Shafter-Wasco Irrigation District
Water Management Plan
2011 Criteria

Date of first draft –September 2012
Date of final January 2013

RESOLUTION OF THE BOARD OF DIRECTORS OF THE SHAFTER-WASCO IRRIGATION DISTRICT APPROVING THE WATER MANAGEMENT PLAN UPDATE

IN THE MATTER OF: **RESOLUTION NO. 13-02**

WHEREAS, the Shafter-Wasco Irrigation District prepared an "Water Conservation Plan" now known as the "Water Management Plan" pursuant to the guidelines of the United States Bureau of Reclamation and the Shafter-Wasco Irrigation District Board of Directors approved such plan on March 14, 1995; and

WHEREAS, THE United States Bureau of Reclamation, in accordance with the guidelines, requires that their Contractors reevaluate and resubmit their plans every five (5) years; and

WHEREAS, the District staff and consultants have prepared a "Water Management Plan Update": in accordance with the United States Bureau of Reclamation's criteria.

NOW, THEREFORE, BE IT RESOLVED BY THIS BOARD OF DIRECTORS that this Board of Directors approves the "Water Management Plan Update: and directs that copy of same, together with this resolution be forwarded to the United States Bureau of Reclamation.

ALL THE FOREGOING, being on motion of Director Samuel D. Frantz, and seconded by Director Rodney Mozingo, was authorized by the following vote:

AYES:	D. Mark Franz, Samuel D. Frantz, Craig Fulwyler, Jerald R. Mozingo and Roger D. Riley
NOES:	None
ABSENT:	None
ABSTAIN:	None

I HEREBY CERTIFY that the foregoing is a resolution of said District as duly passed and adopted by said Board of Directors on this 8th day of January, 2013.

WITNESS my hand and seal of the Board of Directors this 8th day of January, 2013.

Jerry L. Ezell

Jerry L. Ezell, Secretary of the Board of Directors

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Section I: Description of the District

District Name: Shafter-Wasco Irrigation District

Contact Name: Jerry Ezell

Title: General Manager

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A. History

The District was formally organized in September 21, 1937, by Shafter-Wasco farmers after careful studies of the needs and problems peculiar to the area and on legal advice of James Burke, a Visalia attorney. The District's purpose was to find ways and means of replenishing rapidly dwindling underground water supplies.

The District's first attempt for groundwater replenishment was a joint adventure with North Kern Water Storage District for groundwater-recharging. The operation of the percolation ponds appeared to be uneconomical due to silting and sealing problems so Shafter-Wasco Irrigation District withdrew its support.

With the start of construction of Friant Dam on November 4, 1939 a future source of water for the District became a definite possibility. Even with a supply of supplemental water in sight, considerable agitation for the dissolution of the District occurred in 1941. This agitation resulted in an election of November 12, 1941 to determine whether or not the District should continue to function. Although a majority of the voters indicated they desired that the District should be dissolved, the Superior Court of Kern County ruled that the District would have to continue operations.

The District formally applied to the Bureau of Reclamation for Central Valley Project water for the 37, 528 acres within the District boundaries on February 5, 1946. Water service to the District would be from the Friant-Kern Canal, which passes close to the eastern District boundary. On February 11, 1955 the Board of Directors of the Shafter-Wasco Irrigation District executed a contract with the United States providing for a water service contract and for construction of a distribution system for 50,000 acre-feet of Class I water and 39,600 acre-feet of class II water.

After years of negotiations with the Bureau of Reclamation and several in-term contracts the Shafter-Wasco Irrigation District and the United States renewed a contract Dated November 17, 2010, granting the District permanent rights for the same water supply.

The Shafter-Wasco Irrigation District is a political subdivision of the State of California- an independent agency operating under the California Water Code. The District consists of five members of a board of directors and is operated by a General Manager and s staff of 10 employees.

1. *Date district formed:* September 21,1937 *Date of first Reclamation contract*: 1955

Original size (acres): 37,528 *Current year (last complete calendar year)*: September 2011

2. *Current size, population, and irrigated acres*

	(enter data year)
Size (acres)38,766	2011
Population served (urban connections)	0
Irrigated acres	30903

3. *Water supplies received in current year*

Water Source	*AF*
Federal urban water (Tbl 1)	0
Federal agricultural water (Tbl 1)	77034
State water (Tbl 1)	0
Other Wholesaler (define) (Tbl 1)	0
Local surface water (Tbl 1)	0
Upslope drain water (Tbl 1)	0
District groundwater (Tbl 2)	0
Banked water (Tbl 1)	0
Transferred water (Tbl 1)	0
Recycled water (Tbl 3)	1866
Other (define) (Tbl 1)	0
Total	78900

4. *Annual entitlement under each right and/or contract*

	AF	*Source*	*Contract #*	*Availability period(s)*
Reclamation Urban AF/Y				
Reclamation Agriculture Class I	50,000	USBR San Joaquin River	14-06-200-4032D	March 1 to February 28 Except during Friant-Kern Canal Maintenance every 2-3 years during the winter
Reclamation Agriculture Class II	39,600	USBR San Joaquin River	14-06-200-4032D	March 1 to February 28 Except during Friant Kern Canal Maintenance every 2-3years during the winter months
Other AF/Y				

5. *Anticipated land-use changes. For Ag contractors, also include changes in irrigated acres.*
There are no anticipated land use changes at this time. The Cities of Shafter and Wasco have no active plans to convert agricultural land to other uses. There is potential to eventually over time for some limited agricultural land to be converted.

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 1995		*Previous Plan 2005)*		*Current Plan*	
Crop Name	*Acres*	*Crop Name*	*Acres*	*Crop Name*	*Acres*
Cotton	9528	Almonds	14009	Almonds	17414
Almonds	9331	Cotton	4372	Alfalfa	2768
Alfalfa	3822	Alfalfa	2518	Cotton	1472
Grapes	1408	Nursery Stock	1473	Wheat	1371
Other (<5%)	7766	*Other (<5%)*	7918	*Other (<5%)*	7102
Total	31121	*Total*	30290	*Total*	30127

(See Planner, Chapter 3, Addendum D for list of crop names)

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

Original Plan 1995		*Previous Plan2005)*		*Current Plan 2011*	
Irrigation Method	*Acres*	*Irrigation Method*	*Acres*	*Irrigation Method*	*Acres*
Border Irrigation	14536	Border Irrigation	13264	Border Irrigation	10632
Row	12885	Row	9438	Row	3522
Sprinkler	3519	Sprinkler	1291	Sprinkler	1679
Drip/Micro Sprinkler	657	Drip/Micro Sprinkler	6297	Drip/Micro Sprinkler	14294
Multiple		Multiple		Multiple	
Other	947	*Other*	465	*Other*	0
Total	32554	*Total*	30755	*Total*	30127

B. Location and Facilities

See Attachment A for maps containing the following: incoming flow locations, turnouts (internal flow), and outflow (spill) points, conveyance system, storage facilities, operational loss recovery system, district wells and lift pumps, water quality monitoring locations, and groundwater facilities.

1. Incoming flow locations and measurement methods

Location Name	*Physical Location*	*Type of Measurement Device*	*Accuracy*
Friant Kern Canal	134.4	Venturi	<3%
Friant Kern Canal	137.2	Venturi	<3%

2. Current year Agricultural Conveyance System

Miles Unlined - Canal	*Miles Lined - Canal*	*Miles Piped*	*Miles - Other*
0	.75	117	0

3 Current year Urban Distribution System

Miles AC Pipe	*Miles Steel Pipe*	*Miles Cast Iron Pipe*	*Miles - Other*

0	0	0	0

The District does not serve Urban customers

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

Name	*Type*	*Capacity (AF)*	*Distribution or Spill*
None			

5. Description of the agricultural spill recovery system and outflow points.

The District is a completely piped system. The system is operated without spillage or seepage.

6. Agricultural delivery system operation (check all that apply)

Scheduled	*Rotation*	*Other (describe)*
X		

The District Rules and Regulations under section (5) Water Delivery Rules provides that water users must provide a phone request for water at least 24 hours in advance. Attachment B provides in detail other important provisions for ordering District water.

7. Restrictions on water source(s)

Source	*Restriction*	*Cause of Restriction*	*Effect on Operations*
Friant Kern Canal	Water supply may not be available in winter months	Insufficient water supplies and or maintenance of Friant-Kern Canal	Requires water users to pump groundwater during this period. Potential loss of water supply.

The District contract limits the amount of water available to District. There are limitations to water supply during low rainfall years that requires District water users to pump groundwater

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

- Interconnections with North Kern Water Storage District
- Bureau of Reclamation approval of EIR for exchanges and transfers among Poso Creek Integrated Regional Management Group.
- Completion of SCADA systems to monitor water supplies delivered to the District through interconnections with neighboring water districts.

C. Topography and Soils

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

The lands in the District are flat and slopes gradually from east to west on a 0.2% slope. The land slopes from an elevation of 375 feet on the east to an elevation of 300 feet on the west. There are no natural streams in or close to the District boundaries. The U.S. Bureau of reclamation soil classification survey of lands within the District show that the lands are predominantly Class I. The USBR soil survey indicates 83% of the gross agricultural acreage is Class 1, 9% Class II, 3% Class III and 5% Class 6 (urban) land. The Soil Conservation Service Soil Survey of Kern County, California Northwestern Part dated September 1988 gives the eight soil classifications and soil properties for the land in the District. The District overlies an unconfined aquifer. There are no perched zones or shallow groundwater tables

in the District. There are no District or farm surface or subsurface drainage systems installed in the District. Drainage is not a problem in the District

2. *District soil association map (Agricultural only)*

See Attachment A, District Soils Map

A U.S. Department of the Interior Map is Attached. Soils in the District are primarily sandy loam and clay loam which are compatible with the crops grown within the District. There are no known soil quality problems in the District.

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

Soil Problem	*Estimated Acres*	*Effect on Water Operations and Management*
Salinity	0	None
High-water table	0	None
High or low infiltration rates	0	None
Other (define)	0	None

D. Climate

1. *General climate of the district service area*

The District is located in an area characterized by a climate which includes hot, dry summers and mild damp winters. Average monthly temperatures range from 46 degrees in December to 81 degrees in July. Temperatures have from an extreme high of 114 degrees I the summer to a low of 14 degrees in the winter. The percentage of sunshine in the year is high, with nearly all occurring during the spring, summer and fall months. Dense radiation fog can occur in the winter months. The average length of the growing season is about 300 days. The growing season is 262 days above 332 degrees and 315 days above 28 degrees.

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*An*
Avg Precip.	1.3	1.4	1.6	.58	.24	.13	.01	.03	.18	.34	.64	.88	
Avg Temp.	47	52	57	63	70	77	81	80	75	66	53	46	
Max. Temp.	81	86	93	101	109	113	114	113	111	105	92	78	
Min. Temp	19	22	26	31	39	43	49	46	41	29	23	14	
ETo	1.59	2.20	3.66	5.08	6.83	7.80	8.67	7.81	5.67	4.03	2.13	1.59	5

Weather station ID Wasco Weather .com *Data period: Year* 1950 *to Year* 2011

ET Station ID *138 Famoso San Joaquin Valley* *Average annual frost-free days:* 262

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

The District does not have any microclimates which could impact water management in the District.

E. Natural and Cultural Resources

1. Natural resource areas within the service area

There are no natural cultural resources in the District. There are no streams, rivers, lakes in the district. There are also no identified or protected environmental lands or cultural resources in the District.

Name	*Estimated Acres*	*Description*
None		

2. Description of district management of these resources in the past or present
There are no such lands in the District to manage.

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

Name	*Estimated Acres*	*Description*
None		

There are no natural or cultural resources in the District.

F. Operating Rules and Regulations

1. Operating rules and regulations

See Attachment B, District Rules and Regulations (water related)
2. Water allocation policy (Agricultural only)
See Attachment B, Page 6
Summary – The Districts water allocation Policy is in part C "Allocation of Water" paragraph (1) "General" and (1)a " Allocation of Water Supply" of the District Rules and Regulations. A Copy of the required portions of Rules and Regulations are included as an exhibit to the Water Management Plan. The District's annual available water supply for Agricultural use is allocated proportionally to all Water Users on the basis of the amount of water used per turnout in the Base Year. Adjustments to the allocation will be applied as the water supply develops during the irrigation season.

3. Official and actual lead times necessary for water orders and shut-off (Agricultural only)
See Attachment B, Page 5
Summary – The District minimum lead time necessary for the water orders and the water shut-off's are in Part (B) "Delivery of Water" paragraph (2)(a) of the Districts rules and Regulations.
The District requires a minimum of 24 hours for turn-offs and turn-ons. Emergency turn-offs are available 24 hours a day.

4. Policies regarding return flows (surface and subsurface drainage from farms) and outflow (Agricultural only)
See Attachment B, Page Not Applicable
Summary – No Policy. There are no return flows in the District either surface or groundwater.

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

See Attachment B, Page 7

There are no written policies regarding transfers from the District to other Districts. However any such transfers are limited by place of use and other legal criteria that control place and use of District water. The General Manager is responsible for managing the transfers with notification to the Board of Directors.

Water allocated to a particular Water User may be transferred to another Water User for use within the District upon the affected parties filing with the District a water transfer form

Summary – The Districts policy on water transfers within the District are in Part B "Delivery of Water" paragraph (2)(g) of the Districts Rules and Regulations.

G. Water Measurement, Pricing, and Billing

1. Agricultural Customers

Refer to BMP A.1. Information on water measurement for agricultural contractors is completed under BMP A.1 on page 4-18.

2. Urban Customers

a. *Total number of connections* 0

b. *Total number of metered connections* 0

c. *Total number of connections not billed by quantity* 0

d. *Percentage of water that was measured at delivery point* 0

e. *Percentage of delivered water that was billed by quantity* 0

f. *Measurement device table*

Meter Size and Type	*Number*	*Accuracy* (+/-percentage)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
5/8-3/4"	0				
1"	0				
1 ½"	0				
2"	0				
3"	0				
4"	0				
6"	0				
8"	0				
10"	0				
Compound	0				
Turbo	0				
Other (define)	0				

Total	0				

*Documentation verifying the accuracy of measurement devices must be submitted with Plan and included as Attachment C.
There are no urban water users in the District.

3. *Agricultural and Urban Rates*

a. *Current year agricultural and /or urban water charges - including rate structures and billing frequency*
See Attachment B, Page 8, for current year rate ordinance

b. Annual charges collected from agricultural customers

Fixed Charges			
Charges ($ unit)	*Charge units $/acre, etc.*	*Units billed during year acres, etc.*	*$ collected ($ times units)*
23.50	23.50	30,903	726,220
20.00	20.00	30,903	618,060

Volumetric charges			
Charges ($ unit)	*Charge units $/AF, etc.*	*Units billed during year AF, etc.*	*$ collected ($ times units)*
56.00	56.00	75085	4,204,760
63.00	63.00	443	27,909

Annual charges collected from urban customers

Fixed Charges			
Charges ($ unit)	*Charge units ($/meter size) etc.*	*Units billed during year (by meter size) etc.*	*$ collected ($ times units)*
0			
0			
0			
0			

Volumetric charges			
Charges ($ unit)	*Charge units ($/HCF), etc.*	*Units billed during year HCF, Kgal, etc.*	*$ collected ($ times units)*
00			
0			

0			
0			

See Attachment D Page 1, District Sample Bills
There are no urban customers in the District

c. Describe the contractor's record management system

Water record management in the District is computerized with a water operation program and a water billing program. The District water dispatcher utilizes the water operations program to enter all water orders and use in the computer for instant check against water usage and water user balance. The Districts water deliveries are recorded daily on computerized turnout monthly report. An up to date water balance report is maintained at he office for reference and use by the water users. Once a month all water user delivery records are put into the computer for billing purposes and a permanent record. A water bill and water balance report is sent to the water user each month. The District also maintains a file of all water deliveries made to the District from the Friant-Kern Canal.

H. Water Shortage Allocation Policies

1. Current year water shortage policies or shortage response plan - specifying how reduced water supplies are allocated

See Attachment B, (Section C (1) (3) a page 7 of the District Rules and Regulations), District Water Shortage Plan
District water is allocated based on available water supply from the Bureau of Reclamation as the water develops during the water year. As the water supply changes water users are immediately notified to allow them as much time as possible to manage their own supplies.

2. Current year policies that address wasteful use of water and enforcement methods

See Attachment B, (Section B(5)(d)page 5 of the District Rules and Regulations)Water Delivery Rules.
The District Staff monitors for tail water flooding along roads to insure water is not being wasted.

I. Evaluate Policies of Regulatory Agencies Affecting the Contractor and Identify Policies that Inhibit Good Water Management.

Discuss possible modifications to policies and solutions for improved water management.

The following is a listing of USBR policies that limit improved District and on-farm water management.

1. Water supply may not be available in Jan/Feb.
2. Carryover storage of the water supply is not guaranteed from one contract year to another.
3. Mammoth pool agreement on the san Joaquin River which allows power companies to release stored water until late summer or fall.
4. San Joaquin River Settlement that has not found cost effective ways for returning water.

Additional water supplies could be made available with increased storage on the San Joaquin River above Millerton Lake in Fresno County. During high flow water years more water could be controlled and stored for later use.

Section II: Inventory of Water Resources

A. Surface Water Supply

1. Surface water supplies in acre feet, imported and originating within the service area, by month

(Table 1).
See Chapter 5, 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 Chapter 5, Water Inventory Tables, Table 8.

B. Groundwater Supply

1. Groundwater extracted by the district and delivered, by month (Table 2)
See Chapter 5, Water Inventory Tables, Table 2

2. Groundwater basin(s) that underlies the service area

Name	*Size (Square Miles)*	*Usable Capacity (AF)*	*Safe Yield (AF/Y)*
Kern Basin	60.57	Unknown	28,500

3. Map of district-operated wells and managed groundwater recharge areas
See Attachment A, for District Map of Groundwater Facilities
There are no district operated or owned wells.
4. Description of conjunctive use of surface and groundwater

Groundwater management is rooted in the conjunctive use of surface and groundwater resources. Use of the water supplies from the two resources is integrated to accomplish the optimum utilization of each resource.

In years of shortage, the previously stored water is pumped to supplement available surface water. District landowners are encouraged to maximize the utilization of available facilities and resources for conjunctive use through cooperative management. Conjunctive use opportunities motivated the District to enter into a contract with the United States beginning in the 1950's for the importation of supplemental water supply from the Friant Unit of the CVP.

Water exchanges and transfers are an integral part of the existing conjunctive use programs. Under our plan the District seeks to preserve and enhance conjunctive use activities through coordinated use of available supplies and through expansion of relationships with neighboring districts for recharge and exchange programs.

Growers in the District are encouraged to use all the available surface water available to the District from the contract with the United States. Water is allocated to our growers at a rate that in competitive with groundwater pumping. The growers understand the value of the district surface water and the importance of maintaining a higher ground water level.

5. Groundwater Management Plan
See Attachment E, Groundwater Management Plan

6. Groundwater Banking Plan
The District has a groundwater banking plan. The District also has a 25 year exchange and transfer program through the Poso-Creek Integrated Regional Water Management Plan. Water supply reliability and sustainability within the Region are being impacted by changing dynamics of water supply timing

and availability. The Poso Creek RWMG identified the need to offset the projected losses of their available surface water supplies resulting from court-ordered actions, environmental regulations, increased urbanization and changes in whether patters as a result of climate change. Based on studies done for the IRWMP, the decrease in average annual surface water supplies to the Region is estimated to be in excess of 100,000 acre-feet per year. The Poso Creek Integrated Regional Water Management Plan covering 25 years for groundwater banking, transfers and exchange program was authorized. Neighboring North Kern Water Storage District and Semi-tropic water Storage Districts have banking facilities available for District use. The District is negotiations with these agencies to formalize a banking program in addition to transfers and exchanges between the agencies. This new Banking program extends the previous arrangements that the District has since 1993 with North Kern Water District and Semi-tropic Water Storage District.

