandango Valley	5-35	Mccloud Area
5-2	Alturas Area	5-36	Round Valley
5-2.01	South Fork Pitt River	5-37	Toad Well Area
5-2.02	Warm Springs Valley	5-38	Pondosa Town Area
5-3	Jess Valley	5-40	Hot Springs Valley
5-4	Big Valley	5-41	Egg Lake Valley
5-5	Fall River Valley	5-43	Rock Prairie Valley
5-6	Redding Area	5-44	Long Valley
5-6.01	Bowman	5-45	Cayton Valley
5-6.02	Rosewood	5-46	Lake Britton Area
5-6.03	Anderson	5-47	Goose Valley
5-6.04	Enterprise	5-48	Burney Creek Valley
5-6.05	Millville	5-49	Dry Burney Creek Valley
5-6.06	South Battle Creek	5-50	North Fork Battle Creek
5-7	Lake Almanor Valley	5-51	Butte Creek Valley
5-8	Mountain Meadows Valley	5-52	Gray Valley
5-9	Indian Valley	5-53	Dixie Valley
5-10	American Valley	5-54	Ash Valley
5-11	Mohawk Valley	5-56	Yellow Creek Valley
5-12	Sierra Valley	5-57	Last Chance Creek Valley
5-12.01	Sierra Valley	5-58	Clover Valley
5-12.02	Chilcoot	5-59	Grizzly Valley
5-13	Upper Lake Valley	5-60	Humbug Valley
5-14	Scotts Valley	5-61	Chrome Town Area
5-15	Big Valley	5-62	Elk Creek Area
5-16	High Valley	5-63	Stonyford Town Area
5-17	Burns Valley	5-64	Bear Valley
5-18	Coyote Valley	5-65	Little Indian Valley
5-19	Collayomi Valley	5-66	Clear Lake Cache Formation
5-20	Berryessa Valley	5-68	Pope Valley
5-21	Sacramento Valley	5-86	Joseph Creek
5-21.50	Red Bluff	5-87	Middle Fork Feather River
5-21.51	Corning	5-88	Stony Gorge Reservoir
5-21.52	Colusa	5-89	Squaw Flat
5-21.53	Bend	5-90	Funks Creek
5-21.54	Antelope	5-91	Antelope Creek
5-21.55	Dye Creek	5-92	Blanchard Valley
5-21.56	Los Molinos	5-93	North Fork Cache Creek
5-21.57	Vina	5-94	Middle Creek
5-21.58	West Butte	5-95	Meadow Valley
5-21.59	East Butte		
5-21.60	North Yuba		
5-21.61	South Yuba		
5-21.62	Sutter		
5-21.64	North American		
5-21.65	South American		
5-21.66	Solano		
5-21.67	Yolo		
5-21.68	Capay Valley		

## Description of the Region

The Sacramento River HR covers approximately 17.4 million acres (27,200 square miles). The region includes all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa counties (Figure 33). Small areas of Alpine and Amador counties are also within the region. Geographically, the region extends south from the Modoc Plateau and Cascade Range at the Oregon border, to the Sacramento-San Joaquin Delta. The Sacramento Valley, which forms the core of the region, is bounded to the east by the crest of the Sierra Nevada and southern Cascades and to the west by the crest of the Coast Range and Klamath Mountains. Other significant features include Mount Shasta and Lassen Peak in the southern Cascades, Sutter Buttes in the south central portion of the valley, and the Sacramento River, which is the longest river system in the State of California with major tributaries the Pit, Feather, Yuba, Bear and American rivers. The region corresponds approximately to the northern half of RWQCB 5. The Sacramento metropolitan area and surrounding communities form the major population center of the region. With the exception of Redding, cities and towns to the north, while steadily increasing in size, are more rural than urban in nature, being based in major agricultural areas. The 1995 population of the entire region was 2.372 million.

The climate in the northern, high desert plateau area of the region is characterized by cold snowy winters with only moderate precipitation and hot dry summers. This area depends on adequate snowpack to provide runoff for summer supply. Annual precipitation ranges from 10 to 20 inches. Other mountainous areas in the northern and eastern portions of the region have cold wet winters with large amounts of snow, which typically provide abundant runoff for summer supplies. Annual precipitation ranges from 40 to more than 80 inches. Summers are generally mild in these areas. The Coast Range and southern Klamath Mountains receive copious amounts of precipitation, but most of the runoff flows to the coast in the North Coastal drainage. Sacramento Valley comprises the remainder of the region. At a much lower elevation than the rest of the region, the valley has mild winters with moderate precipitation. Annual precipitation varies from about 35 inches in Redding to about 18 inches in Sacramento. Summers in the valley are hot and dry.

