Tulare Irrigation District
Water Management Plan
2010

December 2010

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Section 1: Description of the District

District Name: *Tulare Irrigation District*

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A. History

The Tulare Irrigation District (District) was organized on September 21, 1889 for the purpose of managing, supplying and delivering water to growers in the Tulare area. The original proposal for the formation of the irrigation district covered 219,000 acres, extending from the Sierra Nevada foothills to Tulare Lake. The District was eventually reduced to 32,500 acres upon establishment of the District. The District continued in this status until January 1948 when the so-called "Kaweah Lands" (approximately 11,000 acres) were annexed. In October of 1948, approximately 31,000 acres, compromising the area served by the Packwood Canal Company were also annexed into the District.Today the District is approximately 68,000 acres in size and serves approximately 200 irrigation customers.

A U.S. Bureau of Reclamation contract was signed in 1950 providing an annual supply of 30,000 acre-feet of Class 1 water, and up to 141,000 acre-feet of Class 2 water from the Friant-Kern Canal.

After the annexations of the "Kaweah" and "Packwood" lands and the commencement of the diversion of the Central Valley Project water, the District proceeded with extensive improvements to the existing canal system, and the extension of the canal system to serve annexed areas. This work consisted of enlarging and/or relocating canals, constructing diversion structures, road crossings, checkgates, siphons, installing pipelines, etc. The majority of this work occurred between 1951 and 1964.

Since the completion of Terminus Dam in 1962, Kaweah River water rights owners have benefited by the regulation of the natural river flows – temporary storage of flood waters, uniform downstream releases, and options on the time and quantity of irrigation diversions.

The Kaweah Delta Water Conservation District (KDWCD) and the Tulare Irrigation District (TID) formed a joint-power authority in 1982 – the Kaweah River Power Authority (KRPA). The KRPA filed for a license to construct a 17MW hydroelectric plant at Terminus Dam and Lake Kaweah. KRPA proceeded with design and construction of the plant, and the plant went on-line in 1992 delivering power to Southern California Edison Company.

The District and KDWCD also have coordinated efforts to enhance the recharge of groundwater within the Kaweah Basin. During high flow times KDWCD may use the recharge basins within the District for recharge purposes. Further, KDWCD has historically provided for a financial incentive program through which the District sustains the level of groundwater recharge occurring within the Main Intake Canal, the primary artery delivering water from supply sources into the District. This

historical program was recently reinstated by both districts in lieu of the District's plans to concrete-line this canal to conserve the surface water.

The Tulare Irrigation District is a political subdivision of the State of California – an independent agency operating under the California Water Code. It is governed by a 5-member Board of Directors.

1. Date district formed: 1889 *Date of first Reclamation contract*: October 18, 1950
Original size (acres): 72,000 *Current year (last complete calendar year)*: 2010

2. Current size, population, and irrigated acres

	2010
Size (acres)	67,202
Population served	0
Irrigated acres	58,946

3. Water supplies received in current year

Water Source	*AF*
Federal urban water (Tbl 1)	0
Federal agricultural water (Tbl 1)	81,950
State water (Tbl 1)	0
Other Wholesaler (define) (Tbl 1)	0
Local surface water (Tbl 1)	162,115
Upslope drain water (Tbl 1)	0
District ground water (Tbl 2)	0
Banked water (Tbl 1)	0
Transferred water (Tbl 6)	30,072
Recycled water (Tbl 3)	0
Other (define) (Tbl 1)	0
Total	274,137

4. Annual entitlement under each right and/or contract

Agriculture AF/Y	*AF*	*Source*	*Contract #*	*Availability period(s)*
Reclamation Ag. Class I	30,000	San Joaquin River	175r-2485-LTR1	March 1st – February 28th
Reclamation Ag. Class II	141,000	San Joaquin River	175r-2485-LTR1	March 1st – February 28th
Local - Average Amount	83,000	Kaweah River		January - December

5. *Anticipated land-use changes*

The District surrounds but does not contain the City of Tulare. Growth of the City of Tulare has accounted for exclusions of land from the District due to conversion of farmland to developed City land. The District and the city of Tulare have an agreement that requires the city to pay District tax assessments on any land removed from the District by the City. As the City of Tulare continues to grow into the District, these areas will convert from agriculture to development, and will not be served by the District. The District has recently annexed two parcels of land into the District. This process has been handled through the Tulare County Local Agency Formation Commission and is being approved by the Bureau. The District is also working on a new annexation

6. *Cropping patterns (Agricultural only)*

List of current crops (crops with 5% or less of total acreage) can be combined in the 'Other' category.

Original Plan 1993		*Previous Plan 2002*		*Current Plan 2010*	
Crop Name	*Acres*	*Crop Name*	*Acres*	*Crop Name*	*Acres*
Cotton	27,176	Field Corn	20,936	Field Corn	22,486
Field Corn	14,001	Alfalfa	16,696	Alfalfa	15,346
Alfalfa	11,720	Cotton	15,162	Wheat	18,945
Wheat	4,209	Wheat	11,752	Cotton	7,042
Barley	3,324	Walnuts	2,871	Pistachios	4,667
Grapes	1,766	Pistachios	2,149	Walnuts	3,038
Walnuts	1,392	Grapes	1,134	Almonds	1,107
Other Grasses	1,050	Plums	555	Field Peas	1494
Other (<5%)	2,044	*Other (<5%)*	1,621	*Other (<5%)*	1,805
Total	66,682	*Total*	72,876	*Total*	75,930

(See Planner, Chapter 2, Appendix A for list of crop names)

7. *Major irrigation methods (by acreage) (Agricultural only)*

Original Plan 1985		*Previous Plan 2002*		*Current Plan 2010*	
Irrigation Method	*Acres*	*Irrigation Method*	*Acres*	*Irrigation Method*	*Acres*
Level Basin	20,645	Level Basin	32,116	Level Basin	34,613
Furrow	45,737	Furrow	37,992	Furrow	36,719
Low Volume-Est..	300	Low Volume Drip	2,597	Low Volume Drip	3,773
		Sprinkler	171	Sprinkler	825
Other		*Other*		*Other*	
Total	66,682	*Total*	72,876	*Total*	75,930

(See Planner, Chapter 2, Appendix A for list of irrigation system types)

B. Location and Facilities

See Attachment A for points of delivery, turnouts (internal flow), and outflow (spill) points, measurement locations, conveyance system, storage facilities, operational loss recovery system, wells, and water quality monitoring locations

1. Incoming flow locations and measurement methods

Location Name	*Physical Location*	*Type of Measurement Device*	*Accuracy*
Main Canal/North Branch Split	SE ¼ of Sec. 17, T 19S, R 25E	Parshall Flume	+/- 6%
Cameron Creek @ Mooney's	NW ¼ of Sec. 18 T 19S R 25E	Parshall Flume	+/- 6%
Packwood Creek below Tagus	NW ¼ of Sec. 15 T 19S R 24E	Lined Section	+/- 6%
Evans Ditch	NE ¼ of Sec. 13 T 19 S R 23E	Parshall Flume	+/- 6%

2. Current year Agricultural Conveyance System

Miles Unlined - Canal	*Miles Lined - Canal*	*Miles Piped*	*Miles - Other*
300 +/-	1/4	30 +/-	

3 Current year Urban Distribution System

Miles AC Pipe	*Miles Steel Pipe*	*Miles Cast Iron Pipe*	*Miles - Other*
N/A			

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

Name	*Type*	*Capacity (AF)*	*Distribution or Spill*
Abercrombie	G.W. Recharge/regulate	80	Distribution
Anderson	G.W. Recharge/regulate	680	Distribution
Creamline	G.W. Recharge/regulate	535	Distribution
Doris	G.W. Recharge/regulate	60	Distribution
Enterprise	G.W. Recharge/regulate	100	Distribution
Guinn	G.W. Recharge/regulate	675	Distribution
Tagus	G.W. Recharge/regulate	800	Distribution
Watte	G.W. Recharge/regulate	90	Distribution
K.D.W.C.D. # 3	G.W. Recharge/regulate	640	Distribution
K.D.W.C.D. # 6	G.W. Recharge/regulate	665	Distribution
K.D.W.C.D. # 8	G.W. Recharge/regulate	480	Distribution

5. Outflow locations and measurement methods (Agricultural only)
Provide this information in Section 2 F.

Please see Section 2 F and the District Map included in Attachment A.

