Fair Oaks Water District

FAIR OAKS
WATER DISTRICT

2010 USBR Water Management Plan

September 2009

J. CROWLEY GROUP
WATER RESOURCES PLANNING AND ENGINEERING

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Section 1: Description of the District

District Name: Fair Oaks Water District
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A. History

In 1917 the voters of Fair Oaks created a tax district and elected three directors to establish the Fair Oaks Irrigation District. The district purchased water from the North Fork Ditch Company to irrigate about 4,000 acres growing a wide variety of fruits, nuts, and vegetables. The District issued a bond in 1918 to purchase its water distribution system and drilled its first groundwater well in 1919. The Folsom Dam on the American River was completed in 1954 and the North Fork Ditch Company's water rights were transferred to the newly created San Juan Suburban Water District, which is now called San Juan Water District. By 1979, nearly all of the significant agricultural land in the district had been replaced with low-density residential development. In response, the board of directors passed a resolution declaring the term "irrigation district" no longer described the actual functions performed by the district and that it would be best described as the Fair Oaks Water District.

1. Date District formed and original size

Provide date district formed: *March 26, 1917*
Date of first Reclamation contract*: 14-06-200-152A, 6-07-20-W1373 (San Juan Water District)*
Original size (acres)*: 3,500*
Current year (last completed calendar year)*: 2008*

2. Current size, population, and irrigated acres

Size (square miles)	9.5
Population served	40,000
Irrigated acres	0

3. Water supplies received in current year

Water Source	2008, AFY
Federal urban water	10,534
Federal agricultural water	0
State water	0
Local/other	0
Local surface water	0
Upslope drain water	0
District ground water	2,224
Transferred water	0
Reclaimed water	0
Other (define)	0
Total	12,758

4. Annual entitlement under each right and/or contract

	AF	Source	Contract #	Contract Restrictions
Urban AF/Year (AF/Y)	24,200	USBR contract with SJWD	6-07-20-W1373 LTR 1 (San Juan contract with USBR)	25 percent reduction during drought. Voluntary reductions according to American River flows and other participating water agency reductions per the Water Forum Agreement.
	33,000	SJWD water right	DA-04-167-E610	75 cfs, 149 AF/day. Voluntary reductions according to American River flows and other participating water agency reductions per the Water Forum Agreement.
Agriculture AF/Y	None			
Other AF/Y	None			

FOWD contracts with SJWD for treated surface water and augments with its own groundwater as necessary. FOWD uses a five-year running average of 14,000 acre-feet for surface water demand planning purposes.

5. Anticipated land-use changes

The majority of the District's service area is zoned residential. Review of the Sacramento

County General Plan indicates there are no significant changes to the zoning or land use designation within the District's boundary.

6. Cropping patterns

There are no significant agriculture users in the District's service area.

7. Major irrigation methods (by acreage)

There are no significant agriculture users in the District's service area.

B. Location and Facilities

See Attachment A for a map of the District facility locations.

1. Incoming flow locations and measurement methods

Location Name	Physical Location	Type of Measurement Devise	Accuracy
Pershing	Pershing at Main	Magnetic meter	99%
Twin Lakes	Main at Twin Lakes	Magnetic meter	99%
Filbert	Filbert at Pershing	Magnetic meter	99%

2. Current Year Agricultural Conveyance System

Not applicable.

3. Current Year Urban Distribution System

The District contains over 170 miles of transmission pipelines ranging in size from 8 to 30 inches in diameter. The pipe type breakdown is listed in the table below.

Miles AC Pipe	Miles Steel Pipe	Miles Cast Iron Pipe	Miles - Other
125	25	10	10 (PVC)

4. Storage facilities (tanks, reservoirs, regulating reservoirs)

Name	Type	Capacity	Distribution or Spill
Skyway	welded steel	3.0 million gallons	distribution

5. Outflow locations and measurement methods (Agricultural only)

Not applicable.