Most of the mountainous portions of the region are heavily forested and sparsely populated. Three major national forests (Mendocino, Trinity, and Shasta) make up the majority of lands in the Coast Range, southern Klamath Mountains, and the southern Cascades; these forests and the region's rivers and lakes provide abundant recreational opportunities. In the few mountain valleys with arable land, alfalfa, grain and pasture are the predominant crops. In the foothill areas of the region, particularly adjacent to urban centers, suburban to rural housing development is occurring along major highway corridors. This development is leading to urban sprawl and is replacing the former agricultural production on those lands. In the Sacramento Valley, agriculture is the largest industry. Truck, field, orchard, and rice crops are grown on approximately 2.1 million acres. Rice represents about 23 percent of the total irrigated acreage.

The Sacramento River HR is the main water supply for much of California's urban and agricultural areas. Annual runoff in the HR averages about 22.4 maf, which is nearly one-third of the State's total natural runoff. Major water supplies in the region are provided through surface storage reservoirs. The two largest surface water projects in the region are USBR's Shasta Lake (Central Valley Project) on the upper Sacramento River and Lake Oroville (DWR's State Water Project) on the Feather River. In all, there are more than 40 major surface water reservoirs in the region. Municipal, industrial, and agricultural supplies to the region are about 8 maf, with groundwater providing about 2.5 maf of that total. Much of the remainder of the runoff goes to dedicated natural flows, which support various environmental requirements, including in-stream fishery flows and flushing flows in the Delta.

## Groundwater Development

Groundwater provides about 31 percent of the water supply for urban and agricultural uses in the region, and has been developed in both the alluvial basins and the hard rock uplands and mountains. There are 88 basins/subbasins delineated in the region. These basins underlie 5.053 million acres (7,900 square miles), about 29 percent of the entire region. The reliability of the groundwater supply varies greatly. The Sacramento Valley is recognized as one of the foremost groundwater basins in the State, and wells developed in the sediments of the valley provide excellent supply to irrigation, municipal, and domestic uses. Many of the mountain valleys of the region also provide significant groundwater supplies to multiple uses.

Geologically, the Sacramento Valley is a large trough filled with sediments having variable permeabilities; as a result, wells developed in areas with coarser aquifer materials will produce larger amounts of water than wells developed in fine aquifer materials. In general, well yields are good and range from one-hundred to several thousand gallons per minute. Because surface water supplies have been so abundant in the valley, groundwater development for agriculture primarily supplement the surface supply. With the changing environmental laws and requirements, this balance is shifting to a greater reliance on groundwater, and conjunctive use of both supplies is occurring to a greater extent throughout the valley, particularly in drought years. Groundwater provides all or a portion of municipal supply in many valley towns and cities. Redding, Anderson, Chico, Marysville, Sacramento, Olivehurst, Wheatland, Willows, and Williams rely to differing degrees on groundwater. Red Bluff, Corning, Woodland, Davis, and Dixon are completely dependent on groundwater. Domestic use of groundwater varies, but in general, rural unincorporated areas rely completely on groundwater.

In the mountain valleys and basins with arable land, groundwater has been developed to supplement surface water supplies. Most of the rivers and streams of the area have adjudicated water rights that go back to the early 1900s, and diversion of surface water has historically supported agriculture. Droughts and increased competition for supply have led to significant development of groundwater for irrigation. In some basins, the fractured volcanic rock underlying the alluvial fill is the major aquifer for the area. In the rural mountain areas of the region, domestic supplies come almost entirely from groundwater. Although a few mountain communities are supplied in part by surface water, most rely on groundwater. These groundwater supplies are generally quite reliable in areas that have sufficient aquifer storage or where surface water replenishes supply throughout the year. In areas that depend on sustained runoff, water levels can be significantly depleted in drought years and many old, shallow wells can be dewatered. During 2001, an extreme drought year on the Modoc Plateau, many well owners experienced problems with water supply.