C. Other Water Supplies

1. "Other" water used as part of the water supply – Describe supply
The District does not have another contracted water supply. Growers depend on groundwater as their primary source of water when not available from the District. The City of Wasco has some reclaimed water that they deliver to their agricultural land in the District. The District has no interest in this water as it is not usable on edible crops and it is not connected to our distribution system.
See Chapter 5, Water Inventory Tables, Table 1

D. Source Water Quality Monitoring Practices

1. Potable Water Quality (Urban only)
See Attachment H – District Annual Potable Water Quality Report
The District does not have potable water.
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 monitors the groundwater at 12 domestic wells for PH, EC, and TDS
4. *Current water quality monitoring programs for surface water by source (Agricultural only)*

Analyses Performed	*Frequency*	*Concentration Range*	*Average*
PH	monthly	7.6-8.0	7.8
EC	monthly	.10-.10	.10
TDS	monthly	48-48	48

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

Analyses Performed	*Frequency*	*Concentration Range*	*Average*
PH	Annually	7.2-7.6	7.5
EC	Annually	.30-1.20	.68
TDS(ppm)	Annually	195-858	478

E. Water Uses within the District

1. Agricultural
See Chapter 5, 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*
Alfalfa-hay	2768	2768				
Almonds	17,414	5385			12,029	
Apricots	25				25	
Blackeye Beans	74		74			
Broccoli	15				15	
Cabbage	7			7		
Cherries	572	216			356	
Carrots	1176		72	1102	2	
Corn	849		849			
Cotton	1472		1409	63		
Dry Beans	209		209			
Garden	3		3			
Garlic	37			37		
Grapes	1156	327			829	
Nursery Stock	825	1	757	7	60	
Onions	17			17		
Oranges	33	33				
Pasture	213	210	2	1		
Peas-Green	6		6			
Persimmons	28	19			9	
Pistachios	799	111	27		661	
Plumcot	27	27				
Plums	139	18			121	
Potatoes	392			392		
Strawberries	2		2			
Sugar Beets	36		36			
Tomatoes	263		76		187	
Walnuts	199	199				
Wheat	1371	1318		53		
TOTAL	30127	10,632	3522	1679	14,294	

3. Urban use by customer type in current year

Customer Type	*Number of Connections*	*AF*
Single-family	0	

Customer Type	*Number of Connections*	*AF*
Multi-family	0	
Commercial	0	
Industrial	0	
Institutional	0	
Landscape irrigation	7	572
Wholesale		
Recycled		
Other (specify)		
Other (specify)		
Other (specify)		
Unaccounted for		
Total		

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

Treatment Plant	*Treatment Level (1, 2, 3)*	*AF*	*Disposal to / uses*
City of Wasco	2	1866	Agriculture
	Total		
Total discharged to ocean and/or saline sink			

Collected and delivered to their own lands by the City of Wasco

5. Groundwater recharge in current year (Table 6)

Recharge Area	*Method of Recharge*	*AF*	*Method of Retrieval*
0			
	Total		

The District does not have a recharge facility

*6a. Transfers and exchanges **into** the service area in current year – (Table 1)*

From Whom	*To Whom*	*AF*	*Use*
None			
	Total	0	

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

From Whom	*To Whom*	*AF*	*Use*
SWID	SLWD	320	Agriculture
SWID	DEID	517	Agriculture
SWID	LTID	10,000	Agriculture
	Total	10,837	

7. Wheeling, or other transactions in and out of the district boundaries – (Table 6)

From Whom	*To Whom*	*AF*	*Use*
None			
	Total	0	

8. Other uses of water

Other Uses	*AF*
None	

F. Outflow from the District (Agricultural only)

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

Outflow point	*Location description*	*AF*	*Type of measurement*	*Accuracy (%)*	*% of total outflow*	*Acres drained*
None						

Outflow point	*Where the outflow goes (drain, river or other location)*	*Type Reuse (if known)*
None		

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

There are no outflows from the District

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

Analyses Performed	*Frequency*	*Concentration Range*	*Average*	*Reuse limitation?*
None				

Outflow (subsurface drainage) Quality Testing Program

Analyses Performed	*Frequency*	*Concentration Range*	*Average*	*Reuse limitation?*
None				

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.

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 Addendum C (include in plan as Attachment J)

The District does not have outflow points. The District is involved on behalf of the District water users in the Irrigated Lands Program for both ground and surface water quality activities. The District is a member of the Kern County Irrigated Lands Authority that is representing Kern County interests before the State Region Water Quality Board in our zone.

G. Water Accounting (Inventory)

Go To Chapter 5 for Agricultural Water Inventory Tables and Instructions.

Go To Chapter 6 for Urban Water Inventory Tables and Instructions.

Section III: 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%*

   a. *Number of delivery points (turnouts and connections)* 551

   b. *Number of delivery points serving more than one farm* 51

   c. *Number of measured delivery points (meters and measurement devices)* 551

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

   e. *Total number of delivery points not billed by quantity* 0

   f. *Delivery point measurement device table*

Measurement Type	*Number*	*Accuracy* (+/- %)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
Orifices					
Propeller meter	551	-2%	Daily	5% annually	As needed
Weirs					
Flumes					
Venturi					
Metered gates					
Acoustic doppler					
Other (define)					
Total					

**Documentation verifying the accuracy of measurement devices must be submitted with Plan and included in Attachment C.*

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

Name: Jerry Ezell *Title:* General Manager

Address: P.O. Box 1168 Wasco, CA

Telephone: (661) 758-5153 *E-mail:* swid@lightspeed.net

Provide the job description and minimum qualifications
General Manager is responsible for all the District Operations including personnel, billing, collection of funds and operations. Part of the requirements of operations is to insure that the district is billing and collection of revenues is done accurately. Accurate billing and collecting revenues insures water users are properly billed. Accurate billing also involves the accounting for accurate deliveries of water. The General Manager is responsible for budgeting for improvements and maintenance of the system as necessary to create accurate metering at each district metering location.

3. Provide or support the availability of water management services to water users
See Attachment H, 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	30127	1412	986	1000	1000
Number of farms	270	13	11	10	10

2) Timely field and crop-specific water delivery information to the water user
The District has available to all grower's water records for each turnout and this information is available to growers for determining water use on each crop. The District supports the availability of farm system evaluations. The District supports through financial contributions of $6,000 annually the North West Kern Resource Conservation District for providing Mobil Lab service to our growers for in field efficiency analysis. The District also mails out to all our growers the Friant Water Line which is a monthly publication that highlights stories and articles related to water conservation.

b. Real-time and normal irrigation scheduling and crop ET information
The District has available water reports for each grower turnout by month. This information is available to the growers on request. CIMIS Eto data and crop coefficient date is available at the District office upon request.

c. Surface, ground, and drainage water quantity and quality data provided to water users
The District monitors PH and TDS/Conductivity of groundwater and surface water annually. Water quality information is also available from the Friant Water Authority and neighboring district of Semi-tropic Water Storage District and North Kern water Storage District. All this information is available upon request from our growers or other interested parties.

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

Program	*Co-Funders (If Any)*	*Yearly Targets*
NWKRCD Farm evaluations	NA	All growers
Friant Water Line	Friant water Authority	All growers
Water for Tomorrow National Geographic	NA	Growers, schools and general public

See Attachment F for samples of provided materials and notices

e. other

None

4. Pricing structure - based at least in part on quantity delivered
Adopt a water pricing structure based on the measured quantity delivered
All water is billed by quantity

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

	Total in district	*# surveyed last year*	*# surveyed in current year*	*# projected for next year*
Wells	0	0	0	0
Lift pumps	2	1	0	0

The District has two small lift pumps that only provide water on a limited basis.

B. Exemptible BMPs for Agricultural Contractors

(See Planner, Chapter 2, Addendum B for examples of exemptible conditions)

1. Facilitate alternative land use

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

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

2. Facilitate use of available recycled urban wastewater

Sources of Recycled Urban Waste Water	*AF/Y Available*	*AF/Y Currently Used in District*
City of Wasco Treatment Plant	1866	1866

City of Wasco manages their own reclaimed water

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

Program	*Description*
Bureau of Reclamation	New interconnections with NKWSD
North West Resource Conservation District	Irrigation Efficiency Management
District turnouts	Replace District turnouts

The District has been awarded Grants for improving water deliveries to our groundwater area. Upgraded connections with NKWSD will enable the District to provide flexibility for district operations and the operations for other connected water districts up and down the Friant Kern Canal with improved flexibility for transfers and exchanges.
The District financially support the North West Resource Conservation District that helps offset growers cost for improving irrigation efficiencies on the farm

The District is budgeting and replacing turnouts in the District that helps manage the growers request for water. The turnouts are easier to manage and more accurately meet the grower's needs for water deliveries.

4. Incentive pricing

Describe incentive rate structure and purpose.

The District operates a conjunctive use district. The District provides surface what when available as a secondary supply to our water users. To encourage use of District water the District established a water pricing policy that encourages water users to use District water when available. Water rates have been set at a rate less than pumping costs for growers.

5. a) Line or pipe ditches and canals

Canal/Lateral (Reach)	*Type of Improvement*	*Number of Miles in Reach*	*Estimated Seepage (AF/Y)*	*Accomplished/ Planned Date*
0				
0				
0				

The District is fully lined an dipped.

b) Construct/line regulatory reservoirs

Reservoir Name	*Location*	*Describe improved operational flexibility and AF savings*
None		

The District does not have any reservoirs

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

The District delivers water on demand with 24 hour notice. The District also has service available after hours for growers that require same day turn-offs.

See Attachment I, contractor 'agricultural water order' form

7. Construct and operate district spill and tailwater recovery systems

Distribution System Lateral	*Annual Spill (AF/Y)*	*Quantity Recovered and reused (AF/Y)*
None		
Total		

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

Describe facilities that resulted in reduced spill and tailwater

None

8. *Plan to measure outflow.*

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

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

Location & Priority	*Estimated cost (in $1,000s)*				
	Year 1	*Year 2*	*Year 3*	*Year 4*	*Year 5*
None					

9. Optimize conjunctive use of surface and groundwater
Describe the potential for increasing conjunctive use of surface and groundwater.
The District is a member of the Poso Creek Integrated Regional Water Management Plan Group (IRWMP). The District and others have planning objectives to maintain and improve water supply reliability, maintain groundwater levels at economically viable pumping lifts, protect the quality of groundwater and enhance where practical, maintain water supply costs at a level commensurate with the continues viability of the agricultural economy which has developed in the area, enhance monitoring activities to meet groundwater levels and water quality goals, maintain and /or enhance environmental resources within and outside our area, and enhance flood control. The District plans to build new interconnection facilities with our neighboring Districts to help meet the above objectives. New interconnections with NKWSD are already under construction and will be completed in 2012. Additional facilities are also being considered that will also connection SWSD to the District that will help return San Joaquin River water that was a contribution to the San Joaquin River settlement.

10. Automate distribution and/or drainage system structures
Identify locations where automation would increase delivery flexibility and reduce spill and losses. Describe program to achieve these benefits and estimate the annual water savings.
New SCADA systems are being installed and others upgraded as part of our interconnections with neighboring districts. These facilities can be managed and monitored from our office.

11. Facilitate or promote water customer pump testing and evaluation
See Attachment H, Notices of District Education Programs and Services Available to Customers
The District maintains contact with Pacific Gas and Electric Company regarding availability of pump test activities. This information is available from the local utility. Local Irrigation and pump companies have their own facilities to helping manage users pump activities. The District refers questions regarding pump test to their representative pump company or utility.

12. *Mapping*

The District has contracted with a local engineering firm to prepare a GIS map of the District facilities. The program is also programmed into our Operations Superintendents computer that allows him to document changes and maintenance in the District. Such recordings will include new meter and turnout repairs, line repairs and upgrades. The program will provide an ongoing history of operation line activities by location and dates.

GIS maps	*Estimated cost (in $1,000s)*				
	Year 1	*Year 2*	*Year 3*	*Year 5*	*Year 6*
Layer 1 – Distribution system	40,000	1000	1000	1000	1000
Layer 2 – Drainage system	0	0	0	0	0
Suggested layers:	0	0	0	0	0
Layer 3 – Groundwater information	0	0	0	0	0
Layer 4 – Soils map	0	0	0	0	0
Layer 5 – Natural & cultural resources	0	0	0	0	0
Layer 6 – Problem areas	0	0	0	0	0

C. Provide a 3-Year Budget for Implementing BMPs

1. Amount actually spent during current year.

Year 2011 or Year 1			*Actual Expenditure*	
BMP #		*BMP Name*	*(not including staff time)*	*Staff Hours*
A	*1*	*Measurement*	*$200,000*	*6,500*
	2	*Conservation staff*	*$5000*	*80*
	3	*On-farm evaluation /water delivery info*	*$6000*	*10*
		Irrigation Scheduling	*$50,000*	*1500*
		Water quality	*$1000*	*10*
		Agricultural Education Program	*$500*	*10*
	4	*Quantity pricing*	*$0*	*0*
	5	*Contractor's pumps*	*$0*	*0*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$0	0
	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*	*0*
	9	*Optimize conjunctive use*	$0	0
	10	*Automate canal structures*	$0	0
	11	*Customer pump testing*	$0	0
	12	*Mapping*	$0	*0*
		Total	$262,500	8110

2. Projected budget summary for the next year.

Year 2012 or Year 2			Budgeted Expenditure	
BMP #		BMP Name	(not including staff time)	Staff Hours
A	*1*	*Measurement*	*$200,000*	*6500*
	2	*Conservation staff*	*$5000*	*10*
	3	*On-farm evaluations/water delivery info*	*$6,000*	*80*
		Irrigation Scheduling	*$50,000*	*1500*
		Water quality	*$1000*	*10*
		Agricultural Education Program	*$500*	*10*
	4	*Quantity pricing*	*$0*	*0*
	5	*Contractor's pumps*	*$0*	*0*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$0	0
	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*	*0*
	9	*Optimize conjunctive use*	$0	0
	10	*Automate canal structures*	$0	0
	11	*Customer pump testing*	$0	0
	12	*Mapping*	$0	*0*
		Total	$262,500	8,110

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

Year 2013 or Year 3			Budgeted Expenditure	
BMP #		BMP Name	(not including staff time)	Staff Hours
A	*1*	*Measurement*	*$200,000*	*200,000*
	2	*Conservation staff*	*$5,000*	*80*
	3	*On-farm evaluations/water delivery info*	*$6,000*	*10*
		Irrigation Scheduling	*$50,000*	*1500*
		Water quality	*$1000*	*10*
		Agricultural Education Program	*$500*	*10*
	4	*Quantity pricing*	*$0*	*0*
	5	*Contractor's pumps*	*$0*	*0*
B	*1*	*Alternative land use*	$0	0
	2	*Urban recycled water use*	$0	0
	3	*Financing of on-farm improvements*	$0	0
	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*	*0*
	9	*Optimize conjunctive use*	$0	0
	10	*Automate canal structures*	$0	0
	11	*Customer pump testing*	$0	0

12 Mapping		$0	*0*
	Total	$262,500	8,110

Section IV: Best Management Practices for Urban Contractors

A. Urban BMPs

The District does not provide for Urban water use.

Foundational BMPs

1. Utility Operations Programs
    1.1. Operations Practices
        A.1) Conservation Coordinator
        A.2) Water waste prevention
        A.3) Wholesale agency assistance programs
    1.2. Water Loss Control
    1.3. Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections
    1.4. Retail Conservation Pricing

2. Education Programs
    2.1. Public Information Programs
    2.2. School Education Programs

Programmatic BMPs

3. Residential
    A.1) Residential assistance program
    A.2) Landscape water survey
    A.3) High-efficiency clothes washers (HECWs)
    A.4) WaterSense Specification (WSS) toilets
    A.5) WaterSense Specifications for residential development

4. Commercial, Industrial, and Institutional (CII)

5. Landscape

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

1. Amount actually spent during current year.

Year 2012 or Year 1 *BMP #* *BMP Name*	*Projected Expenditures (not including staff hours)*	*Staff Hours*
1. Utilities Operations		
1.1 Operations Practices	*$0*	*0*
1.2 Water Loss Control	*$0*	*0*
1.3 Metering	*$0*	*0*
1.4 Retail Conservation Pricing	*$0*	*0*
2. Education Programs		
2.1 Public Information Programs	*$0*	*0*
2.2 School Education Programs	*$0*	*0*
3. Residential	*$0*	*0*
4. CII	*$0*	*0*
5. Landscape	*$0*	*0*
Total	*$0*	*0*

2. Projected budget summary for 2nd year.

Year 2013 or Year 2 BMP # BMP Name	Projected Expenditures (not including staff hours)	Staff Hours
1. Utilities Operations		
1.1 Operations Practices	*$0*	*0*
1.2 Water Loss Control	*$0*	*0*
1.3 Metering	*$0*	*0*
1.4 Retail Conservation Pricing	*$0*	*0*
2. Education Programs		
2.1 Public Information Programs	*$0*	*0*
2.2 School Education Programs	*$0*	*0*
3. Residential	*$0*	*0*
4. CII	*$0*	*0*
5. Landscape	*$0*	*0*
Total	*$0*	*0*

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

Year 2014 or Year 3 BMP #	BMP Name	Projected Expenditures (not including staff hours)	Staff Hours
1.	*Utilities Operations*		
	1.1 Operations Practices	*$0*	*0*
	1.2 Water Loss Control	*$0*	*0*
	1.3 Metering	*$0*	*0*
	1.4 Retail Conservation Pricing	*$0*	*0*
2.	*Education Programs*		
	2.1 Public Information Programs	*$0*	*0*
	2.2 School Education Programs	*$0*	*0*
3.	*Residential*	*$0*	*0*
4.	*CII*	*$0*	*0*
5.	*Landscape*	*$0*	*0*
	Total	*$0*	*0*

Year of Data | 2011 |

Table 1

Surface Water Supply

2011 Month	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water Portwood (acre-feet)	Other Water Banked (acre-feet)	Transfers into District (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
Method								
January	0	0	0	0	0	0	0	0
February	4520	0	0	0	0	0	0	4,520
March	4483	0	0	0	0	0	0	4,483
April	7493	0	0	0	0	0	0	7,493
May	9334	0	0	0	0	0	0	9,334
June	12076	0	0	0	0	0	0	12,076
July	14184	0	0	0	0	0	0	14,184
August	10371	0	0	0	0	0	0	10,371
September	6029	0	0	0	0	0	0	6,029
October	4498	0	0	0	0	0	0	4,498
November	1825	0	0	0	0	0	0	1,825
December	627	0	0	0	0	0	0	627
TOTAL	75,440	0	0	0	0	0	0	75,440

Table 2

Ground Water Supply

2011 Month	District Groundwate (acre-feet)	Private Agric *(acre-feet)
Method		
January	0	100
February	0	2,000
March	0	1,000
April	0	2,000
May	0	4,000
June	0	4,000
July	0	4,000
August	0	3,000
September	0	2,000
October	0	1,000
November	0	100
December	0	50
TOTAL	0	23,250

*normally estimated

Table 3

Total Water Supply

2011 Month / Method	Surface Water Total (acre-feet)	District Groundwate (acre-feet)	Recycled M&I (acre-feet)	Total District (acre-feet)
January	0	0	0	0
February	4,520	0	0	4,520
March	4,483	0	0	4,483
April	7,493	0	0	7,493
May	9,334	0	0	9,334
June	12,076	0	0	12,076
July	14,184	0	0	14,184
August	10,371	0	0	10,371
September	6,029	0	0	6,029
October	4,498	0	0	4,498
November	1,825	0	0	1,825
December	627	0	0	627
TOTAL	75,440	0	0	75,440

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

2011 Precipitation Worksheet				
	inches precip	ft precip	acres	AF/Year
Jan	0.61	0.05	2.41	1.04
Feb	0.55	0.05	0.00	0.00
Mar	1.81	0.15	0.00	0.00
Apr	0.37	0.03	0.00	0.00
May	0.33	0.03	0.00	0.00
Jun	0.36	0.03	0.00	0.00
Jul	0.00	0.00	0.00	0.00
Aug	0.00	0.00	0.00	0.00
Sept	0.00	0.00	0.00	0.00
Oct	0.63	0.05	0.00	0.00
Nov	0.54	0.05	0.00	0.00
Dec	0.01	0.00		
TOTAL	**5.21**	**0.43**		

2011 Evaporation Worksheet			
	inches evap	ft evap	acres
Jan	0.94	0.08	2.41
Feb	2.31	0.19	0.00
Mar	3.15	0.26	0.00
Apr	5.18	0.43	0.00
May	6.80	0.57	0.00
Jun	7.68	0.64	0.00
Jul	8.08	0.67	0.00
Aug	7.63	0.64	0.00
Sept	5.76	0.48	0.00
Oct	3.59	0.30	0.00
Nov	1.80	0.15	0.00
Dec	1.65	0.14	
TOTAL	**54.57**	**4.55**	

Table 4

Agricultural Distribution System

2011 Canal, Pipeline, Lateral, Reservoir	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitation (acre-feet)	Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
Lateral 134.4	3,883	27	104,841	1.0	10.9	0	0	(10)
Lateral 137.2	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
	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				1.0	10.9	0	0	(10)

Table 5

Crop Water Needs

2011 Crop Name	Area (crop acres)	Crop ET (AF/Ac)	Leaching Requiremen (AF/Ac)	Cultural Practices (AF/Ac)	Effective Precipitation (AF/Ac)	Appl. Crop Water Use (acre-feet)
Almonds	17,414	3.50	0.1	0.0	0.0	62,342
Alfalfa/Hay	2,768	3.96	0.1	0.0	0.0	11,127
Cotton	1,472	2.80	0.0	0.0	0.0	4,136
Wheat	1,371	2.21	0.0	0.0	0.0	3,030
Carrots	1,176	1.00	0.0	0.0	0.0	1,188
Grapes	1,156	2.60	0.1	0.0	0.0	3,063
Corn	849	2.85	0.1	0.0	0.0	2,462
Nursery Stock	825	4.00	0.0	0.0	0.0	3,333
Pistachios	799	3.50	0.1	0.0	0.0	2,860
Dry Beans	209	2.30	0.1	0.0	0.0	495
Cherries	572	3.50	0.1	0.0	0.0	2,042
Walnuts	199	3.50	0.1	0.0	0.0	712
Potatoes	392	1.82	0.0	0.0	0.0	725
Tomatoes	263	2.50	0.0	0.0	0.0	658
Irrigated Pasture	213	4.00	0.0	0.0	0.0	858
Misc	449	2.50	0.0	0.0	0.0	1,131
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
	0	0.00	0.0	0.0	0.0	0
Crop Acres	30,127					100,165