6. *Description of the agricultural spill recovery system*

The District does not have an agricultural spill recovery system in place. The District utilizes terminal spill basins and an extensive Supervisory Control and Data Acquisition (SCADA) system to monitory and control the network of canals. These features allow the system to maintain a balance that reduces the amount of water that is spilled outside of the District.

7. *Agricultural delivery system operation (check all that apply)*

On-demand	*Scheduled*	*Rotation*	*Other (describe)*
	X		

District deliveries are on Modified Demand system and only available when the District makes water available. The customer does request a start time, but the District requires 24-hour notice to make deliveries and canal capacities. The District typically makes water available for a spring pre-irrigation during the month of February, and summer irrigation during the months of June through August. These deliveries are dependent on the Districts water supply.

8. *Restrictions on water source(s)*

Source	*Restriction*	*Cause of Restriction*	*Effect on Operations*
US Law	USBR Water	CVPIA PL 102-575	Loss of Water Supply
US Law	USBR Water	San Joaquin River Restoration	Future Loss of Water Supply

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

The District proposes the following facilities and operations improvements:

- **Increase groundwater sinking basin and regulation basin acres (approximately 165 acres).**
- **Increase amount of automated and remote sensing sites within the distribution system (SCADA).**
- **Upgrade distribution system checks and measurement devices as required.**

C. Topography and Soils

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

   The District is located on the eastern side of Tulare County and is generally characterized as having fairly flat sloping land. The District generally slopes from northeast to southwest at an average of 6.2 feet per mile. The topography of the District has not had an impact of water operations or water management.

2. *District soil association map (Agricultural only)*
   See Attachment B, District Soils Map

   A NRCS soil classification maps is provided as Attachment B. Soils in the District are primarily a loam and sandy loam, which are compatible with the crops grown within the District. There are no known soil quality problems.

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

Soil Problem	*Estimated Acres*	*Effect on Water Operations and Management*
Salinity		
High-water table		
High or low infiltration rates		
Other (define)		
Soil Problem	Estimated Acres	Effect on Water Operations and Management
Akers- Akers saline-sodic	11,300	No limit Akers. Leaching to maintain low saline-sodic levels for Akers saline-sodic.
Biggriz- Biggriz saline-sodic	29,000	No limitations on Biggriz, crop limitations on Biggriz saline sodic, leaching required.
Crosscreek- Kai	23,700	Duripan effects drainage rate, Kai soils require saline-sodic leaching.
Flamen loam	50	Duripan effects drainage rate.
Gambogy loam	400	Sodicity requires leaching to maintain low sodic levels.
Gambogy loam- Biggriz saline sodic	2,752	Salinity and sodic levels require leaching to keep levels down.

D. Climate

1. *General climate of the district service area*

The District is characterized has having hot and very dry summers, with relatively mild winters. Average annual precipitation is between 10 – 12 inches of rain. The estimated average daytime temperature in the summer months is approximately 95 degrees Fahrenheit the average winter temperature is about 40 degrees Fahrenheit. Frost-free days average 250 days per year in the District. Mean wind speed is less than 10 mph prevailing from the northwest. They are no known microclimates in the District.

With the long, hot summers that the District experiences there is a potential for approximately four feet of evaporation per year, with the majority occurring from April to October. Rainfall in the District primarily occurs during the winter with virtually no rainfall during the summer. Annual crop use per acre averages several times the amount of average precipitation that the District sees. As a result, agricultural crops grown within the District are heavily dependent upon irrigation from surface water deliveries and groundwater pumping, with water needs only partially satisfied by rainfall.

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Annual*
Avg Precip. (in)	1.69	1.51	1.50	.86	.35	.07	.01	.01	.17	.43	.87	1.32	8.80
Avg Temp.(F)	46.4	51.7	55.9	61.1	67.8	75.1	80.5	78.9	73.7	65.2	54.5	46.8	63.1
Max. Temp.(F)	55.9	62.6	68.1	74.7	82.6	91.2	97.6	96.3	90.1	80.2	67.3	56.8	77
Min. Temp(F)	36.9	40.8	43.7	47.5	53.0	59.0	63.4	61.5	57.2	50.1	41.6	36.7	49.3
ETo (in)	.94	1.74	3.39	5.02	6.34	7.3	7.48	6.57	5.18	3.61	1.93	.95	50.45

Weather station ID Tulare, CA/Visalia, CA *Data period: Year* 1876 *to Year* 2010

Average wind velocity < 10 mph *Average annual frost-free days:* 250

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

There are no known microclimates located within the District, primarily due to the flat topography of the area.

E. Natural and Cultural Resources

1. *Natural resource areas within the service area*

Name	*Estimated Acres*	*Description*
Open space	0	

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

   Open space is privately owned and there are no known resource areas.

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

   There are no Recreational or Cultural resources within the District. District land is predominantly privately held land used only for agriculture.

Name	*Estimated Acres*	*Description*
None		

F. Operating Rules and Regulations

1. *Operating rules and regulations*
   See Attachment C, District Rules and Regulations (water related)

   The Rules and Regulations Governing the Distribution of Water in the Tulare Irrigation District is included in Attachment C. Also included in Attachment C is the Tulare Irrigation District – Irrigation Operation Procedures.

2. *Water allocation policy (Agricultural only)*
   See Attachment C, Page 3
   Summary –

   In most years the District does not provide an allocation policy for the distribution of surface water. The request for water is taken on a first-come first-serve basis. As water users go off-line, new services are started. In instances there is not enough water to distribute equally to all users, the District will prorate the water based upon the water available, total District acreage, and the water users' eligible acreage within the canal system and the District.

3. *Official and actual lead times necessary for water orders and shut-off (Agricultural only)*
   See Attachment C, Page 3
   Summary -

   The District requires 24-hours notice prior to start time required by the water user. The same 24-hour notice is required prior to a shot off of irrigation supplies.

4. *Policies regarding return flows (surface and subsurface drainage from farms) and outflow (Agricultural only)*
   See Attachment C, Page xx
   Summary -

   The District does not have any return flows, therefore does not have any policies concerning return flows.

5. *Policies on water transfers by the district and its customers*
   See Attachment C, Page xx
   Summary -

   The District does not have any written policies concerning the transfer of water by the District. In the event of a transfer, the terms and conditions are negotiated between parties and reviewed with the District Board of Directors. All transfers of water are approved by the Board of Directors. The District does not have any customer transfers, due to the fact that the water user does not have any water rights.