Groundwater development in the fractured rocks of the foothills of the southern Cascades and Sierra Nevada is fraught with uncertainty. Groundwater supplies from fractured rock sources are highly variable in terms of water quantity and water quality and are an uncertain source for large-scale residential development. Originally, foothill development relied on water supply from springs and river diversions with flumes and ditches for conveyance that date back to gold mining era operations. Current development is primarily based on individual private wells, and as pressures for larger scale development increase, questions about the reliability of supply need to be addressed. Many existing foothill communities have considerable experience with dry or drought year shortages. In Butte County residents in Cohasset, Forest Ranch, and Magalia have had to rely on water brought up the ridges in tanker trucks. The suggested answer has been the development of regional water supply projects. Unfortunately, the area's development pattern of small, geographically dispersed population centers does not lend itself to the kind of financial base necessary to support such projects.

### Groundwater Quality

Groundwater quality in the Sacramento River HR is generally excellent. However, there are areas with local groundwater problems. Natural water quality impairments occur at the north end of the Sacramento Valley in the Redding subbasin, and along the margins of the valley and around the Sutter Buttes, where Cretaceous-age marine sedimentary rocks containing brackish to saline water are near the surface. Water from the older underlying sediments mixes with the fresh water in the younger alluvial aquifer and degrades the quality. Wells constructed in these areas typically have high TDS. Other local natural impairments are moderate levels of hydrogen sulfide in groundwater in the volcanic and geothermal areas in the western portion of the region. In the Sierra foothills, there is potential for encountering uranium and radon-bearing rock or sulfide mineral deposits containing heavy metals. Human-induced impairments are generally associated with individual septic system development in shallow unconfined portions of aquifers or in fractured hard rock areas where insufficient soil depths are available to properly leach effluent before it reaches the local groundwater supply.

#### Water Quality in Public Supply Wells

From 1994 through 2000, 1,356 public supply water wells were sampled in 51 of the 88 basins and subbasins in the Sacramento River HR. Samples analyzed indicate that 1,282 wells, or 95 percent, met the state primary MCLs for drinking water. Seventy-four wells, or 5 percent, have constituents that exceed one or more MCL. Figure 34 shows the percentages of each contaminant group that exceeded MCLs in the 74 wells.

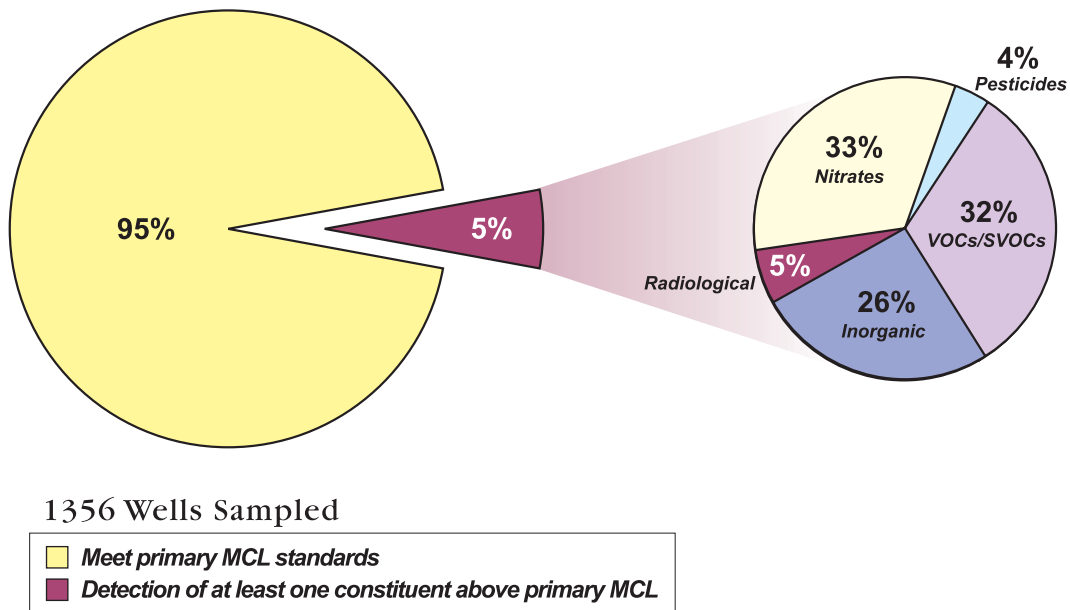


Figure 34 MCL exceedances in public supply wells in the Sacramento River Hydrologic Region

Table 25 lists the three most frequently occurring contaminants in each of the six contaminant groups and shows the number of wells in the HR that exceeded the MCL for those contaminants.