6. Description of agricultural spill recovery system

Not applicable.

7. Agricultural delivery system operation

Not applicable.

8. Restrictions on water source(s)

Restriction	Cause of Restriction	Effect on District Operations
Dry Years – maximum surface water available is 12,600 acre-feet (a 10 percent reduction)	Surface water dry year restrictions through Sacramento Water Forum Agreement as a member of the San Juan Family	FOWD will increase groundwater pumping and implement conservation measures to meet water demands during supply restrictions.
Driest Years - maximum surface water available is 11,200 acre-feet (a 20 percent reduction)	Surface water dry year restrictions through Sacramento Water Forum Agreement as a member of the San Juan Family	FOWD will increase groundwater pumping and implement conservation measures to meet water demands during supply restrictions.

FOWD contracts with SJWD for treated surface water and augments with its own groundwater as necessary. FOWD uses a five-year running average of 14,000 acre-feet for surface water demand planning purposes.

9. Proposed changes or additions to facilities and operations for the next 5 years

FOWD updated its master plan in 2006. The plan developed future demand and supply requirements and analyzed existing infrastructure capacities and requirements. As the District recently completed two new wells, there are no major water supply or transmission main project outlined for the next five years.

The 2006 Master plan outlined extensive distribution mains replacement program. The program has identified approximately 37,000 linear feet of main to be replaced due to condition, age, or operation strategy.

C. Topography and Soils

1. Topography of the district and its impacts on water operations and management

The terrain is slightly hilly with drainage creeks and streams in each valley. The area slopes northeast to southwest, with drainage discharging into the American River on the south side of the District boundary or into tributary creeks at the District's south and west boundaries. The District's utilizes this topography in its distribution system layout and has created three pressure zones to minimize energy costs and maintain constant pressures.

2. District soil associations map (Agricultural only)

Not applicable.

3. Agricultural limitations resulting from soil problems (Agricultural only)

Not applicable.

D. Climate

1. General climate of the district service area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg Precip. (in.)	4.4	3.8	3.9	1.9	0.6	0.2	0.1	0.1	0.5	1.5	3.4	3.5	23.9
Avg Temp. (F)	46	51	54	59	65	72	77	76	73	66	54	47	62
Max. Temp. (F)	73	78	86	94	106	112	115	114	108	102	86	74	115
Min. Temp. (F)	17	19	26	30	35	43	50	45	46	32	26	16	16

Weather Station ID: Western Regional Climate Center, Folsom Dam (043113)
Date Period: Year 1955 to Year 1993
Average wind velocity: Not available as climate data. During wet season, wind generally moves from southwest to northeast. In the dry season, wind generally moves from west to east.

Average annual frost-free days: 352.

2. Impact of any microclimates on water management within the service area

There are no micro climates within the District service area.

E. Natural and Cultural Resources

1. Natural resources area within the service area

There are no natural resources within the District's service area.

2. Description of district management of these resources in the past or present

The District does not provide water to any natural resource areas.

3. *Recreational and/or cultural resources areas within the service area*

Not applicable.

F. Operating Rules and Regulations

1. Operating rules and regulations

Not applicable, no agriculture.

2. Water allocation policy

Not applicable.

3. Official and actual lead times necessary for water orders and shut-off

Not applicable.

4. Policies regarding return flows (surface and subsurface drainage from farms) and outflow

Not applicable.

5. Policies on water transfers by the district and its customers

The district does not transfer water and therefore has no standard transfer policies.

G. Water Measurement, Pricing, and Billing

1. Agricultural Customers

Not applicable.