G. Water Measurement, Pricing, and Billing

1. Agricultural Customers

a. Number of farms 188

b. Number of delivery points (turnouts and connections) 535

c. Number of delivery points serving more than one farm 4

d. Number of measured delivery points (meters and measurement devices) *535*

e. Percentage of delivered water that was measured at a delivery point 100%

f. Delivery point measurement device table (Agricultural only)

Measurement Type	*Number*	*Accuracy (+/- %)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
Orifices					
Propeller meter	55	3	Once a day	Every 2 to 5 yuears	Every 1 or 2 years
Weirs					
Flumes					
Venturi					
Metered gates	480	6%	1 -3 times a day	When requested	When needed / varies
Acoustic doppler					
Other (define)					
Total	535				

2. Urban Customers

a. *Total number of connections* 0

*b. Total number of metered connections*_____

c. Total number of connections not billed by quantity _____

d. Percentage of water that was measured at delivery point _____

e. Percentage of delivered water that was billed by quantity _____

f. Measurement device table

Meter Size and Type	*Number*	*Accuracy (+/-percentage)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
5/8-3/4"					
1"					
1 ½"					
2"					

3"					
4"					
6"					
8"					
10"					
Compound					
Turbo					
Other (define)					
Total					

3. Agriculture and Urban Customers

a. Current year agriculture and /or urban water charges - including rate structures and billing frequency
See Attachment C, Page XX, for current year rate ordinance

The District currently tracks the volumetric rate of water at each water user's turnout in units of acre-feet. The current charge for an acre-foot of water is $33.00 for peak demand irrigation deliveries. During winter months when the District is running recharge efforts, landowner have accessed irrigation water supplies at $25.00 per acre-foot. Each water user's monthly volumetric consumption of water is recorded in the District water accounting system and billed to each water user based on volumetric consumption at the turnout.

Annual charges collected from customers (current year data)

Fixed Charges			
Charges ($ unit)	*Charge units ($/acre), ($/customer) etc.*	*Units billed during year (acres, customer) etc.*	*$ collected ($ times units)*
$32.00 +-	$32.00 +- / acre	65,178 acres	$2,040,490.00

Volumetric charges			
Charges ($ unit)	*Charge units ($/AF), ($/HCF), etc.*	*Units billed during year (AF, HCF) etc.*	*$ collected ($ times units)*
$25.00	$/AF	12,932 AF	$324,877.00
$33.00	$/AF	122,108 AF	$4,052,359.00

See Attachment D, District Sample Bills

b. Water-use data accounting procedures

The District ditchtenders record daily water consumption readings at each water user turnout. This information is delivered to the District office where the Watermaster and the Accounting Department input the water use into the water billing software. The software tracks the water

usage for each turnout and all turnouts listed for each water user (water users have multiple turnouts throughout the District). At the end of each month a bill is created that is mailed to each water user indicating water usage and payment amounts.

The electronic and paper information that is created during this process is kept on file for a minimum of 10 years. The electronic system is kept on the District server and is secure and backed up on a daily basis.

H. Water Shortage Allocation Policies

1. *Current year water shortage policies or shortage response plan - specifying how reduced water supplies are allocated*
   See Attachment E, District Water Shortage Plan

   See attached Rules and Regulations and Operating Procedures (Attachment C). During severe drought periods, no water is available and efforts are made to carryover any water to next year in storage. Water users have the availability of deepwells to meet crop irrigation demands.

   Any time the District is unable to meet irrigation demands, due to water shortage or canal capacity, it will be necessary to prorate available water. The water will be prorated on a basis of water available, total District acreage, and water users' eligible acreage within the canal system and District. If a particular canal or pipeline capacity is not adequate to meet the demand, the prorate will be based upon the water available, acreage served by the canal or pipeline, and the water user's acreage by the canal or pipeline. All water deliveries otherwise, will be made in sequential recipt of application orders.

2. *Current year policies that address wasteful use of water and enforcement methods*
   See Attachment C, Page XX

   See attached Rules and Regulations and Operating Procedures (Attachment C).

Section 2: Inventory of Water Resources

A. Surface Water Supply

1. Acre-foot amounts of surface water delivered to the water purveyor by each of the purveyor's sources
See Water Inventory Tables, Table 1

2. Amount of water delivered to the district by each of the district sources for the last 10 years
See Water Inventory Tables, Table 8

B. Ground Water Supply

1. Acre-foot amounts of ground water pumped and delivered by the district
See Water Inventory Tables, Table 2

2. Ground water basin(s) that underlies the service area

Name	*Size (Square Miles)*	*Usable Capacity (AF)*	*Safe Yield (AF/Y)*
Kaweah	Unknown	Est. 3.4 million AF	740,000 AF/Y

3. Map of district-operated wells and managed ground water recharge areas
See Attachment F, District Map of Ground Water Facilities

Included, as Attachment A is a District Map that indicates the location of groundwater recharge basins and the district canal network. Recharge capacity is estimated to be approximately 225 cfs/day for all basins and unlined canals within the district.

Name	(T, R, & Sec.)	Acreage	Recharge Capacity AF/Day
Abercrombie	20 24 23	20	5
Anderson	20 23 6	167	45
Creamline	19 25 20	153	85
Doris	21 23 6	21	7
Enterprise	19 24 29	20	8
Guinn	19 23 30	162	50
Tagus	19 24 15	120	40
Watte	20 23 34	19	10
K.D.W.C.D. # 3	19 23 22	155	65
K.D.W.C.D. #6	19 23 35	155	65
K.D.W.C.D. #8	20 23 10	118	40

4. Description of conjunctive use of surface and ground water

The District maintains an aggressive conjunctive use program to maintain and decrease the depth to groundwater below the District. This program utilizes all unlined canals estimated to provide 450 acres of recharge basin capacity, as well as over 1,100 acres of recharge basins to provide for recharge of the groundwater table. In very wet years when there is excess water on the Kaweah River System

and the Friant Kern Canal System, the District imports as much water as possible to fill recharge basins and canals. The District has historically maximized excess winter water, which may come free of charge, but also the District has aggressively purchased water during winter months to recharge the groundwater.

This has been an effective and efficient means of recharging the area's groundwater supply, and is one of the primary reasons why the District contracted for Class I and Class II water supply on the Friant Unit of the CVP. Between CVP and local surface water supplies, the District has been able to maintain a relatively steady depth to groundwater in the area with the exception of the drop produced by drought conditions observed recently. Obviously, this success depends on maximizing surface water imports.

5. *Ground Water Management Plan*
   See Attachment G, Ground Water Management Plan

6. *Ground Water Banking Plan*
   See Attachment H, Ground Water Banking Plan

   The District does not engage in ground-water banking.

C. Other Water Supplies

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

See the Water Inventory Tables, Table 1

D. Source Water Quality Monitoring Practices

1. *Potable Water Quality (Urban only)*

See Attachment I – District Annual Water Quality Report

2. Agricultural water quality concerns*:* Yes _____ No _____*X*_____
(If yes, describe)

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

   The District collects groundwater samples and surface water samples each year from various locations throughout the District. The District targets multiple groundwater deepwells that are running throughout the District to sample from. An effort is made to sample different wells on a year-to-year basis. About every 5 years we try to go back and resample some of the earlier wells to run a comparison analysis. The testing shown in the charts below was performed between August 25th and September 5th of 2010.

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

Analyses Performed	*Frequency*	*Concentration Range*	*Average*
Calcium	Annually	4.2 – 4.8 ppm	4.4
Magnesium	Annually	0.7 – 1.1 ppm	1.0
Sodium	Annually	0.9 – 2.8 ppm	1.92
Potassium	Annually	0.4 ppm	0.4
Bicarbonate	Annually	25.3 – 36.8 ppm	31.05
Chloride	Annually	4.4 - 5 ppm	4.5
Nitrate - Nitrogen	Annually	<0.1 ppm	<0.1
Sulfate - Sulfur	Annually	0.8 – 1.4 ppm	1.07
Boron	Annually	0.01 – 0.02 ppm	0.01
pH	Annually	5.0 – 6.6 pH units	5.55
Ecw	Annually	0.03 – 0.04 dS/m	0.04
SAR	Annually	0.03 – 0.30	0.17
pHc	Annually	9.3	9.3
SAR / EC Ratio	Annually	2.6 – 9.0	6.15
TDS	Annually	23 - 27 ppm	25

Current water quality monitoring programs for groundwater by source (Agricultural only)