**Table 25 Most frequently occurring contaminants by contaminant group in the Sacramento River Hydrologic Region**

Contaminant group	Contaminant - # of wells	Contaminant - # of wells	Contaminant - # of wells
Inorganics – Primary	Cadmium – 4	Chromium (Total) – 3	3 tied at 2
Inorganics – Secondary	Manganese – 221	Iron – 166	Specific Conductance – 3
Radiological	Gross Alpha – 4		
Nitrates	Nitrate (as NO <sub>3</sub> ) – 22	Nitrate + Nitrite – 5	Nitrate Nitrogen (NO <sub>3</sub> -N) – 2
Pesticides	Di(2-Ethylhexyl)phthalate – 4		
VOCs/SVOCs	PCE – 11	TCE – 7	Benzene – 4

PCE = Tetrachloroethylene  
TCE = Trichloroethylene  
VOC = Volatile Organic Compounds  
SVOC = Semivolatile Organic Compound

### Changes from Bulletin 118-80

Some modifications from the groundwater basins presented in Bulletin 118-80 are incorporated in this report. These are listed in Table 26.

**Table 26 Modifications since Bulletin 118-80 of groundwater basins and subbasins in Sacramento River Hydrologic Region**

Basin name	New number	Old number
Fandango Valley	5-1.02	5-39
Bucher Swamp Valley	deleted	5-42
Modoc Plateau Recent Volcanic Areas	deleted	5-32
Modoc Plateau Pleistocene Volcanic Areas	deleted	5-33
Mount Shasta Area	deleted	5-34
Sacramento Valley Eastside Tuscan Formation Highlands	deleted	5-55
Clear Lake Pleistocene Volcanics	deleted	5-67

No additional basins were assigned to the Sacramento River HR in this revision. However, four basins have been divided into subbasins. Goose Lake Valley Groundwater Basin (5-1) has been subdivided into two subbasins, Fandango Valley (5-39) was modified to be a subbasin of Goose Lake Valley. Redding Area Groundwater Basin has been subdivided into six subbasins, Sierra Valley Groundwater Basin has been subdivided into two subbasins, and the Sacramento Valley Groundwater Basin has been subdivided into 18 subbasins.

There are several deletions of groundwater basins from Bulletin 118-80. Bucher Swamp Valley Basin (5-42) was deleted due to a thin veneer of alluvium over rock. Modoc Plateau Recent Volcanic Areas (5-32), Modoc Plateau Pleistocene Volcanic Areas (5-33), Mount Shasta Area (5-34), Sacramento Valley Eastside Tuscan Formation Highlands (5-55), and Clear Lake Pleistocene Volcanics (5-67) are volcanic aquifers and were not assigned basin numbers in this bulletin. These are considered to be groundwater source areas as discussed in Chapter 6.