2. *Urban Customers*

a. Total number of connections: 14,474

b. Total number of metered connections: 11,153

c. Total number of connections not billed by quantity: 13,535

d. Percentage of water that was measured at delivery point: 17 percent

e. Percentage of delivered water that was billed by quantity: 17 percent

f. Measurement device table

The meter conversion program at FOWD is ongoing. Part of the program includes converting to a new billing system that will be used to populate the database for a calibration and maintenance program. Meters are read bimonthly. The following table lists the accounts with meters installed. Meters are installed on over 75 percent of FOWD's customer connections, but most are not yet read. FOWD is currently in a partnership with USBR Water Conservation Field Services Program for implementing a large meter testing and maintenance program. The program will establish a regular testing and maintenance schedule for all large meters with consideration for the testing interval given to the size of the meter, the volume of water that passes through the meter, meter accuracy trends as compared to industry standards, and age of meter. FOWD will institute a meter maintenance program for its small diameter meters once the meter installation program is complete. The maintenance program will include an in-house meter shop and will initially pull meters for calibration and maintenance every 4-6 years. The maintenance frequency will be adjusted based on initial results.

Meter Size and Type	Number	Accuracy (+/-percentage)	Reading Frequency (Days)	Calibration Frequency (Months)	Maintenance Frequency (Months)
5/8-3/4"	0	N/A	N/A	N/A	N/A
1"	10,162	Data not available	60	FOWD will implement a maintenance program upon completion of the meter installation program. Maintenance frequency will initially be 4-6 years.	
1 ½"	594	Data not available	60		
2"	334	Data not available	60		
3"	6	Data not available	60		
4"	22	Data not available	60	FOWD is currently in a partnership with USBR Water Conservation Field Services Program for implementing a large meter testing and maintenance program.	
6"	9	Data not available	60		
8"	4	Data not available	60		
10"	2	Data not available	60		
Compound	20	Data not available	60		

3. Agriculture and Urban Customers

a. Current year agricultural and/or urban water charges – including rate structure and billing frequency

FOWD's rate structure is divided into metered and non-metered accounts. Metered accounts are based on a uniform usage rate plus a base service charge. The base service charge is based on meter size.

The non-metered rates are based on lot size. Added to the base rates are additional premiums for larger lots over one acre, second dwelling units, shared meter service, duplexes, and condominiums. Additional rates are developed for home owners associations that irrigate common areas. Rates are based on lot sizes less than 1 acre, between 1-2 acres, and larger than two acres. The rate structure is provided in Attachment B. A sample customer bill is provided in Attachment C.

b. Annual charges collected from customers

The existing accounting system does not track metered and non-metered revenue by customer category. The following table presents the units billed and the total revenue for each type of charge.

Non Metered Fixed Charges			
Charges	Annual Unit Rate	2008 Units billed	2008 $ Collected
Residential			
Single Family up to 0.5 Acres	$520.00	10,437	--
Single Family 0.51-1 Acre	$605.00	1,411	--
Additional Premium Lot Fee over 1 acre base per acre	$438.00	216	--
Second dwelling unit	$399.00	69	--
Duplex	$524.00	304	--
Condominium	$416.00	1,096	--
Commercial			--
Shared Meter Service	$392.00	0	--
Common Area up to 1 Acre	$391.00 plus $438.00 per acre	1	--
Common Area 1-2 Acres	$716.00 plus $438.00 per acre	1	--
Common Area over 2 acres	$1,106.00 plus $438.00 per acre	0	--
Total:		**13,535**	**7,008,818**

Metered Fixed Charges			
Charges	Bi-Monthly Unit Rate	2008 Units billed	2008 $ Collected
1-inch meter	$65.10	383	--
1.5-inch meter	$119.31	185	--
2-inch meter	$184.28	328	--
3-inch meter	$357.56	6	--
4-inch meter	$552.61	22	--
5-inch meter	$876.77	0	--
6-inch meter	$1.093.84	9	--
8-inch meter	$1.744.82	4	--
10-inch meter	$2,2718.87	2	--
Total:		**939**	**$718,102**

Volumetric Charges			
Charges	Charge units	2008 Units billed	2008 $ Collected
CCF	$0.33/CCF	927,319	$271,412

c. Water-use data accounting procedures

Water use records are only kept for the customers on meters. As the meter installation program is implemented, all users will eventually be metered with water use data recorded. Water use data for metered customers is maintained in the billing system database. Currently, all data history is archived daily on tapes stored on site, and quarterly moved to off-site storage. As the new billing system is implemented, data archival will be addressed. Each metered customer's bill lists the meter values and water use for the current billing cycle, as shown on the attached sample bill in Attachment C. Metered customers may access their usage history by calling FOWD for a complete listing.