Analyses Performed	*Frequency*	*Concentration Range*	*Average*
Calcium	Annually	3 - 151 ppm	52.88
Magnesium	Annually	0.1 – 12.1 ppm	3.52
Sodium	Annually	21.9 - 124 ppm	46.94
Potassium	Annually	0.4 – 1.6 ppm	0.77
Bicarbonate	Annually	76.1 – 390 ppm	182.78
Chloride	Annually	7.6 – 88.2 ppm	30.45
Nitrate – Nitrogen	Annually	2.1 – 28.8 ppm	13.43
Sulfate – Sulfur	Annually	3 – 42.6 ppm	18.81
Boron	Annually	0.01 – 0.22 ppm	0.04
pH	Annually	5.4 – 8.1 pH units	7.06
Ecw	Annually	0.14 - .95 dS/m	0.49
SAR	Annually	0.8 – 5.1	2.31
pHc	Annually	7.1 – 9.1	7.81
SAR / EC Ratio	Annually	0.9 – 26.1	7.70
TDS	Annually	95 - 643 ppm	334.67

E. Water Uses within the District

1. Agricultural
See Water Inventory Tables, Table 5 - Crop Water Needs

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

Crop name	*Total Acres*	*Level Basin - acres*	*Furrow - acres*	*Sprinkler - acres*	*Low Volume - acres*	*Multiple methods - acres*
Corn	22,486		22,486			
Alfalfa	15,346	15,346				
Wheat	18,945	18,945				
Cotton	7,042		7,042			
Pistachios	4,667		1,568		3,099	
Walnuts	3,038		3,038			
Almonds	1,107		644	463		
Sorghums	37		37			
Pasture	322	322				
Field Peas	1,494		1,494			
Table Grapes	140				140	
Cherries	212		170		42	
Wine Grapes	307				307	
Plums	137		137			
Onions	272			272		
Rasin Grapes	69		69			
Blue Berries	40				40	
Lettuce	90			90		
Tomatoes	78				78	
Olives	44				44	
Persimmons	23				23	
Pomegranates	34		34			
Total	75,930	34,613	36,719	825	3,773	

3. Urban use by customer type in current year

Customer Type	*Number of Connections*	*AF*
Single-family	N/A	
Multi-family	N/A	
Commercial	N/A	
Industrial	N/A	
Institutional	N/A	
Landscape irrigation	N/A	
Wholesale	N/A	
Recycled	N/A	
Other (specify)	N/A	
Other (specify)	N/A	
Other (specify)	N/A	
Unaccounted for		
Total		

4. Urban Wastewater Collection/Treatment Systems serving the service area – current year

Treatment Plant	*Treatment Level (1, 2, 3)*	*AF*	*Disposal to / uses*
N/A			
N/A			
	Total		
Total discharged to ocean and/or saline sink			

5. Ground water recharge/management in current year (Table 6)

Recharge Area	*Method of Recharge*	*AF*	*Method of Retrieval*
Abercrombie	Basin Seepage	821	Private Wells
Anderson	Basin Seepage	8,255	Private Wells
Creamline	Basin Seepage	15,578	Private Wells
Doris	Basin Seepage	809	Private Wells
Enterprise	Basin Seepage	1,140	Private Wells
Guinn	Basin Seepage	6,641	Private Wells
Tagus	Basin Seepage	5,048	Private Wells
Watte	Basin Seepage	1,698	Private Wells
K.D.W.C.D. #3	Basin Seepage	9,033	Private Wells
K.D.W.C.D. #6	Basin Seepage	10,526	Private Wells
K.D.W.C.D. #8	Basin Seepage	8,073	Private Wells
District Canals	Canal Seepage	51,984	Private Wells
	Total	119,606	

6. *Transfers and exchanges into or out of the service area in current year (Table 6)*

The transfers listed below are not included in Table 6 because the information would conflict with the numbers reported in Table 1.

From Whom	*To Whom*	*AF*	*Use*
Garfield WD	Tulare ID	750	Ag to Ag
Ivanhoe ID	.Tulare ID	640	Ag to Ag
Orange Cove ID	Tulare ID	250	Ag to Ag
Exeter ID	Tulare ID	3,050	Ag to Ag
Lindsay-Strathmore ID	Tulare ID	2,832	Ag to Ag
Madera ID	Tulare ID	14,550	Ag to Ag
Tulare ID	Wheeler Ridge MWSD	4,000	Ag to Ag
Tulare ID	Kern-Tulare WD	6,300	Ag to Ag
Tulare ID	Arvin-Edison WSD	3,776	Ag to Ag
Tulare ID	Tri-Valley WD	15	Ag to Ag
Tulare ID	Ivanhoe ID	1,000	Ag to Ag
.Tulare ID	Tulare Lake Basins WSD	4,465	Ag to Ag
Tulare ID	Kaweah Delta WCD	24,493	Ag to Ag
Tulare ID	Lindsay-Strathmore ID	3,776	Ag to Ag
Paramount Citrus Assoc.	Tulare ID	4,000	Ag to Ag
Sun World International	Tulare ID	4,000	Ag to Ag

7. *Trades, wheeling, wet/dry year exchanges, banking or other transactions in current year (Table 6)*

From Whom	*To Whom*	*AF*	*Use*
N/A			
N/A			
N/A			
N/A			

8. *Other uses of water in current year*

Other Uses	*AF*
N/A	
N/A	

F. Outflow from the District (Agricultural only)

Districts included in the drainage problem area, as identified in "A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley (September 1990)," should also complete Water Inventory Table 7 and Appendix B (include in plan as Attachment L)

See Facilities Map, Attachment A, for the location of surface and subsurface outflow points, outflow measurement points, outflow water-quality testing locations

1. *Surface and subsurface drain/outflow in current year*

   The data listed below represents the surface water outflow from the District. The numbers below do not reflect any subsurface drainage due to the fact that the District does not have any subsurface drainage systems.

Outflow point	*Location description*	*AF*	*Type of measurement*	*Accuracy (%)*	*% of total outflow*	*Acres drained*
Section 7	Sec. 7, T. 21 S. R. 23 E.	74	Weir	+- 5%	47%	N/A
Section 9	Sec. 9, T. 21 S. R. 23 E.	66	Weir	+- 5%	42%	N/A
Cameron Creek	Sec. 6, T. 21 S. R. 23 E.	18	Weir	+- 5%	11%	N/A

Outflow point	*Where the outflow goes (drain, river or other location)*	*Type Reuse (if known)*
Section 7	Highline Canal / Tulare Lake Bottom	Irrigation/Groundwater Recharge
Section 9	Basin / Tulare Lake Bottom	Irrigation/Groundwater Recharge
Cameron Creek	Corcoran Irrigation District Basin	Groundwater Recharge

2. *Description of the Outflow (surface and subsurface) water quality testing program and the role of each participant in the program*

   The information listed in the table below is representative of surface water quality samples taken at each of the District outflow points. The District does not have any subsurface drainage systems, and

therefore the data below is only representative of surface water quality. The samples shown in the chart below were taken between August 25th to September 5th 2010.