Table 27 Sacramento River Hydrologic Region groundwater data

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Types of Monitoring			TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range
5-1	GOOSE LAKE VALLEY	36,000	B	-	400	9	9	-	183	68 - 528
5-1.01	LOWER GOOSE LAKE	18,500	B	2,000	-	3	-	-	-	-
5-1.02	FANDANGO VALLEY	18,500	B	2,000	-	3	-	-	357	180 - 800
5-2	ALTURAS AREA	114,000	B	5,000	1,075	9	-	8	-	-
5-2.01	SOUTH FORK PITT RIVER	68,000	B	400	314	3	-	11	-	-
5-2.02	WARM SPRINGS VALLEY	6,700	B	3,000	-	-	-	-	-	-
5-3	JESS VALLEY	92,000	B	4,000	880	19	9	10	260	141 - 633
5-4	BIG VALLEY	54,800	B	1,500	266	16	7	3	174	115 - 232
5-5	FALL RIVER VALLEY	85,330	B	2,000	589	8	2	13	-	70 - 247
5-6	REDDING AREA	45,320	B	-	-	4	-	-	-	118 - 218
5-6.01	BOWMAN	98,500	B	1,800	46	11	10	69	194	109-320
5-6.02	ROSEWOOD	60,900	B	700	266	11	3	43	-	160 - 210
5-6.03	ANDERSON	67,900	B	500	254	6	5	4	140	-
5-6.04	ENTERPRISE	32,300	B	-	-	0	0	0	360	-
5-6.05	MILLVILLE	7,150	B	-	-	10	4	4	105	53 - 260
5-6.06	SOUTH BATTLE CREEK	8,150	B	-	-	-	-	-	-	-
5-7	LAKE ALMANOR VALLEY	29,400	B	-	-	-	-	9	-	-
5-8	MOUNTAIN MEADOWS VALLEY	6,800	B	40	40	4	4	11	-	-
5-9	INDIAN VALLEY	19,000	B	-	500	1	2	15	248	210 - 285
5-10	AMERICAN VALLEY	117,700	B	1,500	640	34	15	9	312	110 - 1,620
5-11	MOHAWK VALLEY	7,550	B	-	-	15	-	8	-	-
5-12	SIERRA VALLEY	7,260	B	900	302	12	3	6	-	-
5-12.01	SIERRA VALLEY	7,320	B	1,200	171	9	1	9	158	140 - 175
5-12.02	CHILCOOT	24,210	B	1,470	475	49	11	7	535	270 - 790
5-13	UPPER LAKE VALLEY	2,360	B	100	37	5	2	-	598	480 - 745
5-14	SCOTTS VALLEY	2,900	B	-	30	1	5	-	335	280 - 455
5-15	BIG VALLEY	6,530	B	800	446	6	3	3	288	175 - 390
5-16	HIGH VALLEY	6,500	B	1,000	121	10	4	3	202	150 - 255
5-17	BURNS VALLEY	1,400	C	-	-	0	-	0	-	-
5-18	COYOTE VALLEY	266,750	B	1,200	363	30	10	56	207	120 - 500
5-19	COLLAYOMI VALLEY	205,640	B	3,500	977	29	7	30	286	130 - 490
5-20	BERRYESSA VALLEY	918,380	B	5,600	984	98	30	134	391	120 - 1,220
5-21	SACRAMENTO VALLEY	20,770	B	-	275	0	3	9	-	334-360
5-21.50	RED BLUFF	18,710	B	800	575	4	5	22	296	-
5-21.51	CORNING	27,730	B	3,300	890	8	1	3	240	159 - 396
5-21.52	COLUSA	33,170	B	1,000	500	3	3	9	217	-
5-21.53	BEND	125,640	B	3,850	1,212	23	5	69	285	48 - 543
5-21.54	ANTELOPE	181,600	B	4,000	1,833	32	8	36	293	130 - 676
5-21.55	DYE CREEK									
5-21.56	LOS MOLINOS									
5-21.57	VINA									
5-21.58	WEST BUTTE									

Table 27 Sacramento River Hydrologic Region groundwater data (continued)

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Types of Monitoring				TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range	
5-21.59	EAST BUTTE	265,390	B	4,500	1,019	43	4	44	235	122 - 570	
5-21.60	NORTH YUBA	100,400	C	4,000	-	21	-	32	-	-	
5-21.61	SOUTH YUBA	107,000	C	4,000	1,650	56	-	6	-	-	
5-21.62	SUTTER	234,000	C	-	-	34	-	115	-	-	
5-21.64	NORTH AMERICAN	351,000	A	-	800	121	-	339	300	150 - 1,000	
5-21.65	SOUTH AMERICAN	248,000	C	-	-	105	-	247	221	24-581	
5-21.66	SOLANO	425,000	C	-	-	123	23	136	427	150 - 880	
5-21.67	YOLO	226,000	B	4,000+	1,000	127	20	185	880	480 - 2,060	
5-21.68	CAPAY VALLEY	25,000	C	-	-	11	-	3	-	-	
5-30	LOWER LAKE VALLEY	2,400	B	100	37	-	3	5	568	290 - 1,230	
5-31	LONG VALLEY	2,600	B	100	63	-	-	-	-	-	
5-35	MCCLLOUD AREA	21,320	B	-	380	-	-	1	-	-	
5-36	ROUND VALLEY	7,270	B	2,000	800	2	-	-	-	148 - 633	
5-37	TOAD WELL AREA	3,360	B	-	-	-	-	-	-	-	
5-38	PONDOSA TOWN AREA	2,080	B	-	-	-	-	-	-	-	
5-40	HOT SPRINGS VALLEY	2,400	B	-	-	-	-	-	-	-	
5-41	EGG LAKE VALLEY	4,100	B	-	20	-	-	-	-	-	
5-43	ROCK PRAIRIE VALLEY	5,740	B	-	-	-	-	-	-	-	
5-44	LONG VALLEY	1,090	B	-	-	-	-	-	-	-	
5-45	CAYTON VALLEY	1,300	B	-	400	-	-	-	-	-	
5-46	LAKE BRITTON AREA	14,060	B	-	-	-	-	2	-	-	
5-47	GOOSE VALLEY	4,210	B	-	-	-	-	-	-	-	
5-48	BURNEY CREEK VALLEY	2,350	B	-	-	-	-	2	-	-	
5-49	DRY BURNEY CREEK VALLEY	3,070	B	-	-	-	-	-	-	-	
5-50	NORTH FORK BATTLE CREEK VALLEY	12,760	B	-	-	-	-	3	-	-	
5-51	BUTTE CREEK VALLEY	3,230	B	-	-	-	-	-	-	-	
5-52	GRAYS VALLEY	5,440	B	-	-	-	-	-	-	-	
5-53	DIXIE VALLEY	4,870	B	-	-	-	-	-	-	-	
5-54	ASH VALLEY	6,010	B	3,000	2,200	-	-	-	-	-	
5-56	YELLOW CREEK VALLEY	2,310	B	-	-	-	-	-	-	-	
5-57	LAST CHANCE CREEK VALLEY	4,660	B	-	-	-	-	-	-	-	
5-58	CLOVER VALLEY	16,780	B	-	-	-	-	-	-	-	
5-59	GRIZZLY VALLEY	13,400	B	-	-	-	-	1	-	-	
5-60	HUMBUG VALLEY	9,980	B	-	-	-	-	8	-	-	
5-61	CHROME TOWN AREA	1,410	B	-	-	-	-	-	-	-	
5-62	ELK CREEK AREA	1,440	B	-	-	-	-	-	-	-	
5-63	STONYFORD TOWN AREA	6,440	B	-	-	-	-	-	-	-	
5-64	BEAR VALLEY	9,100	B	-	-	-	-	-	-	-	
5-65	LITTLE INDIAN VALLEY	1,270	B	-	-	-	-	-	-	-	
5-66	CLEAR LAKE CACHE FORMATION	30,000	B	245	52	-	-	4	-	-	
5-68	POPE VALLEY	7,180	C	-	-	-	-	1	-	-	
5-86	JOSEPH CREEK	4,450	B	-	-	-	-	-	-	-	