Total Irrig. Acres 30,127 (If this number is larger than your known total, it may be due to double cropping)

Table 6

2011 District Water Inventory

Water Supply	Table 3		75,440
Riparian ET	(Distribution and Drain)	minus	0
Groundwater recharge	intentional - ponds, injection	minus	0
Seepage	Table 4	minus	0
Evaporation - Precipitation	Table 4	minus	10
Spillage	Table 4	minus	0
Transfers out of District		minus	0
Water Available for sale to customers			75,430
Actual Agricultural Water Sales 2011	From District Sales Records		74,131
Private Groundwater	Table 2	plus	23,250
Crop Water Needs	Table 5	minus	100,165
Drainwater outflow	(tail and tile, not recycled)	minus	0
Percolation from Agricultural Land	(calculated)		(2,784)
Unaccounted for Water	(calculated)		1,299

Table 7

Influence on Groundwater and Saline Sink

2011

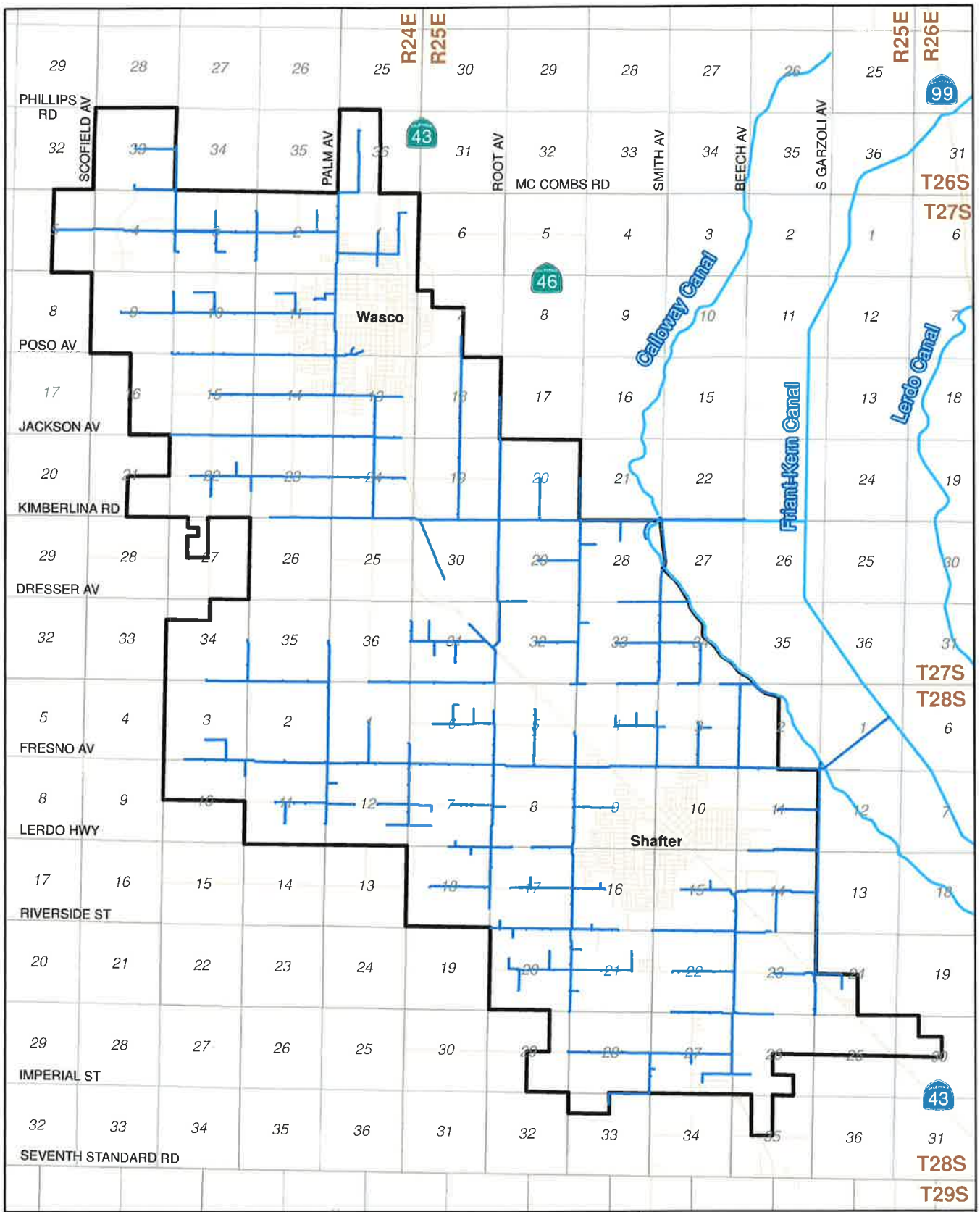
Agric Land Deep Perc + Seepage + Recharge - Groundwater Pumping = District Influence	0
Estimated actual change in ground water storage, including natural recharge)	-7,000
Irrigated Acres (from Table 5)	30,127
Irrigated acres over a perched water table	0
Irrigated acres draining to a saline sink	0
Portion 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 Portwood (acre-feet)	Other Water Banked (acre-feet)	Transfers into District (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
2002	50,801	0	0	0	2,997	0	0	53,798
2003	62,153	0	0	0	3,196	0	0	65,349
2004	53,761	0	0	0	2,992	0	0	56,753
2005	65,505	0	0	0	1,643	0	0	67,148
2006	69,703	0	0	0	2,346	0	0	72,049
2007	34,311	0	0	1,103	3,042	0	0	38,456
2008	49,457	0	0	349	2,200	0	0	52,006
2009	50,723	0	0	788	2,057	0	0	53,568
2010	64,670	0	0	0	46	0	0	64,716
2011	75,440	0	0	0	0	0	0	75,440
Total	576,524	0	0	2,240	20,519	0	0	599,283
Average	57,652	0	0	224	2,052	0	0	59,928

ATTACHMENT A



0 0.5 1 1.5 2 Miles

EST. 1968
PROVOST& PRITCHARD CONSULTING GROUP
An Employee Owned Company

1800 30th St. Suite 280
Bakersfield, CA 93301
(661) 616-5900

Legend

SWID Lateral Pipeline

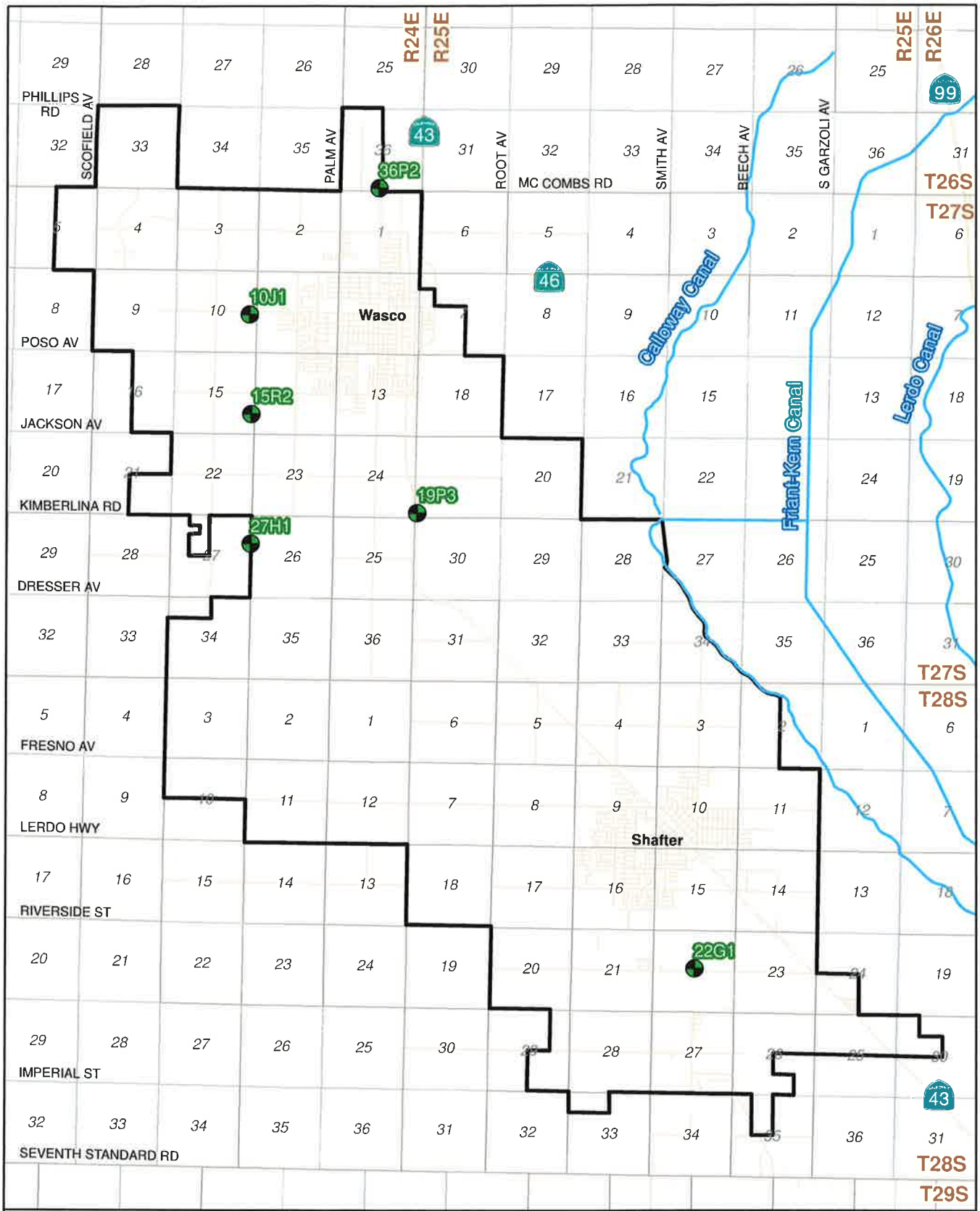
SWID Boundary

Shafter-Wasco Irrigation District

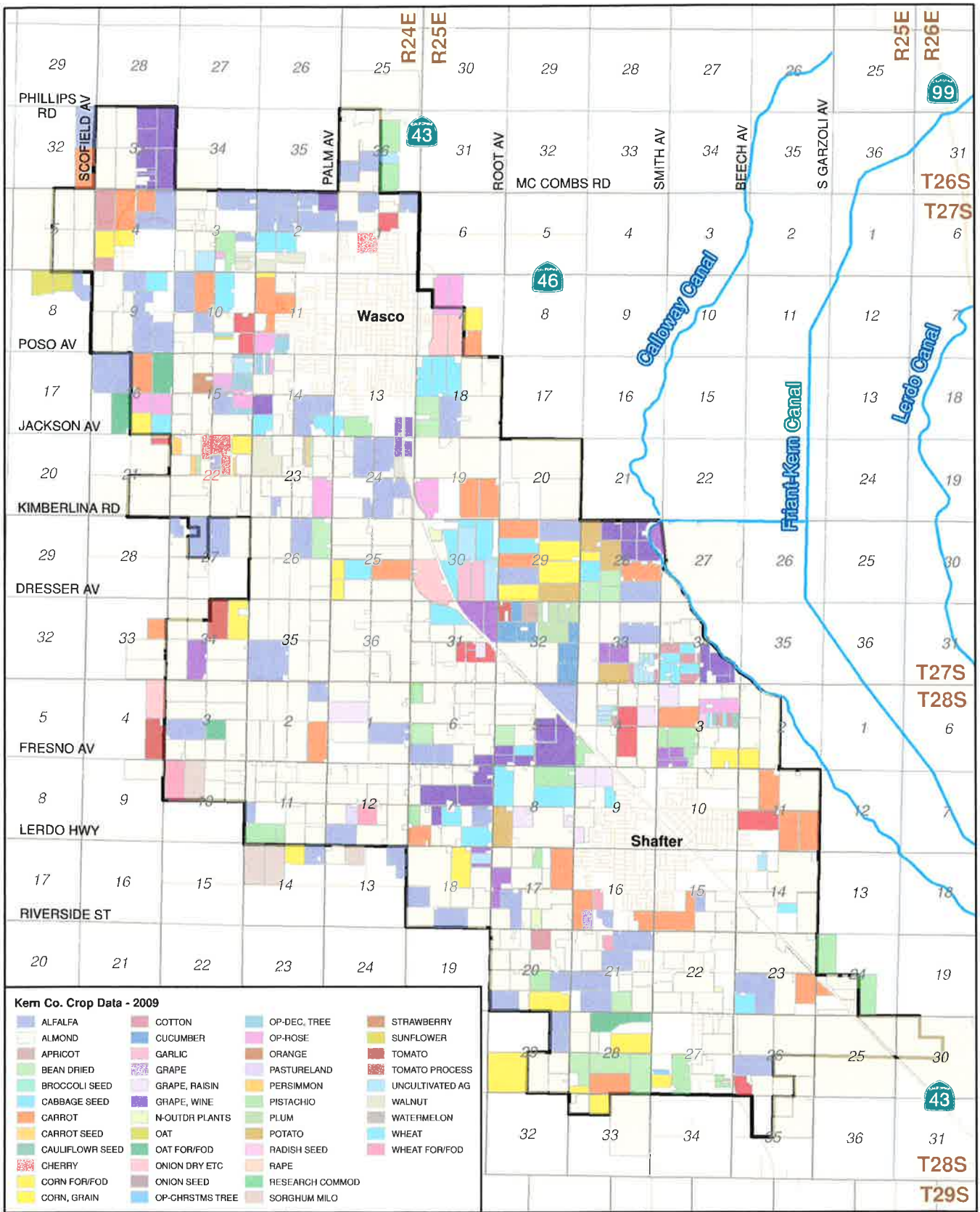
Facilities

Figure x

12/15/2011 \\shotgun\bkf_clients\Clients\Shafter-Wasco ID-2007\20071183 - GWMP Update\GIS\Map\facilities.mxd



12/15/2011 \\shotgun\bkf_clients\Clients\Shafter-Wasco ID-2007\200711B3 - GWMP Update\GIS\Map\wells.mxd



EST 1968
PROVOST & PRITCHARD CONSULTING GROUP
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1800 30th St. Suite 280
Bakersfield, CA 93301
(661) 616-5900

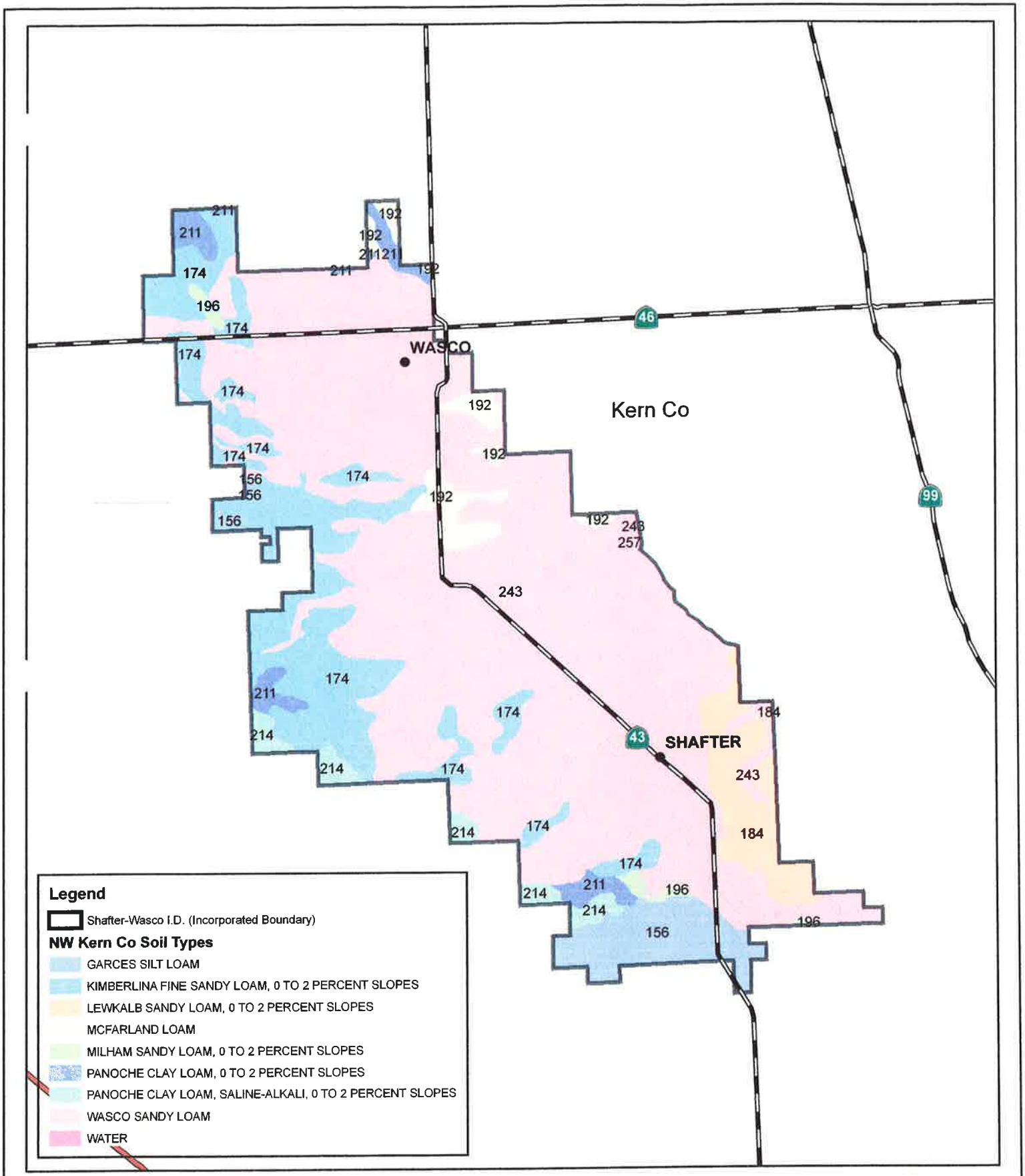
Legend

SWID Boundary

Shafter-Wasco Irrigation District

Crops

Figure x



Shafter Wasco ID
Soil Survey Northwestern Kern County

**see accompanying table for soil description

Date: February 16, 2007
Path Name: K:\serysian\projects\water conservation\soil maps\FRIANT Districts\shafter_wasco\shafter_wasco.mxd

Shafter Wasco Irrigation District - soil Survey Kern County northeast		
map symb	**Sum_Acres**	**soil description**
156	1829.35	GARCES SILT LOAM
174	6298.52	KIMBERLINA FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES
184	1724.54	LEWKALB SANDY LOAM, 0 TO 2 PERCENT SLOPES
192	996.13	MCFARLAND LOAM
196	251.73	MILHAM SANDY LOAM, 0 TO 2 PERCENT SLOPES
211	997.56	PANOCHE CLAY LOAM, 0 TO 2 PERCENT SLOPES
214	767.86	PANOCHE CLAY LOAM, SALINE-ALKALI, 0 TO 2 PERCENT SLOPES
243	26125.03	WASCO SANDY LOAM
257	2.82	WATER

ATTACHMENT B

RULES AND REGULATIONS

FOR WATER SERVICE
SHAFTER-WASCO IRRIGATION DISTRICT

Adopted April 8, 1997

A. AUTHORITY, CONTRACTS AND DEFINITIONS

(1) Authority:

Division 11 Irrigation Districts Part 5, Chapter 2 Article 2 Section 22257 of the California Code states as follows:

Each District shall establish equitable rules for the distribution and use of water, which shall be printed in convenient form for distribution in the district.

(2) Applicable Contracts with United States of America:

The District receives its surface water supply under a water service contract with the United States from the Central Valley Project and delivers its supply through a pipeline distribution system constructed by the United States.

(3) Definitions:

The following definitions shall be applicable to these Rules and Regulations:

- Board: The Board of Directors of the Shafter-Wasco Irrigation District.
- Bureau: Bureau of Reclamation of the United States Department of Interior.
- District: Shafter-Wasco Irrigation District
- Water User: The individual or entity who either owns or leases property within the District and makes application with the District for Agricultural or M&I water service and is responsible for ordering, controlling, using and paying for water received from the District.
- Water Year or Year: March 1 through the last day of February.
- Agriculture Water: Agricultural use shall mean use of water primarily in the commercial production of agricultural crops or livestock, including domestic use incidental thereto, the watering of livestock, and underground water replenishment.

- Municipal and Industrial Water (M&I): Municipal and Industrial use shall mean use of water other than for agricultural use and deliveries to parcels less than 2-acres or parcels less than 5-acres with unapproved agricultural water use.

- Base Year: The Base Year is the most recent year when the Board declares a Base Year due to availability of a large water supply. A turnout's allocation is established in a base year based upon the quantity of water delivered through the turnout in that base year.