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

Analyses Performed	*Frequency*	*Concentration Range*	*Average*	*Reuse limitation?*
Calcium	Annually	4.2 – 4.8 ppm	4.40	None
Magnesium	Annually	0.7 – 1.1 ppm	0.93	None
Sodium	Annually	0.9 – 2.3 ppm	1.37	None
Potassium	Annually	0.4 ppm	0.4	None
Bicarbonate	Annually	27.6 – 36.8 ppm	32.97	None
Chloride	Annually	4.4 – 5.0 ppm	4.6	None
Nitrate – Nitrogen	Annually	<0.1 ppm	<0.1	None
Sulfate – Sulfur	Annually	0.8 – 1.2 ppm	1.0	None
Boron	Annually	0.02 ppm	0.02	None
pH	Annually	5.0 – 6.6 pH units	5.97	None
Ecw	Annually	0.04 dS/m	0.04	None
SAR	Annually	0.03 – 0.10	0.08	None
pHc	Annually	9.3	9.3	None
SAR / EC Ratio	Annually	2.6 – 7.4	4.3	None
TDS	Annually	24 – 27 ppm	25	None

Outflow (subsurface drainage) Quality Testing Program

Analyses Performed	*Frequency*	*Concentration Range*	*Average*	*Reuse limitation?*
N/A				
N/A				
N/A				
N/A				

4. Provide a brief discussion of the District'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.

The Tulare Irrigation District is an active member of the Southern San Joaquin Valley Water Quality Coalition (Coalition) and more specifically the Kaweah River Sub Watershed group which is a comprised of water users on the Kaweah River and St. Johns River systems. The Coalition is a group of public agencies that have a water resources background and a common interest in water quality. The Coalition meets monthly at the offices of the Kaweah Delta Water Conservation District to discuss current water quality issues that face the Southern San Joaquin Valley. The District participates by sending the District Engineer to the monthly meeting to stay informed on any new or changing water quality issues that may face landowners within the District.

The Coalition has members of its Steering Committee that interact with the Central Valley Regional Water Quality Control Board (Regional Board) and attend the regional and state meetings. Steering

Committee members report to greater group during Coalition meetings on recent developments and interactions with the Regional Board. Issues that the Coalition is engaged in include:

- **Diary Monitoring Program**
- **Irrigation Lands Regulatory Program**
- **CV-SALTS**
- **Tulare Lake Basin Plan**
- **Management Plans**

The District Engineer provides reports back to the District based upon information gathered at Coalition meetings. The District Engineer also receives emails from the Regional Board by enrolling in the Regional Boards list-serve service.

The District has not identified any contamination issues and therefore has not had any contact with the Regional Board concerning contamination sites or remediation due to contamination.

G. Water Accounting (Inventory)

1. *Water Supplies Quantified*

   a. *Surface water supplies, imported and originating within the service area, by month (Table 1)*
   b. *Ground water extracted by the district, by month (Table 2)*
   c. *Effective precipitation by crop (Table 5)*
   d. *Estimated annual ground water extracted by non-district parties (Table 2)*
   e. *Recycled urban wastewater, by month (Table 3)*
   f. *Other supplies, by month (Table 1)*

2. *Water Used Quantified*

   a. *Agricultural conveyance losses, including seepage, evaporation, and operational spills in canal systems (Table 4) or*
      Urban leaks, breaks and flushing/fire uses in piped systems (Table 4)
   b. *Consumptive use by riparian vegetation or environmental use (Table 6)*
   c. *Applied irrigation water - crop ET, water used for leaching/cultural practices (e.g., frost protection, soil reclamation, etc.) (Table 5)*
   d. *Urban water use (Table 6)*
   e. *Ground water recharge (Table 6)*
   f. *Water exchanges and transfers and out-of-district banking (Table 6)*
   g. *Estimated deep percolation within the service area (Table 6)*
   h. *Flows to perched water table or saline sink (Table 7)*
   i. *Outflow water leaving the district (Table 6)*
   j. *Other*

3. *Overall Water Inventory*
   a. *Table 6*

H. Assess Quantifiable Objectives:

Identify the Quantifiable Objectives that apply to the District (Planner, chapter 10) and provide a short narrative describing past, present and future plans that address the CALFED Water Use Efficiency Program goals identified for the District.

QO #	*QO Description*	*Past, Present & Future Plans*
183	Decrease flows to salt sinks to increase the water supply for beneficial uses	The Tulare Irrigation District does not contain any salt sink areas. Water supplied to the District from the Friant-Kern Canal and the Kaweah River system is of relatively low salt content and assists in keeping the local water supply from accumulating excess salts.
186	Provide long-term diversion flexibility to increase water supply for beneficial uses	The District does not provide any diversion nor does it have a connection to the Pixley National Wildlife Refuge
187	Provide long-term diversion flexibility to increase water supply for beneficial uses	The Tulare Irrigation District has installed and utilizes a Supervisory Control And Data Acquisition system that monitors and control key structures throughout the system. The ability to manage fluctuations within the system conserves water that is utilized for irrigation purposes. The District also provides irrigation water in winter and spring months to landowners for pre-irrigation purposes. The District continues to increase the amount of SCADA systems within the District and hence increase the flexibility by which the system can meet farmer demands.

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

A. Critical Agricultural BMPs

1. *Measure the volume of water delivered by the district to each turnout with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/- 6%*

Number of turnouts that are unmeasured or do not meet the standards listed above: 0

Number of measurement devices installed last year: 0

Number of measurement devices installed this year: 0

Number of measurement devices to be installed next year: 2

The District measures all turnouts to District water users. This is a necessity being that the District bills water users based on a volumetric usage of surface water. A majority of measurement devices fall under the submerged orifice calculation. The Bureau of Reclamation's Water Measurement Manual states that submerged orifice turnouts have been calibrated to laboratory accuracy of +/- 3%. However, the District feels that given in-field constrains and flow conditions that the submerged orifice is only accurate to approximately +/- 6% on an instantaneous read.

The District has also begun to install on a limited basis propeller meters. These devices are made to deliver reading to an accuracy of +/- 2% under laboratory conditions. The District installs these devices per the manufactures recommendations however due to other constraints feels that the in-field application produces accuracies at approximately +/- 3%.

Types of Measurement Devices Being Installed	*Accuracy*	*Total Installed During Current Year*
Submerged Orifice	+/- 6%	0
Propeller Meters	+/- 3%	2

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

Name: Marco Crenshaw *Title:* Watermaster

Address: 6826 Avenue 240, Tulare, California 93274

Telephone: (559) 686-3425 *E-mail:* mjc@tulareid.org

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

See Attachment J, Notices of District Education Programs and Services Available to Customers.

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 2nd yr in future*
Irrigated acres	58,888	0	0	Unknown	Unknown
Number of farms	188	0	0	0-4	0-4

The District supports the availability of on-farm irrigation and drainage system evaluations. This is accomplished by maintaining a list of irrigation educators and professionals that provide these services at the District office and can making the list available to farmers upon request. The District also provides financial support to the North West Kern Resources Conservation District Mobile Lab Unit, which provides in-field irrigation efficiency testing. This service is made available to landowners upon request. Lastly, as a member of the Friant Water Authority, landowners have access to the Friant Waterline, which is a monthly publication that highlights stories and articles related to water use efficiency.

2) Timely field and crop-specific water delivery information to the water users

The District provides water usage reports to water users upon request and are encouraged to request data as needed. The District has recently invested in new software that will allow the District to better record and report water usage totals. The District has also investigated the potential of software that will make water usage reports available via the District website. The District is phasing the implementation of new water usage software and anticipates that full integration and website implementation will be completed in the next two years.

b. Real-time and normal irrigation scheduling and crop ET information

The District as a member of the Friant Water Authority receives weekly reports on soil water usage, CIMIS Eto data and crop coefficients. This information is made available to farmers upon request. The District is investigating the potential to make information more readily available via the District website.