H. Water Shortage Allocation Policies

1. Current year water shortage policies

FOWD has established a five level water shortage contingency plan. Each level is assigned usage goals with established supply conditions that trigger implementation. Use monitoring procedures and frequency are identified for each level to help the District ensure the reduction goals are met. The contingency plan also identifies and prioritizes water uses to support water shortage use policies. The Water Shortage Contingency Plan is presented in Attachment D.

2. Current year policies that address wasteful use of water

As part of the California Urban Water Conservation Council's 16 best management practices, FOWD has implemented, among others, BMP 13, Water Waste Prohibition and Enforcement. FOWD's water waste prohibition measures include three seasonal employees to patrol and report violations. The wasteful use of water enforcement policy is presented in Attachment D.

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 contractor's sources

See Water Inventory Table 1 at end of section.

2. Amount of water delivered to the district by each of the district sources for the last 10 years

See Water Inventory Table 8 at end of section.

B. Ground Water Supply

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

See Water Inventory Table 2 at end of section.

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

The groundwater basin underlying the District is the North American Subbasin, part of the larger Sacramento Valley groundwater basin. Water bearing formations beneath the District occur in two major strata. The upper water-bearing units include the geologic formations of the Victor, Fair Oaks, and Laguna Formations and are typically unconfined. The lower water-bearing unit consists primarily of the Mehrten Formation, which exhibits confined conditions. The Mehrten Formation is the most productive fresh water-bearing unit in the eastern Sacramento Valley, though some of the permeable layers of the Fair Oaks Formation produce moderate amounts of water. Supply wells in the District draw water primarily from the Mehrten and Fair Oaks formations and typically produce 500-1,500 gpm of good to excellent quality water. Much of the recharge of these aquifer systems comes from the Sacramento and American Rivers and their tributaries where gravel deposits exist. To a lesser extent, aquifer recharge also occurs where the Merhten Formations reaches the surface in the foothills in eastern Sacramento and western El Dorado County. Groundwater levels have been generally declining in Sacramento County for the last 50 years, with many areas declining at a rate of 1.5 to 2.0 feet per year. A groundwater depression that was evident in 1968 significantly expanded and deepened in 1996.

The following table presents data on the District's groundwater basin. Total usable capacity and safe yield have not yet been determined. Such studies are expected to be conducted by the Sacramento Groundwater Authority over the coming years. Usable capacity is assumed to be the yield calculated in the Department of Water Resources' American Basin Conjunctive Use Project Feasibility Study (1997). The study assumed a specific yield of 7 percent and an assumed thickness of 200 feet. Applying these assumptions to the total basin area results in a usable capacity of 70.2 million acre/ft.

Name	Size (Square Mile)	Usable Capacity (AF)	Safe Yield (AF/Y)
Sacramento Valley, North American Subbasin (5-21.64)	548	70,200,00	To be determined.

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

The District has seven wells that are primarily located in the southwestern portion of the system. The wells serve to provide short-term pressure or supply needs, but are not operated on a regular basis during normal precipitation years. The District's facilities are shown in Attachment A. The District does not maintain any groundwater recharge areas.

4. Description of conjunctive use of surface and ground water

The District utilizes a conjunctive use water management strategy dependent on their available supply as defined in the Water Forum Agreement. Historically, the District has always been able to meet all of its water supply needs from surface water. The wells have been used as backup to meet localized peak supply and pressure needs. If the District's supply requirements cannot be met by surface supply, the District plans to use groundwater to make up the difference.