B. DELIVERY OF WATER

(1) Water Use

(a.) The District's water supply is in a raw, untreated condition, and as a result it is considered to be unfit for human consumption without treatment. The District does not warrant the quality of water delivered and is under no obligation to construct or furnish water treatment facilities or maintain or better the quality of water.

(b.) The District sells water as a commodity only and not as a guaranteed service and will not be liable for defective quality of water, shortage of water, either temporary or permanent, or for failure to deliver water or delay in doing so. The District assumes no liability for damages to persons or property occasioned through defective works.

(c.) Water received through District farm delivery outlets shall not be used to irrigate ineligible lands as determined by the Reclamation Reform Act (RRA). Violators are subject to a cut off of water delivery until the situation is rectified and may be assessed the full-cost rate, plus interest, for any such water delivered.

(d.) Water received under the District contracts with the United States shall not be used to irrigate lands outside of district boundaries, except in certain circumstances as determined by the Bureau and the Board. Violators are subject to cut off of water delivery and other penalties, which may be prescribed by law.

(e.) A Landowner selling any part of his land served by a turnout of the District shall reach an agreement with the purchaser regarding water provided by the District and the use of facilities employed to deliver water provided by the District. The District at its convenience if approved, will install new or additional service facilities. All costs incident to the new installation are to be paid for in advance. When land is sold or otherwise transferred to another party, the District will be under no obligation to deliver water to such land until a new Water Order is signed and filed with the District by the new owner. Water delivered by the District shall not be transferred for usage on lands ineligible to receive such water.

(f.) The District assumes no responsibility for water after it passes through its turnout and into a private pipeline or ditch. As a condition for water service, Water User shall indemnify and shall assume the defense of and hold harmless the District and its officers, agents and employees for any and all loss, damage, liability, claims or cause of action of every nature whatsoever, for damage to or destruction of property, including the District's property or for injury to or death of persons, in any manner arising out of or incidental to the control, carriage, handling, use, disposal or distribution of water once it has passed the District's meter.

(2) Water Orders

(a.) Each year prior to February 15, Water Users shall file on a form provided by the District, a "Water Order" for the forthcoming Water Year. Said application shall contain the following:

1) Name and address of the Water User.

2) Farm delivery numbers, assessed acreage, and ownership for each delivery.

3) If the Water Order is for leased land, the Landowner must also sign the Water Order along with the Lessee.

(b.) The Water Year begins on March 1. Water Orders received after the above deadline may result in a delay of water service while the Water Order is reviewed. Late water orders will be filled dependent on availability of water. In any case, water deliveries will be delayed a minimum of 48 hours after the forms are received.

(c.) When a Water User consists of more than one person (e.g. undivided ownership, community outlet, etc.), or when a Water User is an entity (e.g. partnership, corporation, etc.) to a turnout or turnouts, the District may require the Water User file with the District a written instrument appointing a general agent for the purpose of performing any and all acts to be done by the Water User (except permanent assignments of rights) and for receiving all notices, billings and refunds from the District. Failure to appoint such an agent upon request will result in a requirement to pay for water in advance of delivery or discontinuance of water delivery to the turnout or turnouts until an agent has been appointed. Any one acting in a representative capacity for a Water User may be required to furnish evidence to the satisfaction of the District of his authority to so act. The authority of such agent shall continue until a written revocation or a superseding appointment is filed with the District.

(3) Reclamation Law Forms

(a.) The Water Order must also be accompanied by the proper Bureau Certification, or Verification forms for the forthcoming Water Year (unless previously submitted), and any other form required by Federal Reclamation Law. Such forms must be completed

by the Landowner and where the Lessee leases the property. No water will be delivered until the forms are properly completed and submitted to the District office. Forms may be obtained at the District office.

(b.) District staff will review the forms for completeness, but are not responsible for any errors. The District is not responsible for deliveries made to Landholders filing forms with incorrect information or if no forms have been filed. The Landholder is responsible for filing forms on time and the correctness of the information thereon.

(c.) Upon the sale of land, change in a lease or other operating arrangements, both parties must notify the District verbally within 15 days and file new Certification or Reporting forms within 30 days. Reclamation Law does not allow water to be delivered to newly acquired land until the proper forms are filed with the District. Landholders not notifying the District of a change in status will be responsible for any charges incurred until such written notification is given.

(d.) If the proper forms are not filed within 30 days, the Bureau of Reclamation may take the position that any water that may have been delivered will be charged at "Full Cost Rate" from the date of the change of status until the forms are filed. In which case the water user will be responsible for such penalties.

(4) Water Delivery Conditions

(a.) Each Water User will be responsible for utilizing the quantity of water ordered. The District will make no charge for water transferred to the District or between water users within the District at anytime on or before September 15th of each Year. The District will make a minimum charge per acre-foot for each acre-foot of water transferred, and in turn sold by the District for a Water User after September 15th of each Year. If the District cannot sell the unused water, the Water User will be charged the District's cost of the unused water.

(b.) District personnel will perform all adjustments and turn-ons and turn-offs of water deliveries, gates, valves and pumps. Unauthorized individuals tampering with District facilities are subject to a misdemeanor charge as prescribed by the California Penal Code and liable for all damages including all costs of repair and/or discontinued service.

(c.) To operate the system, it is necessary to have access to valves, meters, etc. No delivery of water will be made to a Water User who blocks access to his delivery or provides an unsafe condition for District personnel.

(d.) Water deliveries will be limited or stopped when the Friant-Kern Canal or District facilities are taken out of service for maintenance purposes. Friant-Kern Canal maintenance is usually performed in the months of December and January.

(e.) Water users may not inject chemicals or fertilizers into their water supply through district facilities.

(5) Water Delivery Rules

(a.) The water user shall place **water orders** at least 24 hours in advance. For example, to have water turned on, off or adjusted on Tuesday morning, the water order must be placed with the District Dispatcher (phone 758-5369) by 9:00 A.M. Monday morning. The District dispatcher will take orders for water between the hours of 7:00 A.M. to 12:00 P.M. and 1:00 P.M. to 4:00 P.M. Monday through Friday and 7:00 A.M. to 9:00 A.M. on Saturday. No water orders are taken on Sundays and orders for Monday changes must be in by 9:00 A.M. Saturday. Do not place water orders through the Answering Service. The Answering Service is for reporting emergencies only. A secured, signed, and dated note may be left at an outlet that is scheduled for a service. It is recommended that the note be followed up with a call to the dispatcher. Changes will be granted based upon the condition of the availability of the water on the line and the canal.

(b.) No water orders for turn on of water can be placed and no turn on will be made if the water account is delinquent as shown in Section "D Payments," for any part of the current or prior water seasons. The District may record a notice of any delinquency with the office of the County Recorder of the County of Kern, State of California and/or pursue other remedies that are available. The District reserves the right to require payment in full in advance prior to the delivery of water to any Water User.

(c.) The District has a standby water tender to handle emergencies during off-duty hours. During holidays and off-duty hours the District has engaged an answering service to handle emergency calls. The emergency number is 758-5369. Please do not use this emergency service for a non-emergency use. An emergency is a broken valve, ruptured pipeline or similar failure, not an error in scheduling water. A charge will be made for emergency service after regular working hours.

(d.) In addition to the reasons stated above, the District reserves the right to turn off or reduce water deliveries in those instances of a Water User not taking care of his water and flooding roads or neighboring lands. Prior to turning off or reducing such a delivery an attempt will be made to reach by phone the responsible party causing the flooding.

(e.) Low flow deliveries, which do not register on the turnout water meter, will be charged a minimum of one acre-foot per month.

(f.) After water has been turned on except for dual service orders it shall run continuously day and night until ordered off or until the full amount of water ordered has been delivered. In the event water delivery must be reduced or turned off, through no fault of the District, the user will be billed for the full amount of water ordered.

(g.) On the day the order is put into effect the water tender will turn on or off at the time he passes the point of delivery on his regular morning run. Orders for a certain hour cannot be accepted, but the water tender will cooperate with the Water User as far as it is possible and still maintain efficient operation of the system. A delivery will be serviced

not more than one time per day except for dual service orders. The following lists when delivery service will be provided:

1. DELIVERY TURN-ONS will be made by the water tender 7 days a week.

2. DELIVERY TURN-OFFS
   a) June through August - Turn-offs will be made by the water tender 7 days a week.

   b) September through May - Turn-offs will be made by the water tender in the morning Monday through Saturday. No turn-offs on Sunday.

3. LATE DELIVERY TURN-OFFS
   a) June through August - Late turn-offs with an advance notice to the dispatcher will be made by the water tender by 11:00 Monday through Saturday.

   b) September through May - Late turn-offs, with an advance notice will be made by the water tender by 11:00 a.m. Monday through Friday.

4. DELIVERY ADJUSTMENTS
   a) Adjustments will be made by the water tender Monday through Saturday.

5. DELIVERY OUTLET TRANSFERS
   a) June through August - The water tender will make delivery outlet transfers Monday through Saturday before 2:00 p.m. After 2:00 p.m. see Dual Service.

   b) September through May - The water tender will make delivery outlet transfers Monday through Friday before 2:00 p.m. After 2:00 p.m. see Dual Service.

6. ADDITIONAL OUTLET SERVICE

   This service is available 7 days a week between the hours of 7:00 a.m. and during hours of daylight to 7:00 p.m. with a 24-hour advance notice. There will be an additional charge for each of the following services ordered:

   a) A 12-hour run for a turnout may be ordered for a turn-on and a turn-off on the same day.

   b) A delivery outlet transfer may be ordered after the normal outlet service hours listed above under **Delivery Outlet Transfers.**

   c) A delivery outlet turn-off may be ordered after the normal outlet service hours listed above under **Delivery Turn-Offs** and **Late Delivery Turn-Offs**.

C. ALLOCATION OF WATER

(1) General: Any Water User of lands within the District designated non-excess (or otherwise made eligible to receive water) who has otherwise complied with these Rules and Regulations and policies of the Board, including having timely submitted a Water Order for

water service, is entitled to water service made available to the District under the Contract with the Bureau.

(2) **Base Water Year:** During any Year the Board determines that a forecasted water supply is large enough to declare a Base Year. The water will be delivered to each turnout with eligible lands without restrictions. The turnouts allocation for future non-Base Years is established in a Base Year based upon the quantity of water delivered through the turnout in that Base Year. This policy is used to encourage surface water – groundwater conjunctive use by storing non-storable surface water when it is available in the District's groundwater supply by in-lieu of pumping groundwater recharge.

(3) **Non Base Water Year:** During any Year the Board determines that the forecasted supply is last than the Base Year such water will be allocated in accordance with the following policy.

(a.) Allocation of Water Supply: The District's annual available water supply for Agricultural and M&I use shall be allocated proportionately to all Water Users on the basis of the amount of water used per turnout in the Base Year. Adjustments in the water allocated will be applied as the water supply develops during the irrigation season.

(b.) A Water User may appeal to the board to establish a water allocation for land which did not use water in the prior Base Year or increase a water allocation for lands with below average use in the prior Base Year. The water allocation will be established at the District's average allocation for lands not previously irrigated with District water. An increase in the water allocation for land will only be granted up to the District's average allocation in cases of hardship. Before the last day of February of a year in which a Base Year is established, Water Users may appeal to the Board to be granted the District's average Base Year allocation for cases where they could not use historical amounts of water, due to cropping patterns or rental agreements.

(c.) If, during a year in which water is allocated, a parcel of land is sold, the remaining water, if any, allocated to that land would be assigned to the new owners. However, if the seller has used all of the water allocated to the land, either on the land or transferred to other land, the new owner will not have a water allocation until the next Water Year. The District does not control the transfer of water from one parcel to another within a Water User's operation.

(d.) Land that has been placed in an approved tract map for non-agricultural development will not be allocated agricultural water. If the land is so placed in the current Water Year in which agricultural water is allocated, the remaining allocated agricultural water not delivered as of the approval date of the tract map will be returned to the District. The Board may allocate municipal or industrial water to the land in accordance with the District's contract with the Bureau of Reclamation.

(e.) Water allocated to a particular Water User may be transferred to another Water User for use within the District upon the affected parties filing with the District a water transfer form. The District shall not be involved or a party to the terms of the transaction between the Water Users. Provided; however, water allocated as municipal

and industrial water, by the District's Water Service Contract with the Bureau, may not be transferred for use as irrigation water unless the municipal and industrial rate for water is paid to the District.

(f.) The District may permit individual Water Users to carry-over water allocated or acquired from the prior Water Year or to preuse water to be allocated in the next Water Year, as the case may be, upon the Water User timely submitting an application on a form provided by the District. In this connection, the District may establish a deadline for submitting such applications. Any such carry-over or preuse is subject to approval by the District each year.

(4) Allocation of Other Water from Bureau: Notwithstanding the foregoing, water made available by the Bureau beyond the District's contract providing for Class I and Class II water will be allocated without regard to Base Year allocation first to meet the demands of any eligible lands within the District (or otherwise qualified under reclamation law), and secondly when available shall be allocated equally on a per acre basis to owners or operators of ineligible lands within the District requesting service. Such water shall include, but not be limited to, water that is unstorable or flood flows.

(5) Allocation of Water Other than from the Bureau: In addition to the foregoing, water which the District acquires from sources other than the Bureau shall be marketed within the District to Water Users at a price which reflects the cost of acquiring such additional supplies, plus district operation and maintenance costs shall be allocated on a "first come, first serve" basis.

(6) Allocation of District Banked Groundwater in Other Districts: The district has entered into exchange programs to bank the district's surface water in large water years in the groundwater basin. This water will be returned to the district at the discretion of the Board and allocated as supplemental water or an augmentation to the district's surface water supply.

D. PAYMENT

(1) Water User Payments: Payments required to be paid prior to a Water User being eligible to receive water from the District include the following:

(a.) Standby Charges, annually fixed by the Board on a per acre basis for the availability of water and/or ground water benefits, assessed to all "irrigated lands," regardless of whether eligible or capable of receiving water from the District. The standby charges are collected and used to pay the District's operation and maintenance costs and capitol obligations.

(b.) Assessment charge, annually fixed by the Board on an ad valorem basis for the availability of water and/or ground water benefits, assessed to all "irrigated lands," regardless of whether eligible or capable of receiving water from the District and

collected by the County of Kern along with property taxes. The assessments are collected and used to pay for the District's operation and maintenance costs and capitol obligations.

(c.) **Water rates**, annually fixed by the Board on a per acre-foot basis and paid for by Water Users in the manner set forth following. The Board shall set a basic water rate to cover District costs attributable to providing water service to all Water Users, including but not limited to the following costs: Water, District operation and maintenance, administration, debt service (to the extent not covered by the standby charge or assessment) and reserve accounts. The water rate will be approximately 75% of the energy cost to pump groundwater in the district.

(d.) **Bureau charges**, including full O&M charges, full-cost charges, restoration charges, Friant Surcharges and interest where applicable, fixed by the Bureau and added to water rates as applicable, and paid by Water Users in the matter set forth following. The District may impose an administrative charge in addition to such Bureau charges.

(e.) **Non-Contract water,** such as water purchased from outside the District or groundwater put into the District's distribution system, will be annually fixed to cover District costs attributable to delivering such water, including, but not limited to, the following costs; District operation and maintenance, administration, debt service, Bureau of Reclamation charges for use of federal facilities and any other transportation charge. The District reserves the right to deny any request for delivery of such water if it may create capacity or water quality problems. Such water sold as supplemental surface water will be at a minimum of $5/AF more than the districts base water rate.

(f.) **District Banked Groundwater**, delivered to lands in the district through neighboring district's facilities the water rate will be set at the average annual district water cost plus the district's average annual operation and maintenance cost of the years in which the water was banked.

(g.) **Carry Over Water,** water users who submit a request to carry water over into the following Water Year will pay for the water in the current Water Year at rates charged by the District and if carry-over is approved, any additional costs of storing and returning the water in the carry-over Water Year. Carry-over water will be the first water used by the Water User in the Water Year.

(h) **Preuse Water**, Water users requesting preuse water, will if approved, pay for the water used at rates charged by the District in the Water Year from which the water is preused. Preuse will reduce the Landholder's allocation for the next Water Year.

(2) **Payment Due Dates:** The water service contract with the Bureau requires the District to prepay for all water prior to delivery to the District and, therefore, the following regulations will apply:

(a.) Payments for monthly water bills are due and payable on or before the 25th of each month for water used the prior month. If the 25th falls on Saturday or Sunday, payment must be received in the office by 8:30 a.m. on the following Monday. Payments not

received in the office by 5:00 p.m. on the 25th will be assessed a penalty plus interest, and no water orders will be accepted until payment is made in full.

(b.) Water users which are in arrears in payment to the District of any water rates, Bureau charges, or other charges, penalties or interest, will not receive District water until payment in full is made as set forth above.

(c.) The first installment of standby charges is due by **March 1**, of every year and must be paid before water is delivered. The second installment of standby charges is due by **July 1**, of each year. All delinquent standby charges not paid by March 31, for the first installment and July 25, for the second installment will be charged a late payment penalty. The penalty of 10% or $50, *whichever is greater,* will be billed for *each* unpaid standby installment charge. The late payment penalty will be added to the user's water billing statement. All delinquent standby charges not paid before July 25 will be placed on the County Tax Roll for collection.

(3) Payment of Bills by Check: For payment of bills by check, other than those signed by the Water User and applicant, the District requires the name of the account being paid. Checks, which do not identify the account being paid, will be returned. When paying two or more accounts, the District requires a separate check for each account being paid in order that a true and exact audit trail can be made. Checks received paying for more than one account will be returned. Penalties and interest will be assessed if the account becomes delinquent.

(4) Checks Returned to District: Checks returned for insufficient funds will be charged an additional service charge. All accounts paid by such check will be delinquent and assessed penalties as above.

(5) Delinquent Payments: As prescribed by Water Code Section 25806 any charges for water and other services, or either remain unpaid, together with interest and penalties, constitutes a lien upon the real property within the District for which the services were provided upon the District filing a certificate with the County Recorder, which lien shall have the same force, effect and priority as a judgment lien. When the charges have become delinquent, they may be collected in the manner provided for the collection of delinquent assessments. This remedy is in addition to other remedies provided by law.

(6) Landowner and/or Tenant Accounts: In case any charges for water and other services or either (including charges for water ordered, but not used) remain unpaid, both the undersigned Landowner and/or Tenant shall be held jointly and severally liable for the unpaid charges.

E. ENFORCEMENT OF RULES AND REGULATIONS --APPEALS -- AMENDMENTS

(1) Authorization: The Secretary-Manager of the District is authorized to perform all acts necessary and proper to enforce these Rules and Regulations. Failure of a Water User to comply with any of these Rules and Regulations shall be sufficient cause for the termination of water service, and water service will not again be furnished to such Water User until full compliance has been made with all the requirements as herein set forth; PROVIDED, HOWEVER, that Water User in no way be relieved of any responsibility for payment of any charges or obligations by reason of such termination of water service. When it is practicable to do so, advance notice of any such termination of water service will be furnished to Water User. In no event shall any liability accrue against District or any of its officers, agents or employees' for damage, direct or indirect, arising from such termination of water service. Non-enforcement of any provision of these Rules and Regulations does not constitute a waiver of the District's right of enforcement at any time.

(2) Appeals: In the event a Water User disagrees with a decision made by the Secretary-Manager in carrying out the enforcement of these Rules and Regulations, he/she shall have the right of appeal to the Board. Appeals should be submitted in writing no less than five (5) days prior to a regular meeting of the Board in order to be considered at that meeting, and shall specifically set forth the decision being appealed and shall give the reasons for said appeal.

(3) Application: If any provisions of these Rules and Regulations, or the application thereof to any person or circumstance, are held invalid, the remainder of these Rules and Regulations and the application of their provisions to other persons or circumstances shall not be affected thereby.

(4) Effective Date: These Rules and Regulations shall become effective April 8, 1997, and may be added to, amended or repealed at any time by action of the Board of the District.