Table 27 Sacramento River Hydrologic Region groundwater data (continued)

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Types of Monitoring			TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range
5-87	MIDDLE FORK FEATHER RIVER	4,340	B	-	-	-	-	2	-	-
5-88	STONY GORGE RESERVOIR	1,070	B	-	-	-	-	-	-	-
5-89	SQUAW FLAT	1,300	C	-	-	-	-	-	-	-
5-90	FUNKS CREEK	3,000	C	-	-	-	-	-	-	-
5-91	ANTELOPE CREEK	2,040	B	-	-	-	-	-	-	-
5-92	BLANCHARD VALLEY	2,200	B	-	-	-	-	-	-	-
5-93	NORTH FORK CACHE CREEK	3,470	C	-	-	-	-	-	-	-
5-94	MIDDLE CREEK	700	B	-	75	-	-	1	-	-
5-95	MEADOW VALLEY	5,730	B	-	-	-	-	1	-	-

gpm - gallons per minute

mg/L - milligram per liter

TDS -total dissolved solids

## **Sacramento Valley Groundwater Basin**

### **Solano Subbasin**

Groundwater Basin Number: 5-21.66

County: Solano, Sacramento, Yolo

Surface Area: 425,000 acres (664 square miles)

#### **Basin Boundaries and Hydrologic Features**

The Solano Subbasin lies in the southwestern portion of the Sacramento Basin and the northern portion of the Sacramento-San Joaquin Delta. The elevation varies from 120 feet in the northwest corner to sea level in the south. Subbasin boundaries are defined by; Putah Creek on the north, the Sacramento River on the East (from Sacramento to Walnut Grove), the North Mokelumne River on the southeast (from Walnut Grove to the San Joaquin River), and the San Joaquin River on the South (from the North Mokelumne River to the Sacramento River). The western subbasin border is defined by the hydrologic divide that separates lands draining to the San Francisco Bay from those draining to the Sacramento-San Joaquin River Delta. That divide is roughly delineated by the English Hills and the Montezuma Hills.

Primary waterways in and bordering the basin include the Sacramento, Mokelumne and San Joaquin Rivers, the Sacramento River Deep Water Ship Channel, and Putah Creek.

Annual precipitation averages in the basin range from approximately 23 inches in the western portion of the subbasin to 16 inches in the eastern portion of the basin.