5. Ground water management plan

The Sacramento Groundwater Authority is the lead agency for the groundwater management plan. The title page is provided in Attachment F. The full document is available online at www.sgah2o.org.

6. Ground water banking plan

The District does not participate in a groundwater banking program.

C. Other Water Supplies

1. "Other" water used used as part of the water supply

There are no "Other" sources for water as identified in Water Inventory Table 1 at the end of this section.

D. Source Water Quality Monitoring Practices

1. Potable water quality

There are three significant quality impairment areas with contamination issues affecting the groundwater basin: McClellen AFB, United Pacific Railroad, and Aerojet Superfund Site. The first two sites are down gradient from the District's area and are not expected to impact

groundwater quality within the District's wells. The third site, Aerojet, is south of the District's area and on the other side of the American River. However, a recent study (Montgomery 2000) indicates a contaminant plume (including TCE and PCE) extends under the American River and into the North American subbasin near Hazel Avenue. Monitoring wells on the south side of the District have shown contamination with TCE. FOWD and Aerojet Corporation are currently working towards a solution.

There are no known water quality issues with the surface water. The 2008 Annual Water Quality Report is presented in Attachment G.

2. Agricultural contractors concerns

Not applicable.

3. Description of the agricultural water quality testing program adnt he role of each participant, including the district, in the program

Not applicable.

4. Current water quality monitoring programs for surface water by source (Agricultural only)

Not applicable.

E. Water Uses Within the District

1. Agricultural

Not applicable.

2. Types of irrigation systems for each crop in current year

Not applicable.

3. Urban use by type in current year

Customer Type	Number of Connections	Year 2008 Use (AF)
Single-family	13,664	9,553
Multi-family	267	533
Commercial	417	1,100
Industrial	0	0
Institutional	28	222
Landscape irrigation	98	172
Wholesale	N/A	N/A
Reclaimed	0	0
Other (specify)	0	0
Unaccounted for	--	1,159
Total	14,474	12,759

Use per customer category is estimated until meter retrofit program is complete.

4. Urban wastewater collection/treatment systems serving the service area

All of the wastewater generated in the District is collected and treated at the Sacramento Regional Wastewater Treatment Plant (SRWTP).

Treatment Plant	Treatment Level (1, 2, 3)	2008 (AF)	Disposal to
SRWTP	2	147,860	Sacramento River
SRWTP	3	1,052	Reuse outside of FOWD service area
	Total	148,912	
Total discharged to ocean and or saline sink		0	

Information from http://www.srcsd.com/fastfacts.php

5. Ground-water recharge/management in current year

There is no formal ground water recharge/management/banking other than non-monitored natural recharge.

6. Transfers and exchanges into or out of the service area

From Whom	To Whom	Year	(AF)	Use
San Juan Water District	Fair Oaks Water District	2008	10,534	Retail

7. Trades, wheeling, wet/dry year exchanges or other transactions

None.

8. Other uses of water

None.

F. Outflow from the District (Agricultural only)

Not applicable.

G. Water Accounting (Inventory)

See Water Supply Tables at end of section for all required information.

1. Water Supplies Quantified

See Water Supply Tables at end of section for all required information.

2. Water Used Quantified

See Water Supply Tables at end of section for all required information.

3. Overall Water Inventory

See Water Supply Tables at end of section for all required information. FOWD is currently not able to calculate how much water is actually delivered to the customer side of the connection due to incomplete metering coverage. Therefore, the water inventory calculation in Table 6 is an estimate. FOWD's ongoing meter implementation program will be complete in 2011 and should provide a more complete inventory calculation as meter coverage increases. FOWD is implementing thirteen of the fourteen BMPs in the meantime to improve conservation efforts, as described in Section 4.