ATTACHMENT C

CERTIFIED TEST REPORT

CUSTOMER: TECHNOFLO SYSTEMS-AG

MODEL NO: LP31-06

METER SERIAL NO: 20110898

CONFIGURATION

METER INSIDE DIAMETER: 6

DIAL: AFT X 0.001 256/1

GEARS: 34J / 27D

ACTUAL METER INDEX: 0.2142

TEST FACILITY: Volumetric

As Calibrated

CALIBRATION DATA

	FLOW RATE GPM	% ACCURACY
1	0.17	702978.81
2	657.78	101.31
3	207.25	98.98

TEST DATE: 4/28/2011

CERTIFIED BY: Paul Hobbs

PRINT DATE: 4/28/2011

This calibration was performed on a gravimetric or volumetric test facility, traceable to the National Institute of Standards and Technology, USA. The estimated flow measurement uncertainty of the calibration facilities are:
Gravimetric +/- 0.15% Volumetric +/- 0.5%

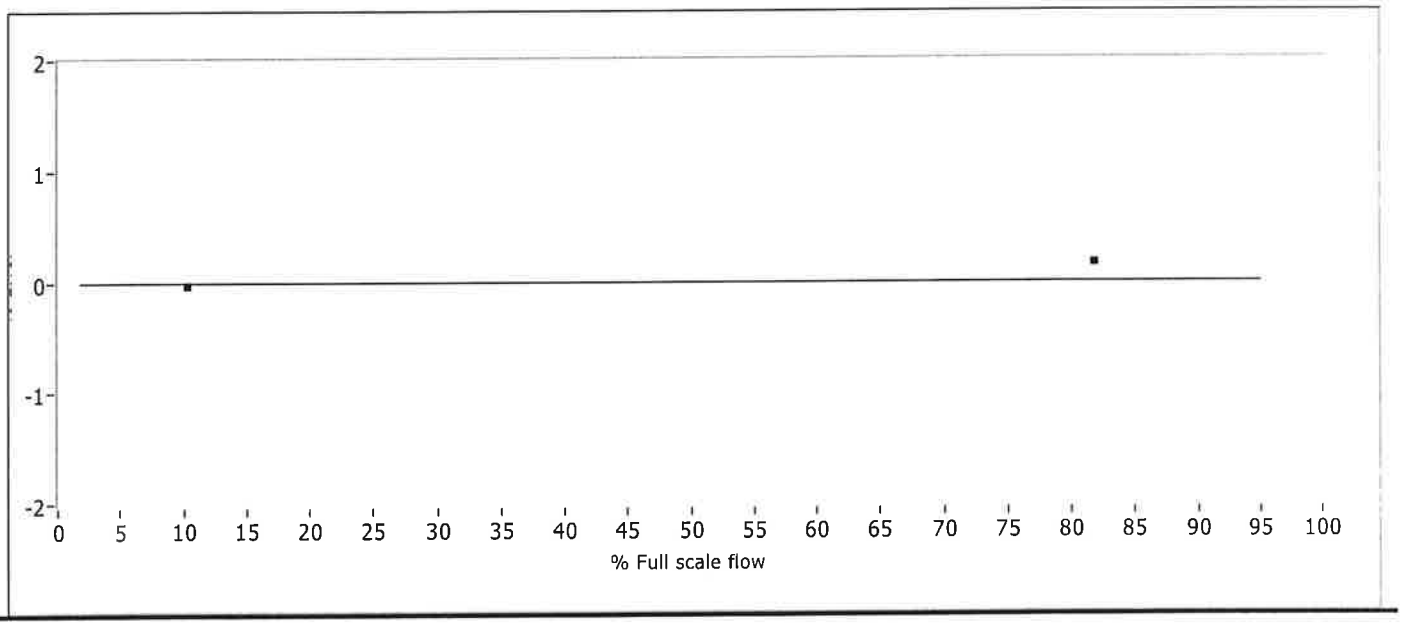
McCROMETER
3255 WEST STETSON AVENUE
HEMET, CA 92545 USA
PHONE (951) 652-6811 / FAX (951) 652-3078
WEB SITE: http://www.mccrometer.com E-MAIL: info@mccrometer.com

20110898

SeaMetrics 17102

METER CALIBRATION REPORT

Model AG2000-800	**Rate Units GPM**	**Total Units AF**
Serial Number 02120977	**10% Flow Rate (GPM) 225.3**	**% Error -0.0255**
Pulse Output 3.344 PPG	**High Flow Rate (GPM) 1800**	**% Error 0.17**
Calibrated by: nick	**Date: 3/13/2012**	**Time: 5:36 AM**



Temp (F)	Flow (GPM)	Meter Output (PPG)	Type A Uncertainty	Type B Uncertainty	Combined Expanded Uncertainty
77.5	1800	3.35	0.00569	.35%	0.0261
77.5	225	3.343	0.000851	.35%	0.0235

1) Type A uncertainty was the bias, where bias = nominal output – measured output. Degrees of freedom was equal to 1.

2) Type B uncertainty was the uncertainty of meter output and flow rate measurements at the 67% confidence probability. Contact SeaMetrics for documentation regarding measurement uncertainty and the calibration system.

3) The combined expanded uncertainty was twice the Root Sum Square (RSS) of the bias and measurement uncertainty. Combined Expanded Uncertainty = 2xRSS(bias, measurement uncertainty). Coverage factor was equal to 2.

4) Meter output and flow rate measurements are traceable to NIST.

See: Peery J, and Frederick J. "A Measurement Assurance Program for Flow Calibration by the Transfer Method." Cal Lab Magazine, Jan., 2005

SeaMetrics Incorporated 19026 72nd Avenue South Kent, Washington 98032 USA
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WATER SPECIALTIES™
PROPELLER METER

4"-20"
VERTICAL UPFLOW METERS
MODELS
VF27, VF28, VF29, VF30

OPERATION AND MAINTENANCE MANUAL
PARTS LIST

FEATURING:
*STANDARD TOTALIZER ASSEMBLY
*MODEL CN06-2 INDICATOR-TOTALIZER
*CERAMIC BEARING CARTRIDGE PROPELLER
*ONE PIECE SEPARATOR/SPINDLE AND THREADED REVERSE THRUST BEARING CARTRIDGE

McCROMETER
3255 WEST STETSON AVENUE
HEMET, CALIFORNIA 92545 U.S.A.

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WARRANTY

This Warranty shall apply to and be limited to the original purchaser consumer of any McCrometer product. Meters or instruments defective because of faulty material or workmanship will be repaired or replaced, at the option of McCrometer, free of charge, FOB the factory in Hemet, California, within a period of one (1) year from the date of delivery.

Repairs or modifications by others than McCrometer or their authorized representatives shall render this Warranty null and void in the event that factory examination reveals that such repair or modification was detrimental to the meter or instrument. Any deviations from the factory calibration require notification in writing to McCrometer of such recalibrations or this Warranty shall be voided.

In case of a claim under this Warranty, the claimant is instructed to contact McCrometer, 3255 W. Stetson Ave., Hemet, California 92545, and to provide an identification or description of the meter or instrument, the date of delivery, and the nature of the problem.

The Warranty provided above is the only Warranty made by McCrometer with respect to its products or any parts thereof and is made expressly in lieu of any other warranties, by course of dealing, usages of trade or otherwise, expressed or implied, including but not limited to any implied warranties of fitness for any particular purpose or of merchantability under the uniform commercial code. It is agreed this Warranty is in lieu of and buyer hereby waives all other warranties, guarantees or liabilities arising by law or otherwise. Seller shall not incur any other obligations or liabilities or be liable to buyer, or any customer of buyer for any anticipated or lost profits, incidental or consequential damages, or any other losses or expenses incurred by reason of the purchase, installation, repair, use or misuse by buyer or third parties of its products (including any parts repaired or replaced); and seller does not authorize any person to assume for seller any other liability in connection with the products or parts thereof. This Warranty cannot be extended, altered or varied except by a written instrument signed by seller and buyer.

This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

McCrometer reserves the right to make improvements and repairs on product components which are beyond the Warranty period at the manufacturer's option and expense, without obligation to renew the expired Warranty on the components or on the entire unit. Due to the rapid advancement of meter design technology, McCrometer reserves the right to make improvements in design and material without prior notice to the trade.

All sales and all agreements in relation to sales shall be deemed made at the manufacturer's place of business in Hemet, California and any dispute arising from any sale or agreement shall be interpreted under the laws of the State of California.

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The published technical data and instructions is subject to change **without notice**. Contact your McCrometer representative for current technical data and instructions.

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***For Indicator-Totalizer Models Only**

VERTICAL UPFLOW METER INSTALLATION

I.UNCRATING. When uncrating the meter, any damage due to rough or improper handling should be reported to the transportation firm and McCrometer. If for any reason it is determined that the unit or parts of the unit should be returned to the factory, please contact McCrometer for clearance prior to shipment. Each unit must be properly crated to prevent any further damage. The factory assumes no responsibility for equipment damage in return shipment due to improper packaging. The shipping crate contains the following items:

Vertical Upflow Meter with Standard Totalizer (VF27 or VF29) 1
Vertical Upflow Meter with CN06-2 (VF28 or VF30) 1
Mounting Equipment as required ..... -
Operation and Maintenance Manual 1
Tool T-2402-1 1

II.INSTALLATION of McCrometer Vertical Upflow Meters varies depending upon the type and model of meter selected for each application. The meter must have a full flow of liquid for proper accuracy. The meter installations fall into two basic categories:

1. **MODEL VF27 and VF28** are designed to allow installation to an appropriate cast iron or fabricated steel tee. These tees usually replace an elbow in existing systems. Fully opened gate valves, fittings, or other obstructions that tend to set up flow disturbances should be a minimum of five pipe diameters upstream from meter location.

2. **MODEL VF29 and VF30 TEE** can be installed similar to placing a flanged elbow or tee in the line. Installation can be made to any vertical discharge concrete turnouts with proper anchor bolts. The meter must be installed upright for a full flow of liquid through the pipe to assure proper accuracy. Fully opened gate valves, fittings, or other obstructions that tend to set up flow disturbances should be a minimum of five pipe diameters upstream from the meter location.

VERTICAL UPFLOW METERS OPERATION AND MAINTENANCE MANUAL

III.MCCROMETER products have been carefully designed to be as maintenance free as possible. Periodic preventive maintenance, however, is highly recommended and should be practiced according to schedule to assure continuous accuracy and trouble-free performance of your propeller meters. The maintenance and inspection procedure can also be used as a guide to locating a problem in the unit that may be the cause of abnormal meter operation.

Routine preventative maintenance should be performed on

all meters, which includes cleaning and an inspection of the propeller and its bearing. The intervals between inspections depend on the water quality and the usage of the meter. The initial inspection should be performed after one to two years of service, to determine the period between future inspections. After five to ten years, the completer meter should be inspected to ensure years of dependable service.

IV.METER HEAD ASSEMBLY should be removed from the tee or meter tee tube by removing the meter head bolts (#45) and lifting the entire head assembly upward, taking care not to damage the propeller assembly as it is pulled clear of the tee flanged end. Inspect the meter head o-ring (#44) or flat gasket for any signs of damage and replace if necessary. Replace the meter head assembly with a dummy cover plate if the service line is to remain in operation.

V.WORKING AREA chosen for disassembly and reassembly of the internal meter components should be clean to reduce the chance of dust or dirt particles being introduced into the meter mechanism.

VI.TOTALIZER ASSEMBLY (#4) service procedure should include cleaning and inspection of the unit noting any excessive wear on the change gears (#7 & #8) that may lead to operational problems in the unit.

1. **BONNET MOUNTING SCREWS (#3)** should be removed and the entire bonnet (#1) lifted off the meter.

2. **TOTALIZER** is contained within the totalizer bonnet (#1) and held in place by a base cup (#5). It should not be necessary to remove the totalizer (#4) during inspection; however, removal of the base cup (#5) is necessary for inspection of the totalizer change gears (#7 & #8). Removal of the base cup (#5) can be accomplished by inserting a small screwdriver into the two cutouts and prying upward under the edge.

3. **TOTALIZER CHANGE GEARS (#7 & #8)** should be inspected for any sign of wear. Both the A-(drive) gear and B-(driven) gear are attached to the lower portion of the totalizer assembly (#4). Spin the floating totalizer driven magnet in the center of the totalizer bottom (#4) to make certain it spins freely without bind or drag. The bottom of the totalizer has the letter "A" molded next to the A-drive gear shaft, and the letter "B" next to the B-driven gear shaft.

4. **TOTALIZER DRIVE MAGNET ASSEMBLY (#12)** located in the meter head (#13) at the top of the vertical shaft assembly (#23) should be checked and adjusted, if necessary, to position it 1/16" below the top surface of the meter head (#13). Adjustments can be made by loosening the socket head set screw in the side of the totalizer drive magnet assembly (#12) and sliding it up or down the vertical shaft (#23) as desired. Always be sure the set screw is tightened into the flat area on the vertical shaft (#23).

***VII.INDICATOR-TOTALIZER** service procedure includes removal, cleaning and inspection of the unit noting any excessive wear on the gears and other wear points that may lead to operational problems in the unit.

***1. BONNET MOUNTING SCREWS (#3)**, located beneath the indicator-totalizer bonnet lid, should be removed and the entire bonnet (#1) lifted off the meter. Replace the o-ring seals around each of the four screws (#3) and at the bottom of the bonnet (#4) and cover each of the new o-rings with a thin coat of silicone grease.

***2. INDICATOR MOUNTING SCREWS (#6)** and shake-proof washers (#7) holding the indicator-totalizer unit (#5) to the meter head (#13) should be removed and the unit lifted off, exposing the A-drive gear (#11) attached to the top of the vertical shaft (#23).

***3. METER CHANGE GEARS** should be inspected for any sign of wear. The A-(drive) gear (#11) is attached to the top of the vertical shaft (#23), and the B-(driven) gear (#12) is attached to the bottom of the indicator (#5). The position of the A-drive gear should be checked and adjusted, if necessary, to position the top face of the gear 1/8" below the top surface of the meter head (#13). The position of the B-driven gear top face should be 1/8" below the bottom of the indicator-totalizer.

***4. INDICATOR-TOTALIZER** unit (#5) should be cleaned thoroughly using a mild soap and a soft brush. Under no circumstances should the entire unit be immersed in the soap or should any metal object be used when cleaning and inspecting the internal parts of the indicator-totalizer unit.

***5. GEARS** within the indicator-totalizer unit (#5) should be inspected carefully. If any excessive wear is visible on the gear teeth and other wear points, the unit must be returned to McCrometer for repair.

VIII. VERTICAL SHAFT ASSEMBLY (#23) is pulled directly out the top of the meter after removing two screws (#29) inside the meter head (#13) holding the vertical shaft support plate (#28) and bearing assembly (#26) to the meter head (#13). Spin both the upper bearing assembly (#26) and the lower bearing assembly (#24) gently, checking for any sign of wear. Inspect the vertical shaft assembly (#23) to be sure it is not bent or damaged.

IX.PROPELLER ASSEMBLY (#31) inspection should include cleaning the ceramic sleeve bearing (#33), separator assembly (#18), drive magnet (#35), and the propeller assembly (#31).

1. **PROPELLER REMOVAL** can be accomplished by first removing the thrust bearing cartridge assembly (#42). Loosen the set screw (#41) in the side of the nose of the propeller. Remove the thrust bearing cartridge (#42) by turning it counterclockwise while holding the propeller in place.

2. **REVERSE THRUST BEARING CARTRIDGE (#38)** must now be removed. Turn the propeller (#32) so that the Allen wrench clearance hole is lined up with the set screw in the side of

***For Indicator-Totalizer Models**

the reverse thrust bearing cartridge (#38). The location of the set screw is marked by a small hole drilled in the face of the reverse thrust bearing cartridge. With a 5/64" Allen wrench, loosen the set screw (#39) in the reverse thrust bearing cartridge (#38) two to three turns, which will allow the cartridge to be unscrewed without damaging the spindle thread. **Note:** If the bearing area appears to be clogged with dirt or sediment, making it difficult to locate the set screw (#39) or to allow the Allen wrench to fit into the set screw socket, then the bearing area should be flushed out with water. Insert Tool T-2402X-1 into the propeller through the threaded nose. The tabs in the tool should engage in the screwdriver slot in the end of the reverse thrust bearing cartridge (#38). Remove the propeller assembly (#31) and reverse thrust bearing cartridge (#38) by turning Tool T-2402X-1 counterclockwise, unscrewing the reverse thrust bearing cartridge (#38) from the spindle (#19). The propeller assembly with reverse flow cartridge will now slide off the spindle. **WARNING:** If the reverse thrust cartridge does not unscrew easily, it may be because the set screw was not unscrewed enough. If unscrewing the reverse flow cartridge is continued with the set screw binding on spindle thread, damage to thread could occur.

3. **WATER LUBRICATION** of the ceramic sleeve bearing (#33) is achieved by means of two openings in the end of the thrust bearing cartridge (#42) which allow air to be purged from the bearing area. These should be cleared of any foreign material by running a small wire through the holes on either side of the screwdriver slot.

4. **CERAMIC BEARING CARTRIDGE (#33)** and drive magnet (#35) should be cleaned of any foreign material and inspected for damage. Using a bottle brush, thoroughly clean the ceramic bearing surface (#33) and the magnet inside diameter (#35). After cleaning the propeller, flush the inside out with water. The outside surfaces of the propeller should also be cleaned to assure a smooth, unrestricted flow across the surface of the propeller. Do not use an oil based solvent in cleaning, as damage to the assembly could occur.

5. **SPINDLE CERAMIC SLEEVE (#20)** and the O.D. or surface of the separator (#18) should be cleaned and inspected for any substantial amount of wear. The thrust bearing (#4.3) should be checked for any damage. If it is determined that the spindle ceramic sleeve (#20) or separator (#19) are worn sufficiently, the separator/support spindle assembly (#18) should be replaced.

6. **SEPARATOR/SUPPORT SPINDLE ASSEMBLY (#18)** can be removed for replacement by removing the four mounting screws (#21) which thread into the gearbox. Separator o-ring (#22) should be replaced and the new o-ring (#22) covered with a thin coat of silicone grease. The separator/support spindle assembly (#18) can then be replaced in the front of the drop pipe (#14) with a firm push, gently rotating the assembly at the same time. Replace and tighten the four mounting screws (#21).

7. **PROPELLER INSTALLATION** is accomplished by following these steps: **a)** The reverse thrust cartridge set screw (#39) should be protruding out of the reverse thrust bearing cartridge so it will not bind up on the spindle thread. **Note:** Look through the end of the propeller and hole in the reverse thrust cartridge to be sure the set screw is not showing. **b)** Slide the propeller assembly onto the support spindle (#18) until the reverse thrust bearing cartridge (#38) contacts the threads on the end of the spindle (#19). Using Tool T-2402X-1, thread the reverse thrust bearing cartridge onto the spindle. If you feel any resistance when threading the reverse thrust cartridge on, stop at once and check to be sure the set screw is not binding on the thread. Be careful not to cross-thread the reverse thrust bearing cartridge. Thread the reverse thrust bearing cartridge (#32) onto the spindle (#18) until the trailing edge of the propeller contacts the drop pipe (#14). Set the proper end play by inserting a 5/64" Allen wrench into the reverse thrust bearing set screw (through the side of the propeller) and loosen the reverse thrust bearing cartridge (#38) 1/2 turn counterclockwise. Tighten the set screw in reverse thrust bearing cartridge. There should be approximately .020" clearance between the gearbox (#14) and trailing edge of the propeller when the propeller in pulled forward (away from the drop pipe). The propeller must not contact the drop pipe.

8. **THRUST BEARING CARTRIDGE ASSEMBLY (#42)** should be inspected for damage and replaced in the nose of the propeller. The thrust bearing cartridge (#42) is used to adjust the amount of longitudinal end play of the propeller assembly on its spindle (#19), which should be about 1/64". End play can be adjusted by turning the thrust bearing cartridge assembly (#42) clockwise until it tightens against the end of the support spindle (#19), then turning thrust bearing cartridge (#42) counterclockwise 1/8 of a turn. Tighten set screw (#41). Check the longitudinal end play of the propeller to ensure it's not excessive and does not allow the propeller (#31) to contact the drop pipe (#14). Check the clearance between the propeller (#31) and drop pipe (#14). The clearance should be approximately .010" between the drop pipe (#14) and trailing edge of the propeller when the propeller in pushed back (toward the drop pipe). The propeller assembly (#31) must spin freely.

9. **PROPELLER BEARING (#33)** can be checked for excessive radial play by rocking the propeller (#32) gently from side to side on the spindle (#19). Some play is required for proper operation of the water lubricated ceramic sleeve bearing.

X.INSPECTION of all internal meter parts that may be replaced in the field has been accomplished at this point. Should any of the meter parts, upon inspection, appear to be damaged or excessively worn, they must be replaced to assure proper meter operation and prevent further damage.

XI.REASSEMBLY is necessary at this point. Before reassembling any parts, make certain that each is cleaned of any dust or dirt and properly lubricated. Costs for replacement parts not covered by warranty are available from current parts and price

list. If it is determined that the meter should be returned for repair, please notify McCrometer prior to shipment. Each meter must be properly packaged to prevent damage to the meter in shipment.

1. **VERTICAL SHAFT ASSEMBLY (#23)** should be inserted gently into the separator (#18) through the opening in the top of the meter head (#13). Take care not to chip the ceramic magnet when replacing the shaft. Replace and secure two screws and shakeproof washers (#29 & #30) that hold the vertical shaft upper bearing support plate (#28) in place. Turn the top of the vertical shaft (#23) to check for any bind or drag. Should any bind or drag be apparent, it can usually be corrected by adjusting the vertical shaft collar and bearing assembly (#26). Loosen the set screw (#41) in the side of the assembly (#26) and slide the shaft (#23) downward until it rests against the bottom of the separator (#18), then lift up about 1/64". Tighten set screw (#41).

2. **TOTALIZER DRIVE MAGNET ASSEMBLY (#12)** should be checked again to make certain it is properly set to drive the totalizer (#4). (See step VI, 4.)