The District also has plans to develop a CIMIS station on the property adjacent to the Administration and Operation facility. The landowner has agreed to permit the installation of a CIMIS station in a pasture that is currently being developed. Once the pasture is established the District will install the CIMIS station.

c. Surface, ground, and drainage water quantity and quality data provided to water users

The District Watermaster collects daily water measurements throughout the District canal system and daily readings are reported from ditchtenders on individual farm turnouts. This information is available to water users upon request. However, the District does not track groundwater usage, as deepwells are owned by private landowners and water usage is a private landowner right. The District collects groundwater and surface water quality samples each year from a selected number of agricultural wells and select surface water locations throughout the District. A general agricultural suitability test is conducted on the samples to determine the levels of constituents that can affect the usability of the water in regards to crop irrigation. The District does not do any

sampling or testing required for potable water. At the time of this report there were no water quality problems to report. Approximately 24 groundwater wells and 7 surface water samples are taken each year. About every five years the District attempts to cycle back and resample all of the earlier wells to run a comparison analysis of water quality.

d. Agricultural water management educational programs and materials for farmers, staff, and the public

Program	*Co-Funders (If Any)*	*Yearly Targets*
5th Grade Water Conservation Program (Project – Water Education of Tulare Students)	N/A	750 Students
Friant Waterline	Friant Water Users Authority	225 Landowners
District Water Efficiency Library	N/A	Open to the public
Online Educational Material	N/A	Variable
Water Education Talks	N/A	Approximately 25 talks per year reaching approximately 300 people

See Attachment J for samples of provided materials and notices

e. other

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.

   The District has utilized a volumetric pricing structure for water since the early 1950's. This system is utilized to provide monitoring and control of each irrigation event to each individual water user. The system the District utilizes requires ditchtenders to make daily readings of turnout gates that are receiving irrigation water. This information is then entered into a water accounting program that converts the volume of water used into a billing request. The cost for water within the District is currently $33.00 per acre foot of water. Monthly invoices are sent to landowners showing the amount of water used and the total cost for the water. A sample bill is included as Attachment D.

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

   The District will consider the need for policy changes given current landowner concerns. At the current time the District has not received any formal complaints or concerns by landowners that would necessitate changes to any current District policies.

6. *Evaluate and improve efficiencies of district pumps*
   Describe the program to evaluate and improve the efficiencies of the contractor's pumps.

   The District provides an inspection of District owned lift pumps on a rotational basis. District lift pumps are tested for efficiency and if determined to need repairs or maintenance they will be

removed and the necessary work will be carried out. The District does not own or operate any deepwells that are utilized for irrigation purposes.

B. Exemptible BMPs for Agricultural Contractors

(See Planner, Chapter 2, Appendix C for examples of exemptible conditions)

1. *Facilitate alternative land use*

The District does have any lands that contain or are susceptible to any of the items listed below.

Drainage Characteristic	*Acreage*	*Potential Alternate Uses*
High water table (<5 feet)	0	N/A
Poor drainage	0	N/A
Ground water Selenium concentration > 50 ppb	0	N/A
Poor productivity	0	N/A

Describe how the contractor encourages customers to participate in these programs.

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

Water users located south of the City of Tulare Waste Water Treatment Plant receive irrigation water from the treatment plant. This arrangement is between the water user and the City of Tulare. The District does not provide any assistance in the ordering or delivery of treated effluent from the City of Tulare Wastewater Treatment Plant.

The District is currently working with the City of Visalia to develop a program to receive tertiary treated effluent from the City of Visalia Waste Water Treatment Plant (Plant). The City of Visalia has approved and is currently in the process of designing an upgrade to their Plant to move from a secondary treatment process to a tertiary treatment process. Currently the Plant discharges its effluent to a natural waterway and then to a terminal basin. The City of Visalia and District propose to install a concrete pipeline from the Plant to the northern edge of the District, which is approximately 2 miles away, and deliver the tertiary treated water to the District. The District will utilize the water for irrigation purposes and recharge capacity, all of which is dependent upon the water quality and restrictions placed on the usage of the tertiary treated water.

Sources of Recycled Urban Waste Water	*AF/Y Available*	*AF/Y Currently Used in District*
City of Tulare Waste Water Treatment Plant	12,558	8,609
City of Visalia Waste Water Treatment Plan	13,000	0

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

The District continues to seek grant funding from the State of California Department of Water Resources and the United States Bureau of Reclamation for water efficiency improvement projects. Current grant awards have been made to assist the District with facility upgrades, which in turn has helped improve the flexibility of the on-demand system of the District and reduce the amount of water that is spilled outside of the District. The District also supports water efficiency by making available

on-farm irrigation and drainage system evaluations, making available a list of water educators and professionals and provides the Friant Water Authority Water Line newsletter.

The District received a grant from the Natural Resources Conservation District (NRCS) in 2008 called the Agricultural Water Efficiency Program (AWEP). This grant application is aimed at providing funds to support on-farm water efficiency projects to individual water users within the District. The District was awarded $4 million to be spread over 5 years. The District has successfully funded two years of the project and accomplished approximately 17 projects within the District. Farmers utilize the funds provided by the NRCS to develop water efficiency projects like micro/drip irrigation or tailwater return systems. The District has also developed a low interest loan program that landowners can access to meet their cost share match for each on-farm efficiency project.

Funding source Programs	*How provide assistance*
NRCS AWEP Grant	Provide 50% cost share for on-farm water efficiency projects
District Low Interest Loan	Provide $250,000 annually to water users for assist in meeting 50% cost share for AWEP program

4. *Incentive pricing*

The District operates as a conjunctive use district, which means that the District provides surface water to water users to meet crop demands, but in many years is unable to meet the entire supply required to cultivate a crop. Therefore, water users are forced to utilize groundwater deepwells to meet the crop demands within the District. The District prices its water supply to be competitive with the ability to pump groundwater utilizing deepwells, therefore providing a cost effective alternative to extracting more groundwater and adding to the overdraft of the underlying basin. Each water user within the District owns and operates a deepwell as a part of their farming operations, and can generally pump water for a cost of approximately $30.00 to $50.00 per acre foot of water. If the District were to price water at rates higher than the cost to pump water, water users would simply rely upon their deepwells to meet crop demand. This would cause an excess amount of pumping to increase the overdraft situation that the District faces. For every land owner in the District, regardless of their use of irrigation water or not, there is a flat $32.00 per acre per year assessment.

Structure of incentive pricing	*Related goal*
Providing surface water at a reasonable rate, such that water users take surface water first and then use groundwater if required	Protection of the groundwater aquifer

5. *a) Line or pipe ditches and canals*

This BMP is not applicable to most of the canal system within the District, which will remain unlined by intention. The District maintains an aggressive conjunctive use program to maintain and decrease the depth to groundwater. This program utilizes all unlined canals, which is estimated to be the

equivalent of 450 acres of recharge basin capacity, as well as over 1,100 acres of recharge basins to provide for recharge of the groundwater table. The conversion of these unlined canals to lined canals would adversely impact the District's ability to recharge groundwater and increase the amount of overdraft experienced within the District.

Canal/Lateral (Reach)	*Type of Improvement*	*Number of Miles in Reach*	*Estimated Seepage (AF/Y)*	*Accomplished/ Planned Date*
None				

b) Construct regulatory reservoirs

The District has recently embarked on two new recharge basin projects (Please see Attachment A for a location map). The first project is a joint venture project with the City of Tulare called the Swall Basin. The Swall Basin is located northeast of the City of Tulare and will provide approximately 140 acres of recharge/regulation basin. The Swall Basin will be equipped with inlet and outlet features and Supervisory Control and Data Acquisition (SCADA) equipment, which will allow the District to utilize the basin for groundwater recharge and for regulation purposes. This basin is strategically located at the headworks of our Main Canal, which allows the District to regulate a large amount of water and provide a more flexible and on-demand water supply to our water users. The Swall Basin is currently under construction and estimated to be completed by 2012.

The other basin the District is developing is the Martin Basin, which is located in the center of the District behind the new District Administration and Operation & Maintenance Facility. The Martin Basin is approximately 25 acres in size and will involve the construction of a small regulation basin and a larger recharge basin. The basin will be designed with inlet and outlet facilities along with SCADA equipment that will be tied back to the District SCADA system. Water will be stored and released from the regulation basin to provide a more flexible and on-demand water supply to water users. The Martin Basin is ready for construction and is anticipated to begin in the spring of 2011.