#### **Hydrogeologic Information**

##### ***Water Bearing Formations***

The primary water-bearing formations comprising the Solano subbasin are sedimentary continental deposits of Late Tertiary (Pliocene) to Quaternary (Recent) age. Fresh water-bearing units include younger alluvium, older alluvium, and the Tehama Formation (Thomasson and others 1960). The units pinch out near the Coast Range on the west and thicken to a section of nearly 3000 feet near the eastern margin of the basin. Saline water-bearing sedimentary units underlie the Tehama formation and are generally considered the saline water boundary (adapted from Thomasson and others, 1960).

Flood basin deposits occur along the eastern margin of the subbasin. These deposits consist primarily of silts and clays, and may be locally interbedded with stream channel deposits of the Sacramento River. In the delta, flood basin deposits contain a significant percentage of organic material (peat), and are sometimes mapped as peaty mud (Wagner and others 1987). Thickness of the unit ranges from 0 to 150 feet. The flood basin deposits have low permeability and generally yield low quantities of water to wells. Recent stream channel deposits consist of unconsolidated silt, fine- to medium-grained sand, gravel and in some cases cobbles deposited in and adjacent to active streams in the subbasin. They occur along the Sacramento, Mokelumne and San Joaquin Rivers, and the upper reaches of Putah Creek.

Thickness of the younger alluvium ranges from 0 to 40 feet, however with the exception of the Delta, they generally lie above the saturated zone.

Older alluvium consists of loose to moderately compacted silt, silty clay, sand, and gravel deposited in alluvial fans during the Pliocene and Pleistocene. Thickness of the unit ranges from 60 to 130 feet, about one-quarter of which is coarse sand and gravel generally found as lenses within finer sands, silts, and clays. Permeability of the older alluvium is highly variable. Wells penetrating sand and gravel lenses of the unit produce between 300 and 1000 gpm. Adjacent to the Sacramento River, wells completed in ancestral Sacramento River stream channel deposits yield up to 4000 gpm. Wells completed in the finer-grained portions of the older alluvium produce between 50 and 150 gpm.

The Tehama Formation is the thickest water-bearing unit underlying the Solano subbasin, ranging in thickness from 1500 to 2500 feet. Surface exposures of the Tehama Formation are limited mainly to the English Hills along the western margin of the basin. It consists of moderately compacted silt, clay, and silty fine sand enclosing lenses of sand and gravel, silt and gravel, and cemented conglomerate. Permeability of the Tehama Formation is variable, but generally less than the overlying younger units. Because of its relatively greater thickness, however, wells completed in the Tehama can yield up to several thousand gpm.

Underlying the Tehama Formation are brackish to saline water-bearing sedimentary units including the somewhat brackish sedimentary rocks of volcanic origin (Pliocene to Oligocene?) underlain by undifferentiated marine sedimentary rocks (Oligocene? to Paleocene). These units are typically of low permeability and contain connate water. The upper contact of these units generally coincides with the fresh/saline water boundary at depths as shallow as a few hundred feet near the Coast Range on the west to nearly 3000 feet near the eastern margin of the basin (Berkstresser and others 1973).

### ***Groundwater Level Trends***

Groundwater levels were measured at what we now consider to be natural, predevelopment levels in 1912 by the USGS. At that time the general direction of groundwater flow in this subbasin was from northwest to southeast. From 1912 to 1932, below-average precipitation resulted in lower groundwater levels throughout the basin. Due to above-average precipitation from 1932 and 1941 groundwater levels recovered slightly in spite of increased groundwater development. After 1941, groundwater levels continued to decline due to increasing agricultural and urban development, reaching their lowest historical levels in the late 1950s. A large pumping depression between Davis and Dixon was one of the more notable groundwater level depressions in the subbasin. Surface water deliveries from the Solano Project beginning in 1959 caused groundwater levels to rise slightly or slow their descent. Since this time, groundwater level trends within the Solano subbasin have been impacted by drought periods in the mid-1970s and late-1980s but have recovered quickly in the following "wet" years. (This discussion is taken largely from California Department of Water Resources, 1994.)

### ***Groundwater Storage***

**Groundwater Storage Capacity.** To date, there has been no groundwater storage calculation for the Solano subbasin as it is described by Bulletin 118. The USGS, however, has determined specific yield averages and groundwater storage calculations for some areas within and around the Solano subbasin (Thomasson and others 1960).

**Groundwater in Storage.** (see above)

### ***Groundwater Budget (Type C)***

Currently no groundwater budget has been calculated for the Solano Subbasin.