3. **TOTALIZER BASE CUP (#5)** can be placed back in the totalizer bonnet (#1) on the totalizer assembly (#4) after the desiccant capsule and the base cup o-ring (#6) are replaced. Be sure o-ring (#6) is on base cup (#5) properly.

4. **TOTALIZER BONNET ASSEMBLY (#1)** should be cleaned and replaced on the meter head (#13). Bonnet o-ring (#2) should be replaced and the new o-ring (#2) covered with a thin coat of silicone grease. Secure four screws (#3).

*5. **CHANGE GEARS (#11 & #12)** should be checked again to make certain they are in proper alignment (see step VII-3.)

*6. **INDICATOR-TOTALIZER** mechanism (#5) should be placed on the meter head (#13) with the mounting screws and shake-proof washers (#6 & #7). The B-driven gear (#12) should be set in the cutout in the meter head (#13). Do not tighten mounting screws (#6) until the gear mesh has been properly adjusted. To adjust gear mesh slide the indicator-totalizer mechanism (#5) towards the A-drive gear (#11) until the unit stops because of full gear mesh. Now back off the indicator-totalizer mechanism 1/64" and tighten mounting screws (#6).

*7. **INDICATOR BONNET ASSEMBLY (#1)** should be cleaned and replaced over the indicator-totalizer unit (#5) after the desiccant bag is replaced. Secure four screws (#2) beneath the bonnet lid. Do not overtighten the mounting screws (#2) as this will result in damage to the screw o-rings (#3).

8. **PROPELLER ASSEMBLY (#31)** should be dipped in water to lubricate the propeller ceramic sleeve bearing (#33). Spin the propeller (#32) gently to make certain the meter operates smoothly and no bind or drag is apparent.

***For Indicator-Totalizer Models Only**

9. **METER HEAD O-RING OR FLAT GASKET (#44)** should be inspected for any sign of damage. O-ring should be covered with a thin coat of silicone grease. The meter can now be installed in the service line. When replacing the meter on the line, make certain that the top of the meter tube or tee is smooth and free of any foreign material. Make certain that no foreign materials are attached to the inside of the service line pipe, as any flow disturbance or obstruction may affect the accuracy of the meter.

NOTES

4"-20" VERTICAL UPFLOW METERS
MODELS VF27, VF29
PARTS LIST

NO.	QTY.	PART NUMBER	DESCRIPTION
A	1	7-VF27-*	VERTICAL UPFLOW METER HEAD ASSEMBLY
B	1	7-VF29-*	VERTICAL UPFLOW METER HEAD ASSEMBLY
	1	6-4260	TOTALIZER & BONNET COMPLETE (ITEMS 1 THRU 6)
	1	7-4260	TOTALIZER & BONNET COMPLETE (ITEMS 1 THRU 8)
1	1	5-4316	TOTALIZER BONNET ASSEMBLY
	1	1-4317-2	TOTALIZER BONNET LID (W/PIN)
2	1	1-1551-38	O-RING, TOTALIZER BONNET
3	4	1-1115-10-10	SCREW, BONNET MOUNTING (ea.)
4	1	5-4260	TOTALIZER ASSEMBLY (SPECIFY DIAL)
	1	2-2310-‡	DIAL (AS SPECIFIED)
	2	1-1118-3-3	SCREW, DIAL MOUNTING (ea.)
	1	1-4276	SWEEP HAND
5	1	1-4318	BASE CUP, TOTALIZER
6	1	1-1551-17	O-RING, BASE CUP
7	1	3-4045	A-GEAR ASSEMBLY (SPECIFY # OF TEETH)
8	1	3-4045	B-GEAR ASSEMBLY (SPECIFY # OF TEETH)
12	1	3-2324	DRIVE MAGNET ASSEMBLY, TOTALIZER
13A	1	3-2401-*	METER HEAD (VF27 VERTICAL UPFLOW METER)
13A	1	2-2401-04	METER HEAD (VF27, 4" ONLY) VERTICAL UPFLOW METER
13B	1	2-2103	METER HEAD (VF29 VERTICAL TEE METER)
13C	1	2-2105	METER HEAD (VF29, 4" ONLY) VERTICAL TEE METER
14	1	3-2390-*	DROP PIPE ASSEMBLY
15	8	1-1251-6-16	BOLT, DROP PIPE TOP FLANGE (ea.)
16	-	1-1806	VIBRA-TITE, DROP PIPE BOLT
17	1	1-1551-25	O-RING, DROP PIPE TOP FLANGE
18	1	4-2455-2	SEPARATOR/ SUPPORT SPINDLE ASSEMBLY
20	1	1-1508-20	CERAMIC SLEEVE FOR SUPPORT SPINDLE
21	4	1-1103-8-7	SCREW, SEPARATOR/SPINDLE MOUNTING (ea.)
22	1	1-1551-24	O-RING, SEPARATOR
23A	1	3-2392-*	VERTICAL SHAFT & DRIVEN MAGNET ASSEMBLY FOR VF27-*
23B	1	3-4114-*	VERTICAL SHAFT & DRIVEN MAGNET ASSEMBLY VF29 4" ONLY
24	1	3-2306	SHAFT GUIDE & LOWER BEARING ASSEMBLY
25	1	3-2175	SET COLLAR ASSEMBLY
26	1	3-2352	VERTICAL SHAFT COLLAR & BEARING ASSEMBLY
27	2	1-1113-6-4	SCREW, VERTICAL SHAFT COLLAR & BEARING MTG. (ea.)
28	1	2-2305	VERTICAL SHAFT UPPER SUPPORT PLATE
29	2	1-1113-10-6	SCREW, SUPPORT PLATE MOUNTING (ea.)
30	2	1-1302-10	SHAKEPROOF WASHER, SUPPORT PLT. MTG. SCREW (ea.)
31	1	5-2425-‡-PT	PROPELLER ASSEMBLY (ITEMS 32 THRU 42)
32	1	3-2425-‡-P	PROPELLER
33	1	2-2426-P-1	CERAMIC BEARING CARTRIDGE
34	1	1-1116-8-6	SCREW, CERAMIC BEARING CARTRIDGE MTG.
35	1	2-1601-2	DRIVE MAGNET
36	1	1-2428-‡	DRIVE MAGNET RETAINING PLATE
37	2	1-1115-3-18	SCREW, DRIVE MAGNET RETAINING PLATE (ea.)
38	1	3-2402-2	REV. THRUST BEARING CART. ASSEM. (ITEMS 39 & 40)
39	1	1-1101-8-5	SET SCREW, THRUST BEARING
40	2	1-1509-1	CERAMIC THRUST BEARING, 3/16" DIA. (ea.)
41	1	1-1125-6	SET SCREW, NYLON POINT (ea.)
42	1	3-2356	THRUST BEARING CARTRIDGE ASSEMBLY
43	2	1-1510-1	CERAMIC THRUST BEARING, 1/4" DIA. (ea.)
44A	1	1-1557-*	GASKET, METER HEAD (VF27 VERTICAL UPFLOW METER)
44B	1	1-1552-‡	O-RING, METER HEAD (VF29 VERTICAL TEE METER)
45A	set	1-1253-‡	BOLTS, METER HEAD (VF27 VERTICAL UPFLOW METER)
45B	8	1-1251-8-24	BOLTS, METER HEAD (ea.) (VF29 VERTICAL TEE METER)
46A	set	1-1301-‡	WASHERS, METER HEAD BOLTS (VF27 METER)
46B	8	1-1301-14	WASHERS, METER HEAD BOLTS (ea.) (VF29 METER)
-	1	1-1607-5	DESICCANT CAPSULE

* INSERT METER SIZE TO COMPLETE PART NUMBER
(USE -04 FOR 4"; -06 FOR 6", - 08 FOR 8"; ETC.)

‡ CONSULT FACTORY

CONSULT FACTORY FOR PRICING.

When ordering replacement parts, please specify:
• Meter Size • Meter Model • Meter Serial Number

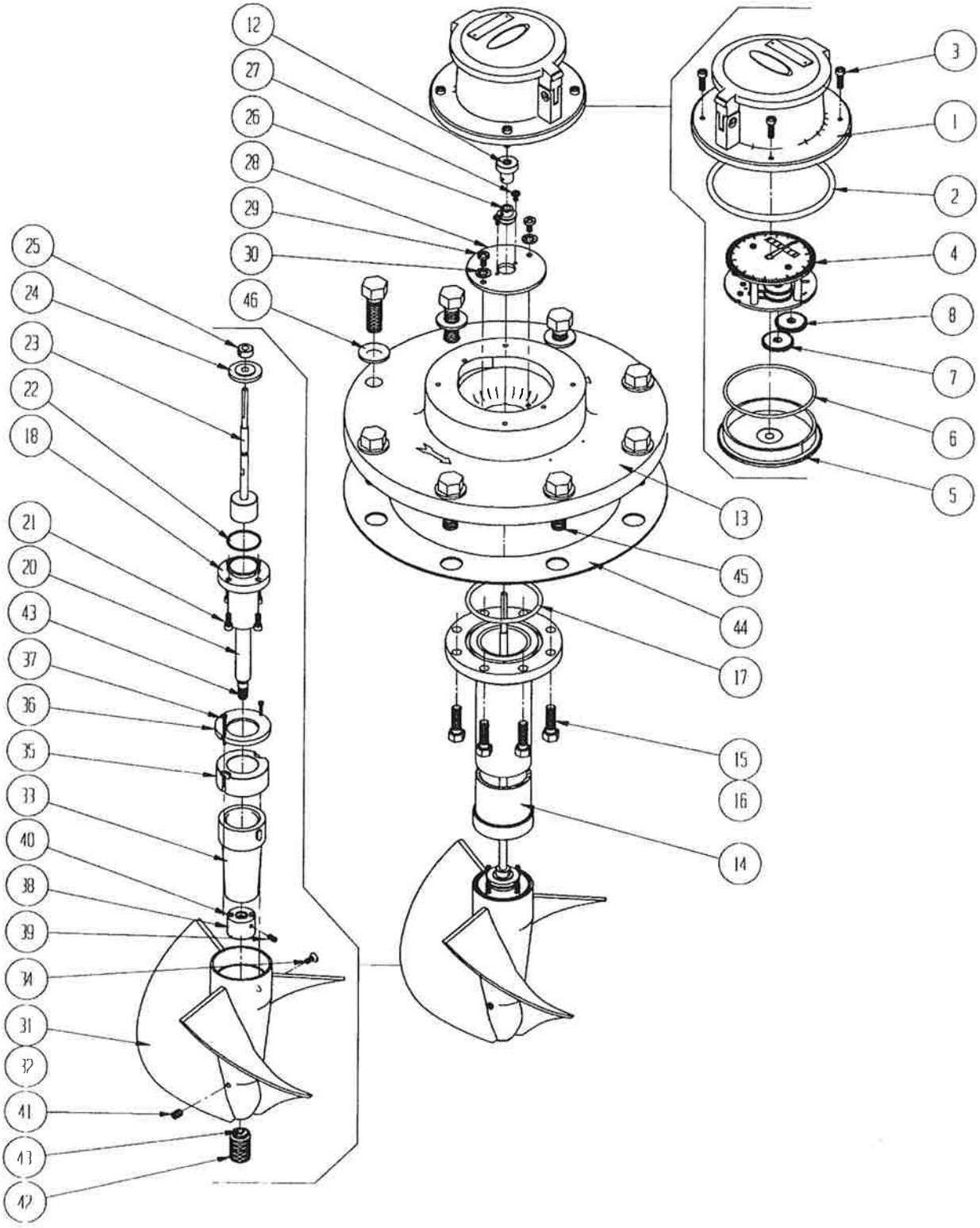
4"-20" VERTICAL UPFLOW METERS

MODELS VF27, VF29

*STANDARD TOTALIZER ASSEMBLY

*CERAMIC BEARING CARTRIDGE PROPELLER

*ONE PIECE SEPARATOR/SPINDLE AND THREADED REVERSE THRUST BEARING CARTRIDGE



4"-20" VERTICAL UPFLOW METERS
MODELS VF28, VF30
PARTS LIST

NO.	QTY.	PART NUMBER	DESCRIPTION
A	1	7-VF28-*	VERTICAL UPFLOW METER HEAD ASSEMBLY
B	1	7-VF30-*	VERTICAL UPFLOW METER HEAD ASSEMBLY
1	1	5-4337	INDICATOR-TOTALIZER BONNET ASSEM. (ITEMS 2 THRU 5)
	1	1-4338	INDICATOR-TOTALIZER BONNET LID (W/PIN)
2	4	1-1115-10-56H	SCREW, BONNET MOUNTING (ea.)
3	4	1-1551-6	O-RING, BONNET MOUNTING SCREW (ea.)
4	1	1-1551-49	O-RING, BONNET
5	1	5-CN06-2	INDICATOR-TOTALIZER MECHANISM (SPECIFY DIAL)
	1	1-4013-‡	DIAL (AS SPECIFIED)
	2	1-1118-3-3	SCREW, DIAL MOUNTING (ea.)
	1	1-4321	INDICATOR HAND
	1	1-4326	TEST HAND
6	2	1-1113-10-6	SCREW, INDICATOR-TOTALIZER MOUNTING (ea.)
7	2	1-1302-10	SHAKEPROOF WASHER, IND.-TOT. MOUNTING SCREW (ea.)
11A	1	3-2176	A-GEAR ASSEMBLY (5-15 TEETH) (SPECIFY # OF TEETH)
11B	1	3-2157	A-GEAR ASSEMBLY (16-54 TEETH) (SPECIFY # OF TEETH)
12	1	3-2163	B-GEAR ASSEMBLY (SPECIFY # OF TEETH)
13A	1	3-2401-*	METER HEAD (VF28 VERTICAL UPFLOW METER)
13B	1	2-2401-04	METER HEAD (VF28, 4" ONLY) VERTICAL UPFLOW METER
13C	1	2-2103	METER HEAD (VF30 VERTICAL TEE METER)
13D	1	2-2105	METER HEAD (VF30, 4" ONLY) VERTICAL TEE METER
14	1	3-2390-*	DROP PIPE ASSEMBLY
15	8	1-1251-5-16	BOLT, DROP PIPE TOP FLANGE (ea.)
16	-	1-1806	VIBRA-TITE, DROP PIPE BOLT
17	1	1-1551-25	O-RING, DROP PIPE TOP FLANGE
18	1	4-2455-2	SEPARATOR/SUPPORT SPINDLE ASSEM. (ITEMS 19 & 20)
20	1	1-1508-20	CERAMIC SLEEVE FOR SUPPORT SPINDLE
21	4	1-1103-8-7	SCREW, SEPARATOR/SPINDLE MOUNTING (ea.)
22	1	1-1551-24	O-RING, SEPARATOR & SPINDLE
23A	1	3-2392-*	VERTICAL SHAFT & DRIVEN MAGNET ASSEMBLY VF28-*
23B	1	3-4114-*	VERTICAL SHAFT & DRIVEN MAGNET ASSEMBLY VF30 4"ONLY
24	1	3-2306	SHAFT GUIDE & LOWER BEARING ASSEMBLY
25	1	3-2175	SET COLLAR ASSEMBLY
26	1	3-2352	VERTICAL SHAFT COLLAR & BEARING ASSEMBLY (ea.)
27	2	1-1113-6-4	SCREW, VERTICAL SHAFT COLLAR & BEARING MTG. (ea.)
28	1	2-2305	VERTICAL SHAFT UPPER SUPPORT PLATE
29	2	1-1113-10-6	SCREW, SUPPORT PLATE MOUNTING (ea.)
30	2	1-1302-10	SHAKEPROOF WASHER, SUPPORT PLT. MTG. SCREW (ea.)
31	1	5-2425-‡-PT	PROPELLER ASSEMBLY (ITEMS 32 THRU 42)
32	1	2-2425-‡-P	PROPELLER
33	1	2-2426-P-1	CERAMIC BEARING CARTRIDGE
34	1	1-1116-8-6	SCREW, CERAMIC BEARING CARTRIDGE MTG.
35	1	2-1601-2	DRIVE MAGNET
36	1	1-2428-P	DRIVE MAGNET RETAINING PLATE
37	2	1-1115-3-18	SCREW, DRIVE MAGNET RETAINING PLATE (ea.)
38	1	3-2402-2	REV. THRUST BEARING CART. ASSEM. (ITEMS 39 & 40)
39	1	1-1101-8-5	SET SCREW, THRUST BEARING
40	2	1-1509-1	CERAMIC THRUST BEARING, 3/16" DIA. (ea.)
41	1	1-1125-6	SET SCREW, NYLON POINT (ea.)
42	1	3-2356	THRUST BEARING CARTRIDGE ASSEMBLY (ITEM 43)
43	2	1-1510-1	CERAMIC THRUST BEARING, 1/4" DIA. (ea.)
44A	1	1-1557-*	GASKET, METER HEAD (VF28 VERTICAL UPFLOW METER)
44B	1	1-1552-2	O-RING, METER HEAD (VF30 VERTICAL TEE METER)
45A	set	1-1253-‡	BOLTS, METER HEAD (VF28 VERTICAL UPFLOW METER)
45B	8	1-1251-8-24	BOLTS, METER HEAD (ea.) (VF30 VERTICAL TEE METER)
46A	set	1-1301-‡	WASHERS, METER HEAD BOLTS (VF28 METER)
46B	8	1-1301-14	WASHERS, METER HEAD BOLTS (ea.) (VF30 METER)
-	1	10015-00	DESICCANT BAG

* INSERT METER SIZE TO COMPLETE PART NUMBER
(USE -04 FOR 4"; -06 FOR 6", - 08 FOR 8"; ETC.)

‡ CONSULT FACTORY

CONSULT FACTORY FOR PRICING.

When ordering replacement parts, please specify:
• Meter Size • Meter Model • Meter Serial Number