H. Assess Quantifiable Objectives

There are no quantifiable objectives identified for FOWD in the CALFED Water Use Efficiency Program goals.

Year of Data 2008 Enter data year here

Table 1

Surface Water Supply

2008 Month	Federal Urban Water (acre-feet)	Federal Agric. Water (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Other Water (define) (acre-feet)	Total (acre-feet)
January	386	0	0	0	0	386
February	327	0	0	0	0	327
March	521	0	0	0	0	521
April	788	0	0	0	0	788
May	1,035	0	0	0	0	1,035
June	1,213	0	0	0	0	1,213
July	1,325	0	0	0	0	1,325
August	1,688	0	0	0	0	1,688
September	1,274	0	0	0	0	1,274
October	994	0	0	0	0	994
November	525	0	0	0	0	525
December	459	0	0	0	0	459
TOTAL	10,534	0	0	0	0	10,534

Table 2

Ground Water Supply

2008 Month	District groundwtr (acre-feet)	Private groundwater (acre-feet)
January	47	
February	57	
March	126	
April	208	
May	360	
June	361	
July	457	
August	285	
September	204	
October	61	
November	17	
December	40	
TOTAL	2,225	0

*normally estimated

Table 3

Total Water Supply

2008 Month	Surface Water Supply (acre-feet)	District Groundwater (acre-feet)	Recycled M&I Wastewater (acre-feet)	Total District Water Supply (acre-feet)
January	386	47	0	434
February	327	57	0	384
March	521	126	0	647
April	788	208	0	996
May	1,035	360	0	1,395
June	1,213	361	0	1,575
July	1,325	457	0	1,782
August	1,688	285	0	1,973
September	1,274	204	0	1,477
October	994	61	0	1,055
November	525	17	0	542
December	459	40	0	499
TOTAL	10,534	2,225	0	12,759

Recycled wastewater is treated urban wastewater that is reused

Table 4

Distribution System

2008 Area or Line	Length (feet)	Leaks (acre-feet)	Breaks (acre-feet)	Flushing/Fire (acre-feet)	Total (acre-feet)
Service breaks/leaks (26)	n/a	0	1	0	1
					0
Main breaks/leaks (17)	n/a	0	13	0	13
					0
Hydrants (20 tests)	n/a	0	0	3	3
					0
Flushing (100 events)	n/a	0	0	10	10
					0
					0
					0
					0
TOTAL	0	0	14	13	27

Table 6

2008 District Water Inventory

Water Supply	Table 3		12,759
Environmental Consumptive Use		minus	0
Groundwater Recharge	(Perc ponds & recharge wells)	minus	0
Water Exchanges or Transfers	(into or out of the district)	minus / plus	0
Flushing / Fire	Table 4b	minus	13
Distribution System Leaks & Breaks	Table 4b	minus	14
Non-Urban (Agricultural) Deliveries	<2,000 AF	minus	0
	Water Supply Available for Sale		12,732
2008			
Actual M&I Water Sales		**From District Records**	**12,759**
Inside Use	Feb use x 12	minus	4,612
Landscape / Outside Use	(calculated)		8,147

Table 8

Annual Water Quantities Delivered Under Each Right or Contract

Year	Federal Urban Water (acre-feet)	Federal Agric. Water (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Other Water (define) (acre-feet)	Total (acre-feet)
1999	14,235	0	0	0	0	14,235
2000	14,407	0	0	0	0	14,407
2001	15,040	0	0	0	0	15,040
2002	11,455	0	0	0	0	11,455
2003	12,333	0	0	0	0	12,333
2004	13,629	0	0	0	0	13,629
2005	12,282	0	0	0	0	12,282
2006	11,178	0	0	0	0	11,178
2007	11,532	0	0	0	0	11,532
2008	10,534	0	0	0	0	10,534
Total	126,625	0	0	0	0	126,625
Average	12,662	0	0	0	0	12,662