The District also continues to search for future sites that can serve as a regulatory or recharge basin. Sites that are considered are reviewed to ensure the site meets the criteria of a regulatory/recharge basin and that the project is cost effective.

Reservoir Name	*Annual Spill in Section (AF/Y)*	*Estimated Spill Recovery (AF/Y)*	*Accomplished/ Planned Date*
Martin Basin	N/A	Unknown	December 2012
Swall Basin	N/A	Unknown	December 2012

6. Increase flexibility in water ordering by, and delivery to, water users
See Attachment L, contractor 'agricultural water order' form

The District provides surface water to water users based on an on-demand system with a 24-hour notice before delivery and shutoff. Water users are required to place calls to the District Watermaster 24-hours prior to the start of surface water and 24-hours prior to a shutoff of surface

water. In most cases the Watermaster is able to start surface water to a water user sooner than 24-hours. The District has also embarked on an aggressive program of installing regulation basins and specific SCADA equipment which allows the Watermaster to make faster changes within the District canal network and deliver water to water users on a quicker timeframe. The SCADA system also allows the canal network to stay closer to a balanced state and deliver a consistent supply of water to the water user. Please see the attached District Map for locations of SCADA Equipment

7. *Construct and operate district spill and tailwater recovery systems*

The District conducts water operations to prevent the operational spill of water out of the District canal system. When water does spill outside of the District, it is generally during flood release operations from the Kaweah River system, which the District is obligated to pass through its system. During all operations the District owns and operates a system of regulation and recharge basins near the end of all major canals within the District to prevent or minimize the operational spills. The names of these basins are Anderson Basin, Doris Basin, Enterprise Basin, Guinn Basin and Watte Basin (these basins are shown on the attached Facilities Map). The District also has large basin at the upstream end of the District, which allows the Watermaster to operate these basins as regulation basins. This feature allow for the Watermaster to store or release water much closer to the water user and improve water management decisions to reduce the amount of water that is spilled. The District has also installed several new SCADA monitored and controlled sites to assist the Watermaster in balancing the District Canal system and preventing operational spills.

Distribution System Lateral	*Annual Spill (AF/Y)*	*Quantity Recovered and reused (AF/Y)*
Section 7	74	0
Section 9	66	0
Doris Basin	18	0
Total	158	

Drainage System Lateral	*Annual Drainage Outflow (AF/Y)*	*Quantity Recovered and reused (AF/Y)*
None		
Total		

8. Plan to measure outflow.

Total # of outflow (surface) locations/points 3
Total # of outflow (subsurface) locations/points 0
Total # of measured outflow points 3
Percentage of total outflow (volume) measured during report year 100%

Identify locations, prioritize, determine best measurement method/cost, submit funding proposal

Location & Priority	*Estimated cost (in $1,000s)*				
	2009	*2010*	*2011*	*2012*	*2013*
Section 7					

Section 9					
Doris Basin					

9. Optimize conjunctive use of surface and ground water

The District has historically operated under an aggressive conjunctive use program. This program consists of aggressively pursuing wet year excess water (flood water from the Kaweah River system and Class II water fromm the Friant Kern Canal System) to provide groundwater recharge benefits to the District. The District utilizes a vast network of unlined canals and 1,100 acres of recharge basin within the District to place excess water and allow it to recharge the groundwater. The District also does not pursue the active lining of canals which are utilized to provide recharge to groundwater as surface water is delivered to water users. Lastly, the District provides a pricing structure for surface water that encourages the use of surface water versus the use of deepwells that pump groundwater.

The District is also actively seeking the acquirement of new recharge basins within the District. In the last several years the District has added approximately 165 acres of new recharge basins in specific locations throughout the District. The District seeks lands that are located in high permeability soils and are located near District canal facilities that will deliver surface water. Given an analysis of these criteria and the cost/benefit of the site, the District can and will pursue the development of any site as a recharge basin.

10. Automate canal structures

The District began a System Modernization Project in 2007 to install a SCADA monitoring and control system on select canal systems within the District. This project included the installation of several monitoring sites, two level control gates (LOPAC gates), one flow/level control gate (Langemann Gate) and a pump back system out of a reservoir (See attached District Map for a location of SCADA facilities). This project was completed in 2008, at which time the District began evaluating future sites for the inclusion of canal automation and monitoring. Since that time the District has received several grants to install new SCADA sites and has either completed those projects or is in the progress of installing those facilities. The District continues to evaluate new sites to be outfitted with SCADA monitoring and control equipment and based upon a cost/benefit analysis will pursue such projects which are a benefit to the District.

11. Facilitate or promote water customer pump testing and evaluation

See Attachment K, Notices of District Education Programs and Services Available to Customers

The District coordinates pump testing between individual water users and Southern California Edison (SCE) or Pacific Gas and Electric (PG&E) upon request. The District advertises this service through the FWUA and monthly newsletters. The District is also in the process of coordinating the use of the new District Administration Office as a seminar site for SCE to hold water user meetings for pump testing. The District also requests from the utility companies any results of efficiency test performed on pumps within the District for a record of pump efficiencies within the District.

12. Mapping

The District is currently working with an engineering consultant who is developing the layers to be utilized in a Geographical Information System (GIS) map. The work began in 2010 and will be completed by the end of 2011.

GIS maps	*Estimated cost (in $1,000s)*				
	2009	*2010*	*2011*	*2012*	*2013*
Layer 1 – Distribution system		13,000			
Layer 2 – Drainage system					
Suggested layers:					
Layer 3 – Ground water information			2,500 Well Monitoring		
Layer 4 – Soils map					
Layer 5 – Natural & cultural resources					
Layer 6 – Problem areas					

C. Provide a 3-Year Budget for Implementing BMPs

1. Amount actually spent during current year.

BMP #		*BMP Name*	*Actual Expenditure (not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$15000**	*750*
	2	*Conservation staff*	*$1500*	*40*
	3	*On-farm evaluation /water delivery info*	*$2000*	*10*
		Irrigation Scheduling	*$500*	*5*
		Water quality	*$2000*	*80*
		Agricultural Education Program	*$500*	*40*
	4	*Quantity pricing*	*$13700*	*100*
	5	*Policy changes*	*$1500***	*25*
	6	*Contractor's pumps*	*$5000*	*15*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$12000	75
	3	*Financing of on-farm improvements*	$0	60
	4	*Incentive pricing*	$0	0
	5	*Line or pipe canals/install reservoirs*	$200000	1000
	6	*Increase delivery flexibility*	$0	0
	7	*District spill/tailwater recovery systems*	$0	0
	8	*Measure outflow*	*$0*	80
	9	*Optimize conjunctive use*	$0	0
	10	*Automate canal structures*	$0	0
	11	*Customer pump testing*	$0	0
	12	*Mapping*	$0	0
		Total	$253,700	2,280

**Value does not include maintenance*

*** Value indicated hours spent to address California SB 7x-7 regulations*

2. *Projected budget summary for the next year.*

BMP #		BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A	1	Measurement	$20,000	800
	2	Conservation staff	$1,500	50
	3	On-farm evaluations/water delivery info	$2,500	15
		Irrigation Scheduling	$500	5
		Water quality	$2,500	80
		Agricultural Education Program	$1,000	50
	4	Quantity pricing	$2,000	80
	5	Policy changes	$0	0
	6	Contractor's pumps	$5,000	15
B	1	Alternative land use	$0	0
	2	Urban recycled water use	$25,000	100
	3	Financing of on-farm improvements	$250,000	150
	4	Incentive pricing	$0	0
	5	Line or pipe canals/install reservoirs	$250,000	2,000
	6	Increase delivery flexibility	$0	0
	7	District spill/tailwater recovery systems	$0	0
	8	Measure outflow	$0	80
	9	Optimize conjunctive use	$0	0
	10	Automate canal structures	$100,000	500
	11	Customer pump testing	$0	0
	12	Mapping	$0	0
		Total	$660,000	3,925