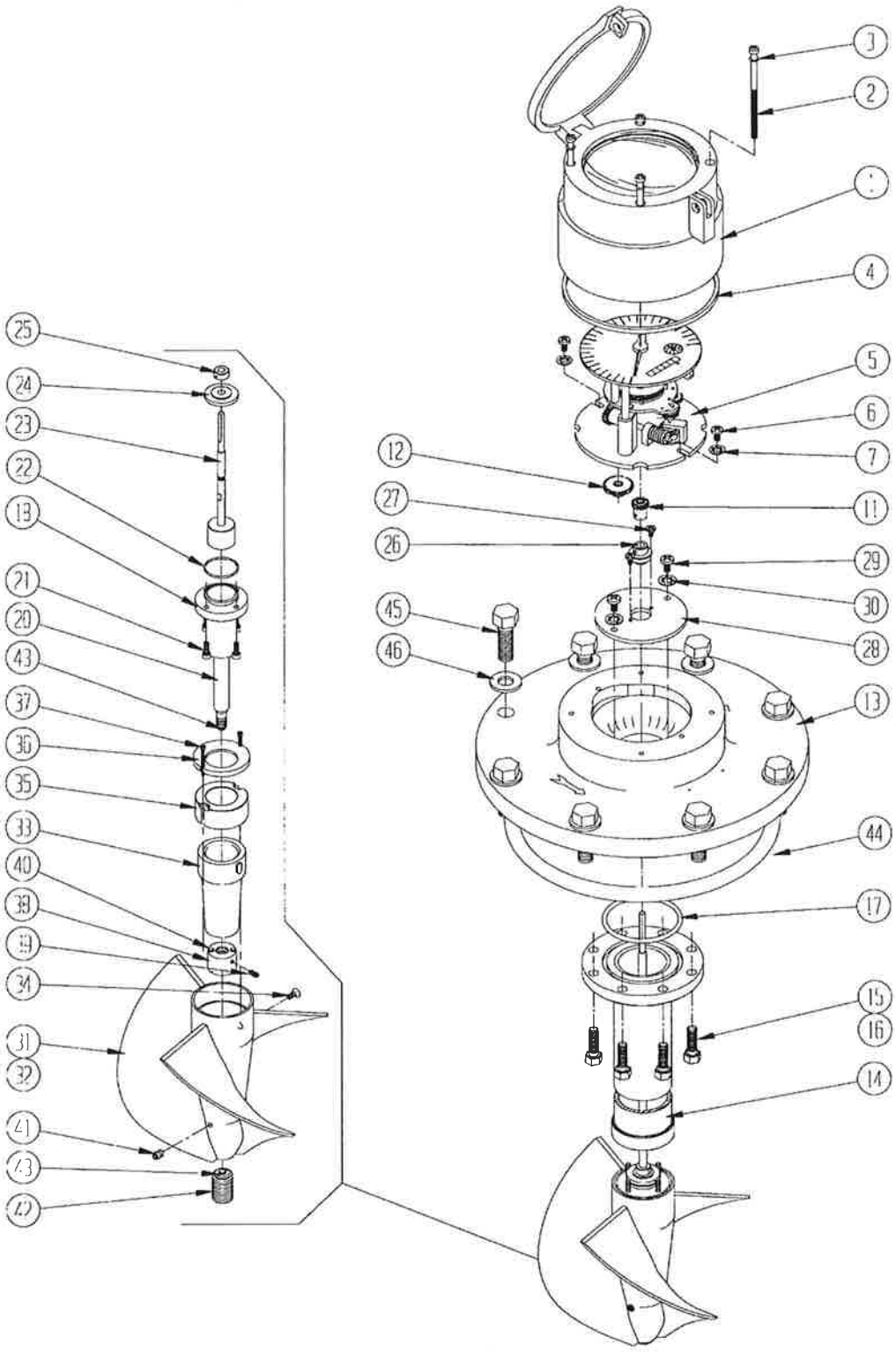
4"-20" VERTICAL UPFLOW METERS

MODELS VF28, VF30

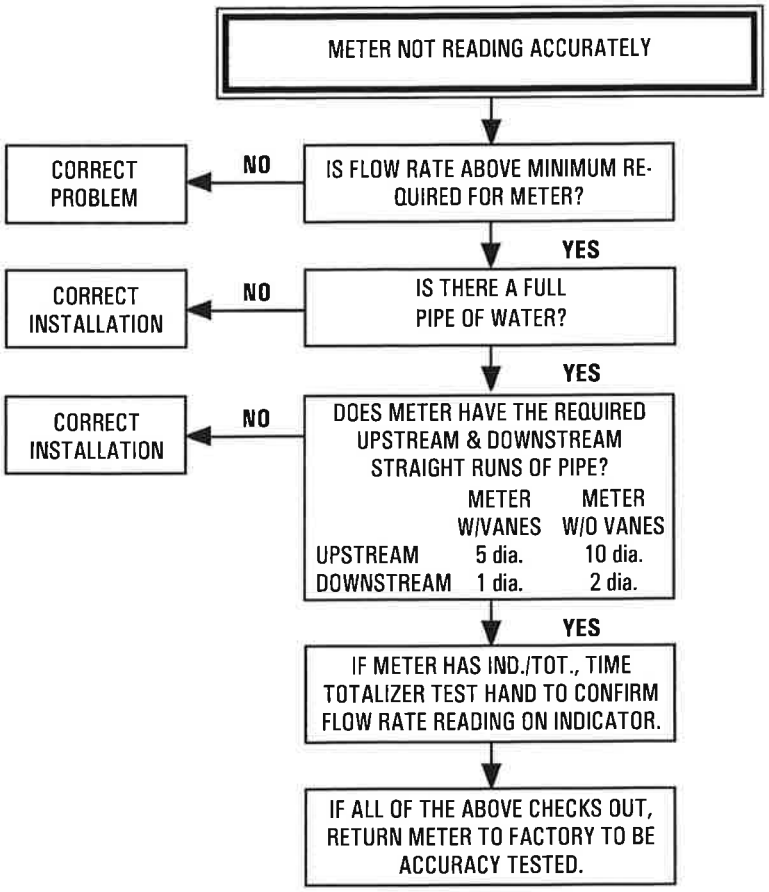
*MODEL CN06-2 INDICATOR-TOTALIZER ASSEMBLY

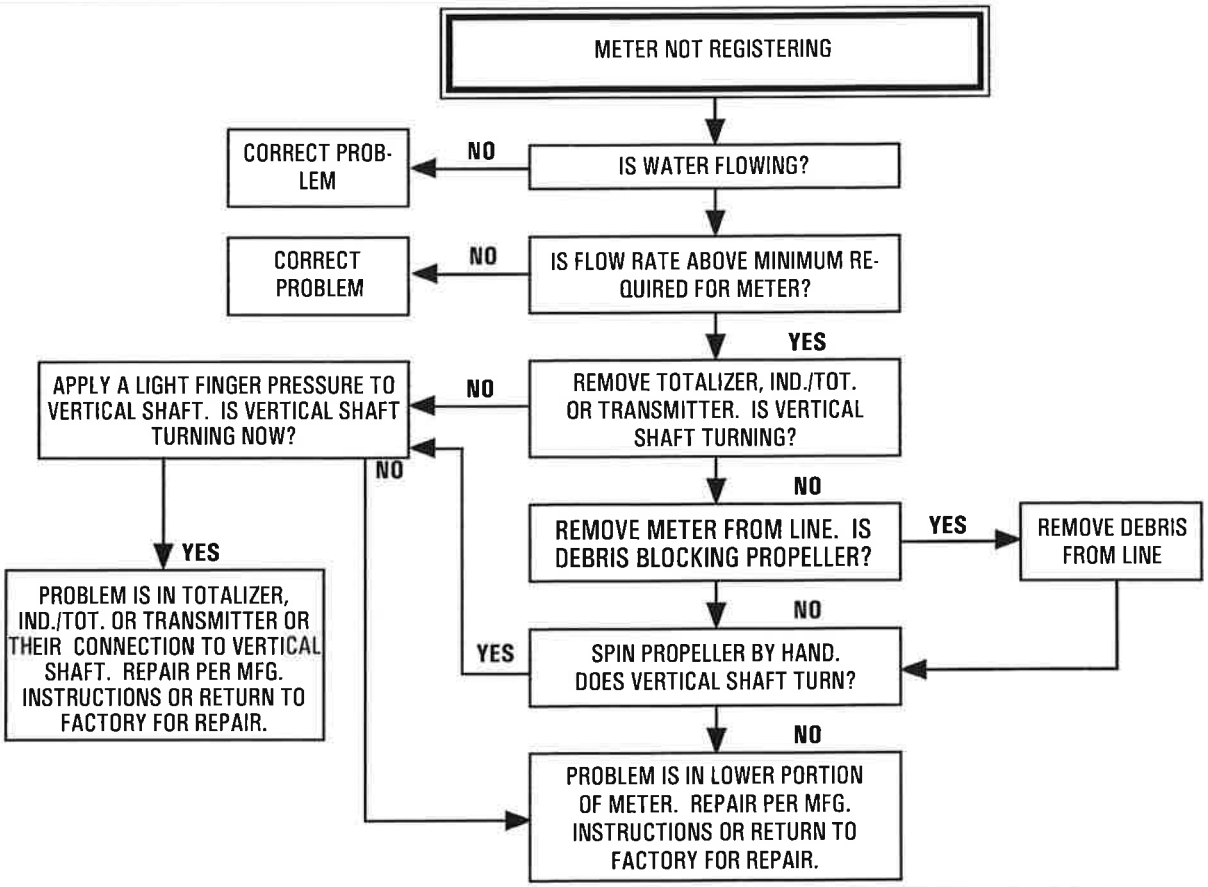
*CERAMIC BEARING CARTRIDGE PROPELLER

*ONE PIECE SEPARATOR/SPINDLE AND THREADED REVERSE THRUST BEARING CARTRIDGE



PROPELLER METER TROUBLESHOOTING FLOW CHART





WATER SPECIALTIES™
PROPELLER METER

REPAIR RECORD

SERIAL NUMBER

PURCHASE DATE

SPECIFICATIONS		INDEX
METER SIZE & MODEL NO.		
REGISTRATION		
INDICATOR DIAL GEARING		

ODOMETER READING

CHANGE GEARS
A/B
RATIO

NOTES: _____

DATE	REPAIR	METER LOCATION	COMMENTS

WARNING:

BEFORE REMOVING THE METER HEAD FROM THE PIPELINE THE WATER MUST BE TURNED OFF AND PRESSURE MUST BE RELIEVED FROM THE LINE. SERIOUS INJURY CAN RESULT FROM REMOVING A METER HEAD UNDER PRESSURE.

ATTACHMENT D

ATTACHMENT E

GROUNDWATER MANAGEMENT PLAN

SHAFTER-WASCO IRRIGATION DISTRICT

JULY 2007

DENNIS R. KELLER / JAMES H. WEGLEY
CONSULTING CIVIL ENGINEERS

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SECTION 1
PURPOSE
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SECTION 1
PURPOSE
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

PLAN OBJECTIVE

The Shafter-Wasco Irrigation District (District) desires to formalize its existing groundwater management practices for the continuance of local management and to enhance existing monitoring activities in a coordinated manner. Through this Groundwater Management Plan (Plan) the District will identify and implement modifications to ongoing practices in order to preserve and enhance groundwater resources. The District will organize existing and expanded groundwater management activities to facilitate the implementation of the Plan.

Preservation and enhancement of the groundwater resource is vital to sustaining the local economy which has been built up in reliance, in whole or in part, on this resource. The District's objective is to preserve the utility of the groundwater resource, both in terms of quantity and quality at the least possible cost to sustain the agricultural production and support urban development within the boundaries of the District. Enhancement or augmentation of the resource is necessary to mitigate the present level of overdraft and the attendant long-term decline in groundwater levels in the overall groundwater basin. The Plan objectives can be accomplished, at least on a cost basis, by joint implementation of the Plan through the District as opposed to individual implementation by District landowners.

DISTRICT

The District is organizing current and proposed groundwater management activities under provision of Part 2.75 of Division 6 of the California Water Code commencing with Section

10750, otherwise known as AB3030, the Groundwater Management Act of 1992. The 1992 Act was amended in 2002 and 2004 to describe specific requirements for the Plan.

For the purpose of groundwater management, powers granted to an entity which adopts a Plan include the powers of a water replenishment district (Part 4, Division 18, California Water Code), to the extent not already possessed by the entity, but not limited to the following:

a. Acquire and operate facilities, waters and rights needed to replenish the groundwater supplies;

b. Store water in groundwater basins, acquire water rights, import water into the District and conserve water;

c. Participate in legal proceedings as required to protect and defend water rights and water supplies and to prevent unlawful exportation of water from the District;

d. Under certain conditions to exercise the right of eminent domain;

e. Act jointly with other entities in order to economically perform required activities;

f. Carry out investigations required to implement the Plan;

g. Fix rates for water for replenishment purposes; and

h. Fix the terms and conditions of contracts for use of surface water in-lieu of groundwater.

PLAN ELEMENTS

Part 2.75, Groundwater Management, of the Water Code establishes required (§10753.7) and recommended (§10753.8) elements of a groundwater management plan. Bulletin 118

prepared by the Department of Water Resources (DWR) also provides recommendations for groundwater management plans.

The District's Plan has been prepared to address the requirements and recommendations for groundwater management plans. Table 1-1 summarizes these elements and their respective location within the District's Plan.

TABLE 1-1
PLAN SUMMARY
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SECTION REFERENCE	SUBJECT	PLAN LOCATION
REQUIRED PLAN ELEMENTS (Water Code §10753.7 (a))		
(1)	Basin management objectives	Section 4
(1)	Monitoring and Management: - groundwater levels - groundwater quality - land surface subsidence - changes and quality	 Section 5, Section 6 Section 5, Section 6 Section 5, Section 6 Section 5, Section 6
(2)	Plan to involve other agencies	Section 2, Section 5, Section 7
(3)	Map of groundwater basin and local agencies	Section 2
(4)	Monitoring protocols	Section 6
RECOMMENDED PLAN ELEMENTS (Water Code §10753.8)		
a.	Saline Water Intrusion	Section 5
b.	Wellhead Protection (Recharge Areas)	Section 5
c.	Migration of Contaminated Water	Section 5
d.	Well Abandonment/Destruction	Section 5
e.	Overdraft Mitigation	Section 5
f.	Groundwater Replenishment	Section 5
g.	Groundwater Extractions	Section 5
h.	Groundwater Monitoring	Section 5, Section 6
i.	Conjunctive Use	Section 5
j.	Well Construction Policies	Section 5
k.	Operation of Facilities	Section 5, Section 7
l.	Relationships with Other Agencies	Section 5
m.	Land Use Planning	Section 5

TABLE 1-1 (cont'd)
PLAN SUMMARY
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

ADDITIONAL PLAN ELEMENTS (DWR Bulletin 118, Appendix C) (1)		
(4)	Advisory Committee of Stakeholders	Section 7, Appendix A
(5)	Groundwater basin description: - physical features and characteristics - historical data - issues of concern - historical and project water demands and supplies	Section 2
(8)	Existing and planned management actions	Section 5, Section 6
(10)	Monitoring program features: - map of monitoring sites - type and frequency of monitoring	Section 6
(12)	Groundwater Management Reports	Section 7
(13)	Plan re-evaluation	Section 7

Note: (1) DWR Bulletin 118, Appendix C outlines 14 required and recommended components for groundwater management plans. Required elements have been documented.

PLAN CONTACT INFORMATION

Questions or requests for additional information regarding the District's Plan should be directed to the Program Manager at the following address:

Shafter-Wasco Irrigation District
16294 Highway 43
Wasco, CA 93280-8068
Phone: 661/758-5153 FAX: 661/758-6167

Business Hours: 8:00 a.m. – 5:00 p.m.
Monday through Friday

The District meets on the 2nd Tuesday of each month. District meetings are held at above address and are open to the public.

SECTION 2
GENERAL
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SECTION 2
GENERAL
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

DESCRIPTION OF DISTRICT

The Shafter-Wasco Irrigation District (District) is a California Irrigation District. The District covers 38,766 acres with approximately 30,300 acres being farmed. The District was formed in 1937 with the primary purpose of finding ways and means to replenishing the dwindling underground water supply. Groundwater levels declined an average of 2.3 feet per year from 1921 to 1949. A contract for Friant Division CVP supply was executed on February 11, 1955, with the first deliveries under the contract taking place in 1957. Continuous deliveries have been made since that time.

As the surface supply is supplemental, groundwater still plays a principal role. AB 3030 provides a means for local agencies to manage their individual water supplies. In order to preserve local management and enhance existing groundwater management programs operated over many years by the District, the Board of Directors of the District, on September 12, 2006, instructed the preparation of this Groundwater Management Plan (Plan) under the provisions of AB 3030. The Plan will enable the District to establish policies that will serve to enhance the overall management of the water supplies available to the District.

In 2002 and 2004, Senate Bill (SB) 1938 and Assembly Bill (AB) 105, respectively, amended the requirements of groundwater management plans. This Plan incorporates the necessary elements to comply with the provisions of that legislation.

AB 3030 provides for the development of a groundwater management plan within the boundaries of the District. The underlying groundwater basin is part of the larger Tulare Lake Basin as identified in State of California Bulletin 118. The management area for the District's Plan may include, by agreement, adjacent entities whose activities would influence the common groundwater resource. The District's boundaries are shown on Figure 2-1.

Plan Participants

The District will be responsible for the implementation of the Plan. The District will be the primary Plan Participant. The identification and involvement of additional Plan Participants will result from Plan activities.

A Plan Participant tabulation is presented in Appendix A. This Appendix will be revised from time-to-time to reflect the Plan's then current participants.

Stakeholders

For the purposes of the Plan, a stakeholder will be defined as any individual, group, or entity located within the Plan Area that may be affected by the implementation of the Plan. Stakeholders can be Plan Participants.

An initial compilation of District Plan stakeholders is presented in Appendix A. Additional stakeholders may be identified through Plan activities.

Advisory Committee

To date, the District has not created an Advisory Committee to oversee the implementation and subsequent refinement of the Plan. This function will be performed by District management, staff and consultants until otherwise determined by the District Board of Directors.

SECTION 3
GROUNDWATER BASIN CHARACTERISTICS
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SECTION 3
GROUNDWATER BASIN CHARACTERISTICS
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRTICT

GENERAL

The Shafter-Wasco Irrigation District (District) is located within the Kern County Sub-basin of the San Joaquin Valley Groundwater Basin (Basin No. 5-22.13). The Kern County Sub-basin is bounded by the following groundwater sub-basins; Tule River (north) and Tulare Lake (northwest). The District portion of the groundwater basin includes the Poso Creek drainage as its major surface drainage.

Typical annual rainfall in the District is approximately 6.6 inches. The western portion of the Basin is typically more arid. The eastern edge of the Basin along the mountains experiences slightly higher rainfall amounts.

The region encompassed by the District's Groundwater Management Plan (Plan) is shown on Figure 3-1. The cities of Shafter and Wasco represent the major population centers within the District. The Basin is rural in nature, dominated by agricultural land use as shown in Figure 3-2.

PHYSICAL CHARACTERISTICS

The physical characteristics of the groundwater basin influence the content of the Plan. In particular, the manner in which groundwater is replenished is directly affected by surface and subsurface characteristics, such as the permeability of the overlying and subsurface soils. The permeability of the soils within the groundwater basin is limited. In general, the soils having higher permeability rates are associated with the Poso Creek delta.

The District overlies areas of both unconfined and confined aquifers. There are limited areas of perched water and shallow groundwater tables. These conditions result from subsurface geologic conditions. A general depiction of the aquifer and subsurface geologic conditions is presented on Figure 3-3. Figure 3-4 shows the groundwater elevations for spring, 2004, as compiled and prepared by the Department of Water Resources. Recent average depths to groundwater are presented on Figure 3-5.

The District overlies an unconfined aquifer. There are no perched zones or shallow groundwater tables in the District. The District lies in the San Joaquin Basin Hydrologic Study Area as described in Department of Water Resources Bulletin No. 118-75 and 118-80. The District is located in the Kern Basin which is composed of contiguous older and younger alluvium. The Basin is one (1) of eight (8) in the basin hydrologic study area which has been identified as subject to critical condition of overdraft. There are no District or on-farm surface or subsurface drainage systems installed in the District. Drainage is not a problem in the District.

The groundwater supply is pumped with privately owned wells by individual water users from an unconfined aquifer. The surface water is to be used conjunctively with the groundwater by storing non-storable District surface water in the groundwater reservoir by in-lieu of pumping groundwater recharge.

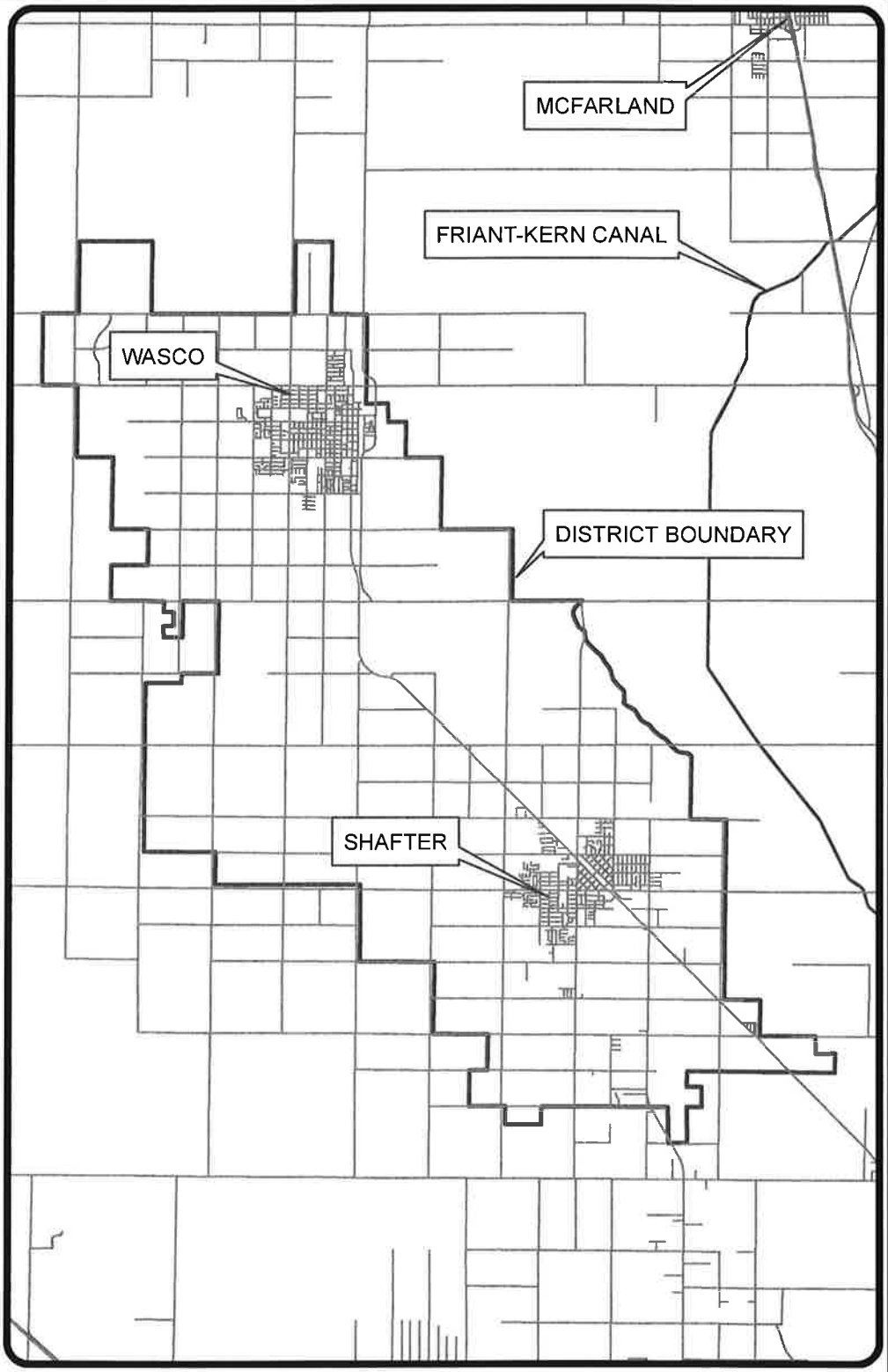
The District is a surface water groundwater supply conjunctive use district in which the water users' water supply comes from imported water from the Friant Unit of the CVP, local precipitation and groundwater from water user owned pumps. The hydrologic cycle for the San Joaquin River varies greatly, providing a variable surface supply to the District. The frequency and magnitude of the surface supply for the District is expected to continue to fluctuate in the future as it has in the past. The water users stabilize their water supply by maximizing the

surface supply when it is available, and utilizing the groundwater supply when the surface supply is deficient.