### ***Groundwater Quality***

**Characterization.** This discussion of groundwater quality is based on USGS Water Supply Investigation Report 84-4244 (Evenson, 1985) except where noted.

Groundwater within the Solano subbasin is considered to be of generally good quality, and useable for both domestic and agricultural purposes. Chemical water types within the basin are variable and classified generally as magnesium bicarbonate in the central and northern areas, sodium bicarbonate in the southern and eastern areas, and calcium magnesium or magnesium calcium bicarbonate around and west of Dixon. Total dissolved solids (TDS) range from between 250 and 500 ppm in the northwest and eastern portion of the basin and are found at levels higher than 500 ppm in the central and southern areas. (Evaluation of data from the Department of Health Services (Department of Health Services, 2000) shows the TDS minimum = 150 ppm, maximum = 880 ppm, average = 427 ppm). In general, most of the water within the subbasin is classified as hard to very hard (see below).

Chloride concentrations are found over 100 ppm in the southern areas, while sulfate concentration is greater than 50 ppm in the southern areas. The maximum contaminant level (MCL) for both chloride and sulfate is 600 ppm.) Boron concentrations are less than 0.75 ppm except in the southern and southeastern basin where concentrations average between 0.75 and 2.0 ppm (more than 1.0 ppm will affect sensitive tree crops).

Iron concentrations increase toward the eastern side of the subbasin, from less than 0.02 ppm to greater than 0.05 ppm (MCL = 0.3 ppm) along the Sacramento River, while manganese concentrations also increase from west to east with concentrations from .01 ppm to over 0.1 ppm (MCL = 0.050 ppm) found north of Rio Vista and east of the Solano-Yolo County line.

**Impairments.** Overall hardness (as CaCO<sub>3</sub>) is generally greater than 180 ppm. Approximately one half of drinking water well samples taken between 1970 and 2000 analyzed for overall hardness measured above 200 ppm, but

rarely over 400 ppm (Department of Health Services 2000). High concentrations of bicarbonate which cause precipitation of Ca and Mg carbonates is found in the southern portion of the basin.

Arsenic concentrations are typically between 0.02 and 0.05 ppm, with the highest concentrations found along the southeastern margin of the basin. Although this is currently not considered problematic, there could be impacts if the MCL is lowered. The current MCL (as set by the EPA) for arsenic is 0.05 ppm. Also, manganese (a secondary constituent) is found at concentrations above the MCL of 0.05 ppm along the Sacramento River along the eastern portion of the subbasin.

### Water Quality in Public Supply Wells

Constituent Group <sup>1</sup>	Number of wells sampled <sup>2</sup>	Number of wells with a concentration above an MCL <sup>3</sup>
Inorganics – Primary	71	1
Radiological	41	0
Nitrates	96	8
Pesticides	56	3
VOCs and SVOCs	57	1
Inorganics – Secondary	71	17

<sup>1</sup> A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

### Well Characteristics

#### Well yields (gal/min)

Currently there is insufficient data to provide statistics on water well yields.

#### Total depths (ft) <sup>1</sup>

Domestic	Range: 38 to 1070 ft	Average: 239 ft
Municipal/Irrigation	Range: 62 to 2275 ft	Average: 510 ft

<sup>1</sup>Based on DWR well completion report data from 2001.

## Active Monitoring Data

Agency	Parameter	Number of wells / measurement frequency
DWR	Groundwater levels	35 semi-annually
Solano ID		7 monthly
USBR		2 monthly
DWR	Miscellaneous water quality	60 semi-annually
Department of Health Services and cooperators		12 monthly
	Title 22 water quality	23
		136

## Basin Management

Groundwater management:	City of Vacaville adopted AB3030 plan in 2/95 Maine Prairie Water District adopted AB3030 plan in 1/97 Reclamation District #2068 adopted AB3030 plan in 1/97 Solano Irrigation District adopted AB3030 plan in 2/95
Water agencies	
Public	City of Dixon City of Rio Vista California Water Service City of Vacaville
Private	University of California, Davis Maine Prairie Water District Solano Irrigation District Solano County Water Agency North Delta Water Agency Reclamation District #501 Reclamation District #536 Reclamation District #1607 Reclamation District #1667 Reclamation District #2060 Reclamation District #2068 Reclamation District #2084 Reclamation District #2093 Reclamation District #2098 Reclamation District #2104 Reclamation District #2112

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## Errata

Changes made to the basin description will be noted here.