3. *Projected budget summary for 3rd year.*

BMP #		BMP Name	Budgeted Expenditure (not including staff time)	Staff Hours
A	1	Measurement	$20,000	800
	2	Conservation staff	$1,500	50
	3	On-farm evaluations/water delivery info	$2,500	15
		Irrigation Scheduling	$500	5
		Water quality	$2,500	80
		Agricultural Education Program	$1,000	50
	4	Quantity pricing	$2,000	80
	5	Policy changes	$0	0
	6	Contractor's pumps	$5,000	15

(continued)			*Budgeted Expenditure*	
BMP #		*BMP Name*	*(not including staff time)*	*Staff Hours*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$50,000	200
	3	*Financing of on-farm improvements*	$250,000	150
	4	*Incentive pricing*	$0	0
	5	*Line or pipe canals/install reservoirs*	$0	0
	6	*Increase delivery flexibility*	$0	0
	7	*District spill/tailwater recovery systems*	$0	0
	8	*Measure outflow*	*$0*	80
	9	*Optimize conjunctive use*	$0	0
	10	*Automate canal structures*	$0	0
	11	*Customer pump testing*	$0	0
	12	*Mapping*	$0	*0*
		Total	$335,000	1,525

Section 4: Best Management Practices for Urban Contractors

(Due to the adoption of revised BMPs in December 2008, this section will be updated in Spring 2009.)

A. Urban BMPs

Not Applicable

Year of Data	2010	Enter data year here

Table 1

Surface Water Supply

2010 Month	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Water (define) (acre-feet)	Transferred into District (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
Method								
January	39	0	0	13048	0	760	0	13,847
February	21	0	0	11784	0	544	0	12,349
March	0	0	0	9539	0	0	0	9,539
April	13967	0	0	3689	0	7386	0	25,042
May	31821	0	0	15073	0	0	0	46,894
June	12721	0	0	36078	0	0	0	48,799
July	15891	0	0	27006	0	10832	0	53,729
August	7490	0	0	28696	0	10550	0	46,736
September	0	0	0	7127	0	0	0	7,127
October	0	0	0	0	0	0	0	0
November	0	0	0	52	0	0	0	52
December	0	0	0	10023	0	0	0	10,023
TOTAL	81,950	0	0	162,115	0	30,072	0	274,137

Table 2

Ground Water Supply

2010 Month	Groundwater (acre-feet)	Agric Groundwate *(acre-feet)
Method		
January	0	12,000
February	0	12,000
March	0	12,000
April	0	12,000
May	0	12,000
June	0	12,000
July	0	12,000
August	0	12,000
September	0	12,000
October	0	12,000
November	0	12,000
December	0	12,000
TOTAL	0	144,000

*normally estimated

Table 3

Total Water Supply

2010 Month	Surface Water Total (acre-feet)	Groundwater (acre-feet)	M&I Wastewater (acre-feet)	District Water (acre-feet)
Method				
January	13,847	0	0	13,847
February	12,349	0	0	12,349
March	9,539	0	0	9,539
April	25,042	0	0	25,042
May	46,894	0	0	46,894
June	48,799	0	0	48,799
July	53,729	0	0	53,729
August	46,736	0	0	46,736
September	7,127	0	0	7,127
October	0	0	0	0
November	52	0	0	52
December	10,023	0	0	10,023
TOTAL	274,137	0	0	274,137

*Recycled M&I Wastewater is treated urban wastewater that is used for agriculture.

Table 4

Agricultural Distribution System

2010 Canal, Pipeline, Lateral, Reservoir	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitatio (acre-feet)	Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
Intake Canals	52,800	50	2,640,000	78.9	227.3	0	0	(148)
In District Canals	1,584,000	25	39,600,000	1,184.1	3,409.8	0	0	(2,226)
Basins	6,922	6,922	47,914,084	1,432.7	4,125.8	0	0	(2,693)
Section 7	0	0	0	0.0	0.0	581	0	(581)
Section 9	0	0	0	0.0	0.0	790	0	(790)
Cameron Creek	0	0	0	0.0	0.0	393	0	(393)
	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	0	0.0	0.0	0	0	0
	0	0	0	0.0	0.0	0	0	0
TOTAL				2,695.7	7,762.9	1,764	0	6,831

Table 5

Crop Water Needs

2010 Crop Name	Area (crop acres)	Crop ET (AF/Ac)	Leaching Requiremen (AF/Ac)	Cultural Practices (AF/Ac)	Effective Precipitatio (AF/Ac)	Appl. Crop Water Use (acre-feet)
Corn	22,486	3	0	1	0	76,677
Alfalfa	15,346	4	0	1	0	74,121
Wheat	18,945	2	0	1	0	47,363
Cotton	7,042	3	0	1	0	26,055
Pistachios	4,667	3	0	1	0	18,341
Walnuts	3,038	4	0	1	0	14,066
Almonds	1,107	4	0	1	0	4,793
Sorghum	37	3	0	1	0	126
Pasture	322	2	0	1	0	741
Field Peas	1,494	2	0	1	0	4,661
Table Grapes	140	3	0	1	0	466
Cherries	212	3	0	1	0	812
Wine Grapes	307	3	0	1	0	1,022
Plums	137	4	0	1	0	593
	0	0	0	0	0	0
Onions	272	0	0	1	0	218
Raisin Grapes	69	3	0	1	0	230
Blueberries	40	2	0	1	0	125
Lettuce	90	0	0	1	0	72
Tomatoes	78	0	0	1	0	62
Olives	44	0	0	1	0	35
Persimmons	23	3	0	1	0	88
Pomegranates	34	0	0	1	0	27
Crop Acres	75,930					270,696

Total Irrig. Acres 59,590 (If this number is larger than your known total, it may be due to double cropping)

Table 6

2010 District Water Inventory

Water Supply	Table 3		274,137
Riparian ET	(Distribution and Drain)	minus	0
Groundwater recharge	intentional - ponds, injection	minus	119,606
Seepage	Table 4	minus	0
Evaporation - Precipitation	Table 4	minus	5,067
Spillage	Table 4	minus	1,764
Transfers/trades/wheeling	(out of District)	minus	17,753
Water Available for sale to customers			129,947
2005 Actual Agricultural Water Sales	From District Sales Records		135,042
Private Groundwater	Table 2	plus	144,000
Crop Water Needs	Table 5	minus	270,696
Drainwater outflow	(tail and tile, not recycled)	minus	0
Percolation from Agricultural Land	(calculated)		8,346

Table 7

Influence on Groundwater and Saline Sink

2010

Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District Influence	119,606
Estimated actual change in ground water storage, including natural recharge)	-118,350
Irrigated Acres (from Table 5)	75,930
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	0
Portion of percolation from agri seeping to a saline sink	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	0

Table 8

Annual Water Quantities Delivered Under Each Right or Contract

Year	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)	Water (define) (acre-feet)	Transferred into District (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
2001	24,907	0	0	49,755	0	0	0	74,662
2002	40,026	0	0	61,445	0	0	0	101,471
2003	86,742	0	0	85,821	0	0	0	172,563
2004	28,199	0	0	45,682	0	0	0	73,881
2005	213,811	0	0	169,188	0	0	0	382,999
2006	131,291	0	0	170,849	0	0	0	302,140
2007	18,838	0	0	28,639	0	0	0	47,477
2008	23,932	0	0	59,154	0	0	0	83,086
2009	73,367	0	0	75,956	0	0	0	149,323
2010	81,950	0	0	162,115	0	30,072	0	274,137
Total	723,063	0	0	908,604	0	30,072	0	1,661,739
Average	72,306	0	0	90,860	0	3,007	0	166,174