The District encompasses 38,766 acres of which approximately 30,290 acres is farmed. Imported water is delivered to 27,100 of the 30,290 farmed acres. The imported water varies from 0.5 acre-feet per acre to 4.0 acre-feet per acre, depending on the water year. The water users recharge the imported water to the groundwater supply in large water years by using the imported water to meet their irrigation requirements and not pumping the groundwater supply. Some of the imported water is also recharged to the groundwater supply through deep percolation.

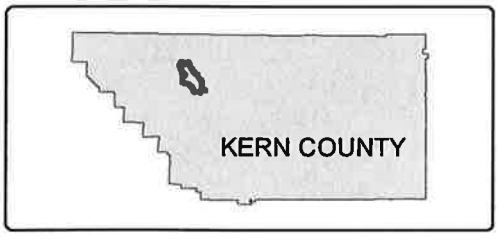
The District staff monitors the groundwater levels in the District by measuring approximately 74 groundwater wells in January and September of each year. This information is used to monitor the amount of groundwater used by the water users in the District.

FIGURE 3-1



Legend

- Shafter-Wasco Irrigation District
- water_course
- kernroads



VICINITY MAP

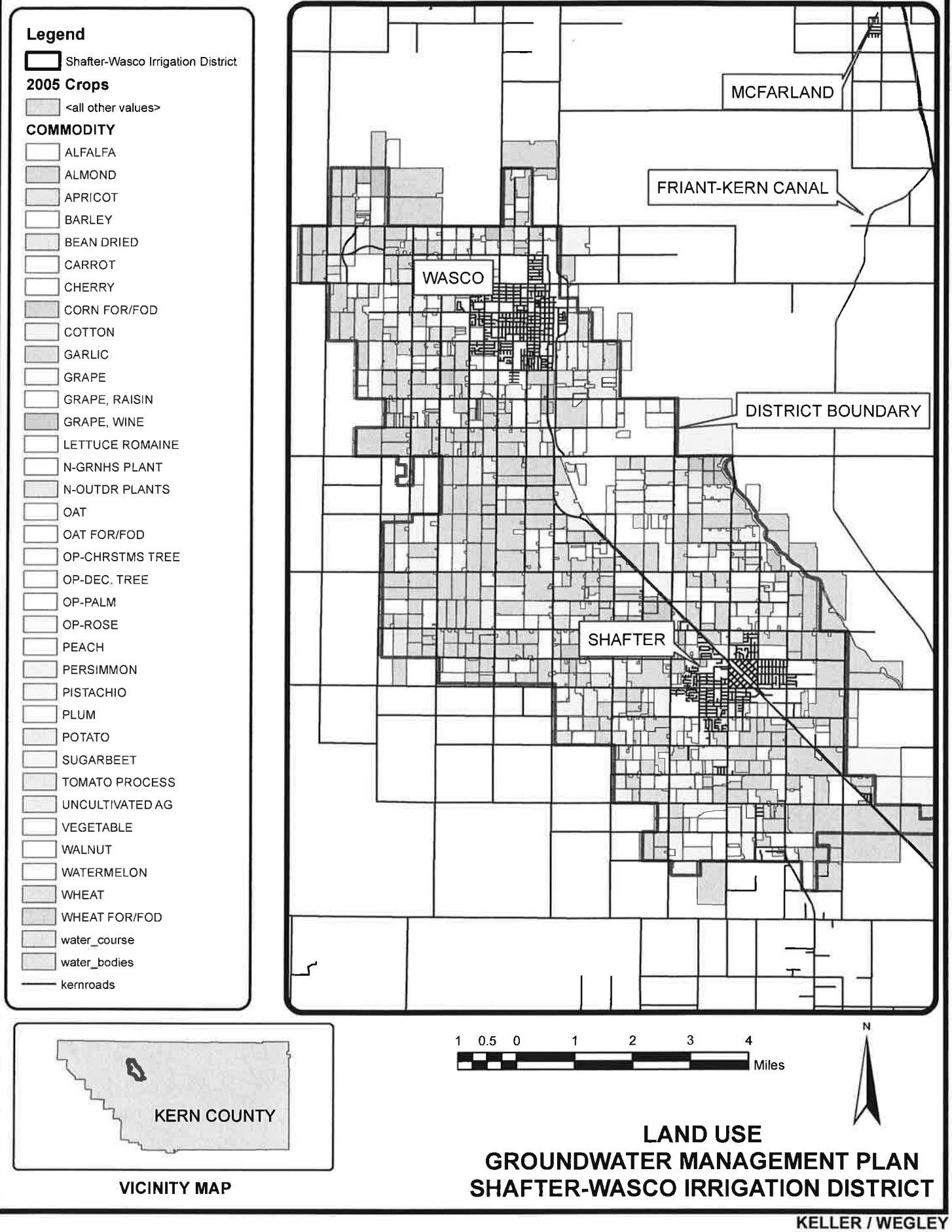
1 0.5 0 1 2 3 4 Miles

N

PLAN BOUNDARIES
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

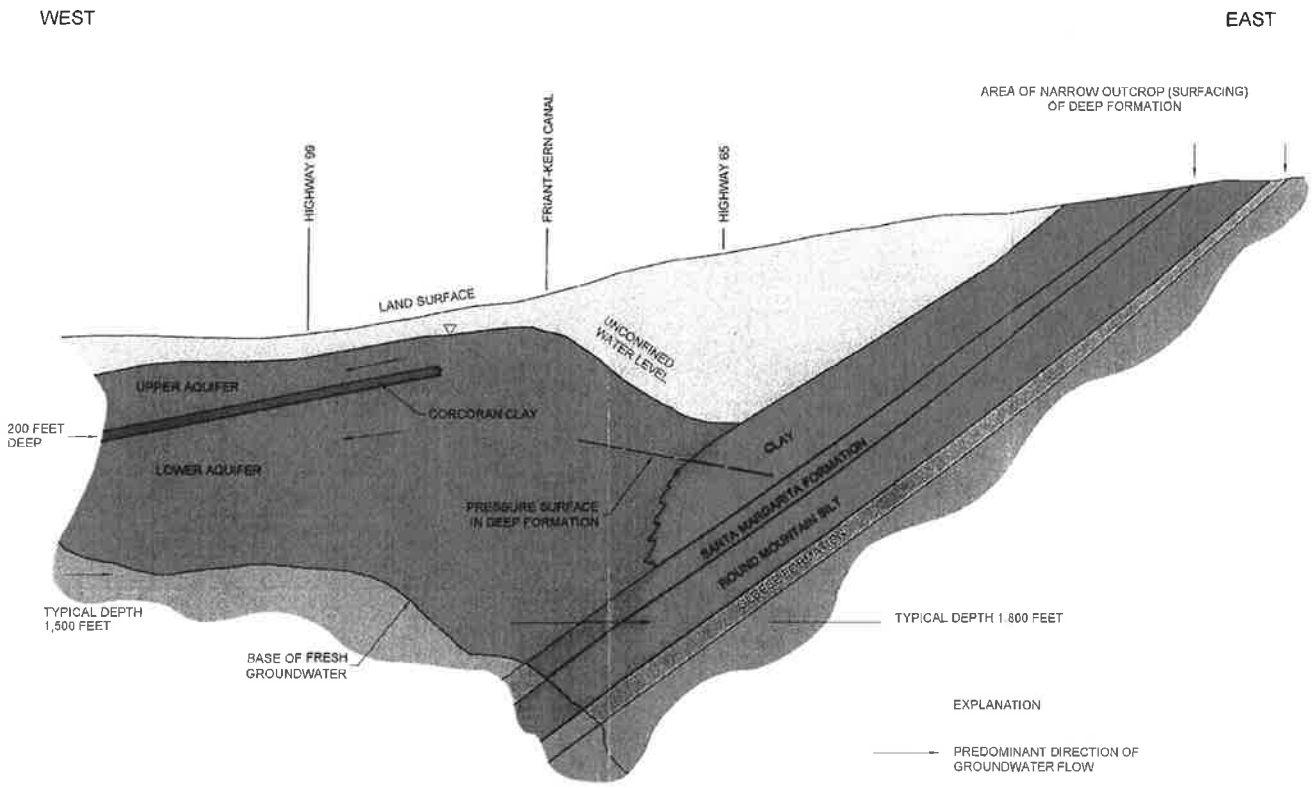
KELLER / WEGLEY

FIGURE 3-2



LAND USE
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

KELLER / WEGLEY

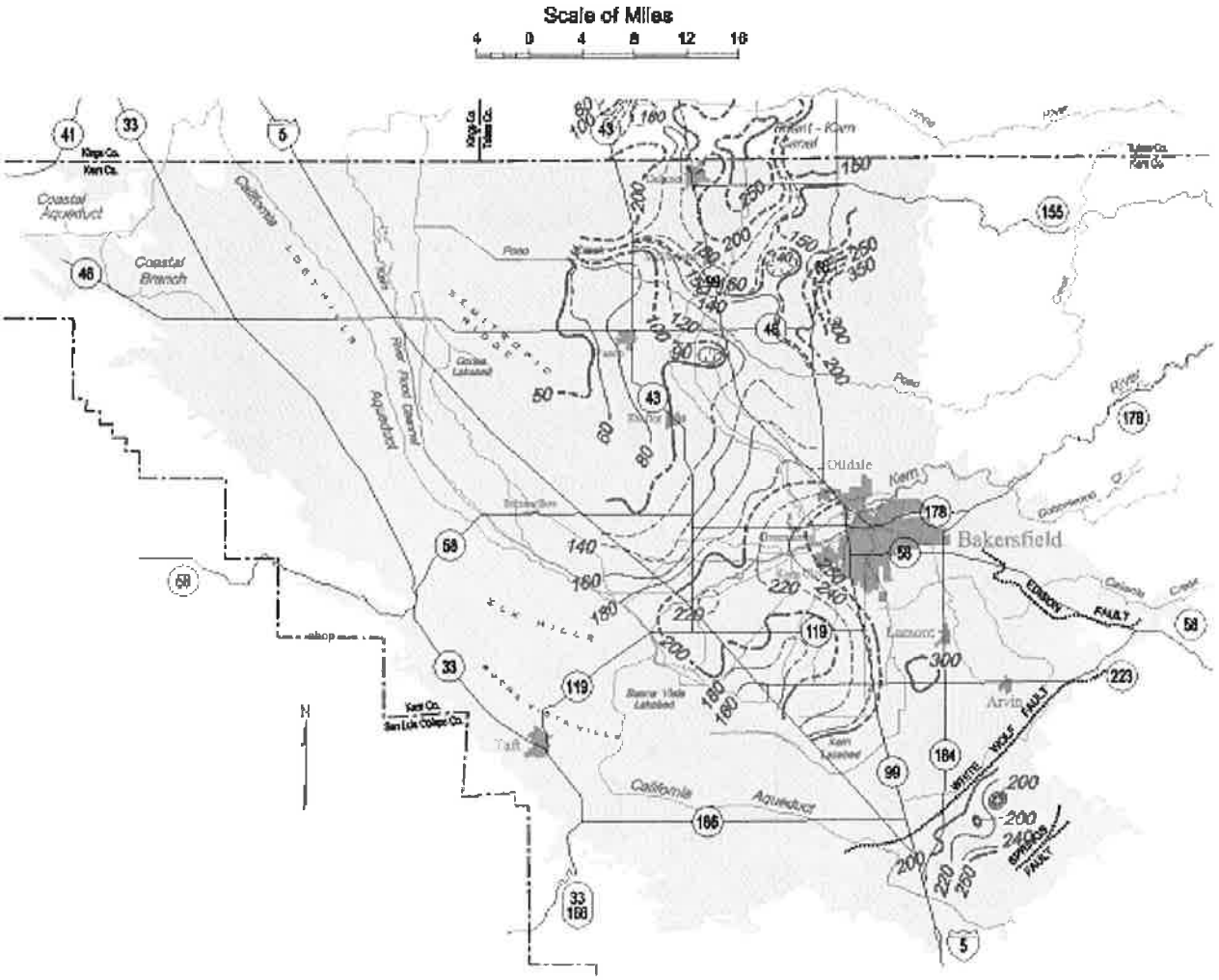


SOURCE: FIGURE 9, ANALYSIS OF GROUNDWATER RESOURCES
PROVOST AND PRITCHARD 2001.

SURFACE CONDITIONS
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

Kern Groundwater Basin

Spring 2004, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer

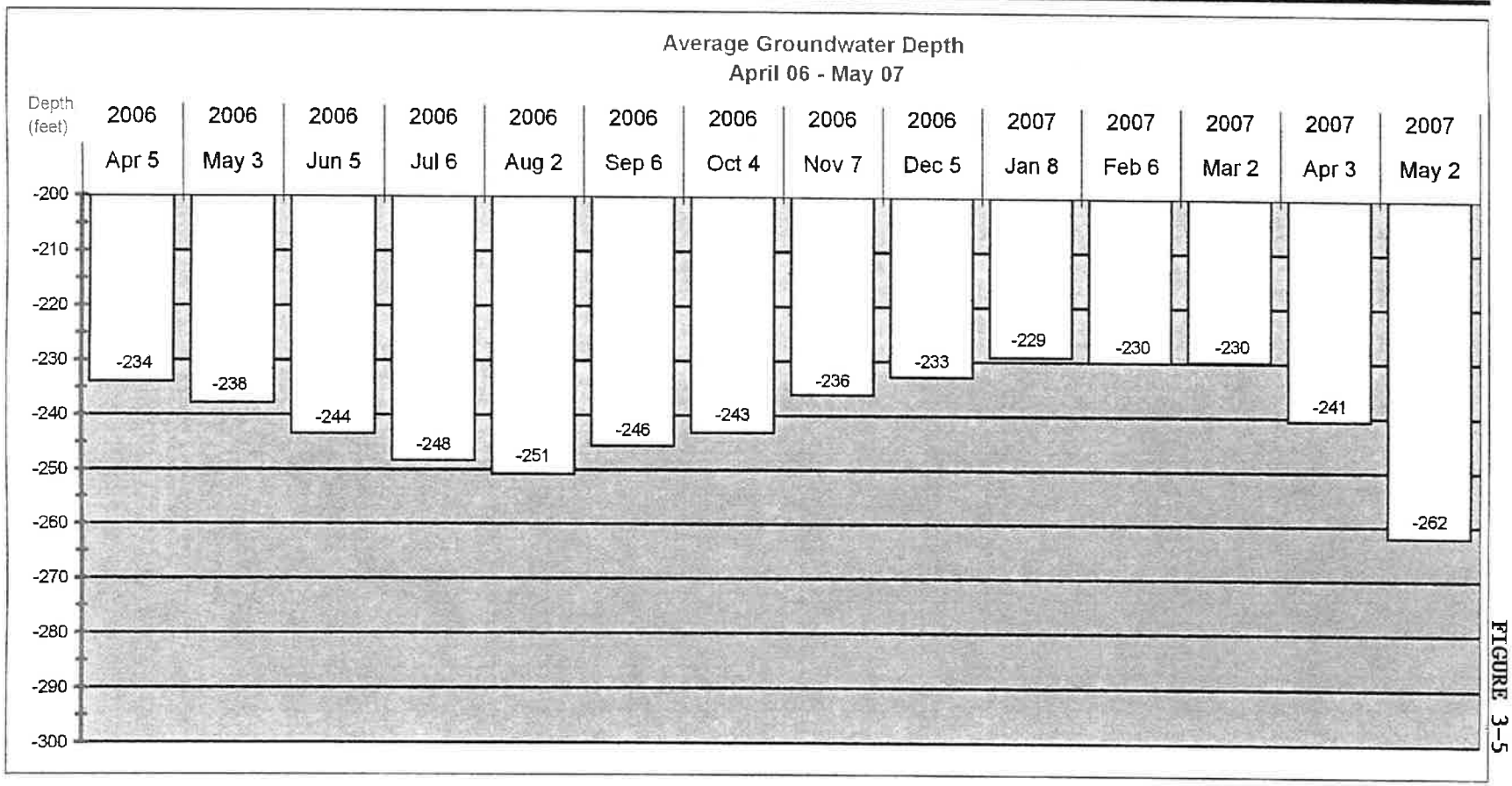


SOURCE: DEPARTMENT OF WATER RESOURCES

GROUNDWATER ELEVATIONS
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SHAFTER - WASCO IRRIGATION DISTRICT
AVERAGE GROUNDWATER DEPTH

LOCATION	2006	2006	2006	2006	2006	2006	2006	2006	2006	2007	2007	2007	2007	2007
(From North)	Apr 5	May 3	Jun 5	Jul 6	Aug 2	Sep 6	Oct 4	Nov 7	Dec 5	Jan 8	Feb 6	Mar 2	Apr 3	May 2
	-223	-230	-242	-250	-256	-245	-240	-228	-222	-217	-219	-221	-238	-276
	-226	-232	-242	-250	-252	-244	-240	-229	-225	-220	-220	-221	-238	-273
	-235	-242	-249	-253	-255	-249	-246	-238	-234	-231	-230	-230	-245	-276
	-240	-244	-246	-251	-255	-252	-250	-243	-239	-234	-239	-236	-246	-261
	-247	-247	-250	-254	-254	-252	-250	-247	-245	-242	-242	-241	-247	-255
	-233	-232	-232	-232	-233	-232	-233	-232	-232	-231	-230	-230	-230	-231
AVERAGE	-234	-238	-244	-248	-251	-246	-243	-236	-233	-229	-230	-230	-241	-262



KELLER/WEGLEY

FIGURE 3-5

SECTION 4
BASIN MANAGEMENT OBJECTIVES
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SECTION 4
BASIN MANAGEMENT OBJECTIVES
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

GENERAL

The Shafter-Wasco Irrigation District (District) has developed five (5) basin management objectives to guide the implementation of the Groundwater Management Plan (Plan). By accomplishing these objectives, the District believes that a more reliable groundwater supply for long-term beneficial uses within the Plan area will be realized. The District's basin management objectives within the Plan area are:

1. To promote and realize groundwater resource protection;
2. To facilitate groundwater resource sustainability;
3. To develop groundwater resource understanding;
4. To develop groundwater basin understanding; and
5. To promote and facilitate information dissemination regarding the groundwater resource.

Each basin management objective is described below.

GROUNDWATER RESOURCE PROTECTION

Groundwater needs to have water quality that will sustain its beneficial uses to remain a viable water resource within the groundwater basin. This objective focuses the District's management strategies to maintain the good water quality of the Plan Area's groundwater. The District will utilize the following strategies to achieve this objective.

- Wellhead/Recharge Area Protection;
- Migration of Contaminated Water Controls;
- Well Abandonment and Destruction Policies; and
- Well Construction Policies.

Protection of the groundwater beneath the District ensures that the maximum amount of groundwater remains available. Achieving this basin management objective minimizes the potential to lose groundwater volumes to contamination.

GROUNDWATER RESOURCE SUSTAINABILITY

Groundwater is the primary water supply in the Plan Area for both domestic and agricultural purposes. This objective emphasizes the maintenance and/or increase of the available groundwater supply. The following management strategies will be used toward achieving this objective:

- Overdraft Mitigation;
- Groundwater Recharge Policies;
- Groundwater Extraction Management;
- Conjunctive use Policies; and
- Operation of Facilities.

This basin management objective will identify and quantify the surface and groundwater supplies available to the District landowners and define the interaction between these supplies. Groundwater storage is affected by groundwater pumping and groundwater recharge as water users attempt to meet their water use demands. The net result of the interactions between the

available water supplies and the demands for water is a change in groundwater storage. This basin management objective is intended to provide the District with the information and tools required to maintain and improve the total water supply through coordinated management of groundwater.

GROUNDWATER RESOURCE UNDERSTANDING

The purpose of this basin management objective is to further develop knowledge regarding the Plan Area's groundwater. With detailed information regarding the groundwater resource, improved characterization will lead to future groundwater management decisions. The primary Plan element that will achieve this objective is groundwater monitoring.

Continued monthly monitoring of six (6) wells and semi-annual monitoring of 64 wells will assist in conclusions as to the status (availability) of the resource. Groundwater levels also reveal the effectiveness of other strategies, such as groundwater recharge efforts. Monitoring data developed over time will serve as the foundation of conclusions regarding groundwater reliability and management strategy effectiveness.

GROUNDWATER BASIN UNDERSTANDING

This basin management objective garners basin information to facilitate evaluations regarding basin features and potential groundwater resource impacts.

Changes to the groundwater basin's topographic, geologic and hydrologic conditions may adversely affect the groundwater. Land use development can impact both the quantity and

quality of groundwater. The availability of surface water reduces overall demand on the groundwater.

This objective will be achieved through the following management strategies:

- Land Subsidence Monitoring;
- Land Use Planning; and
- Surface Water Management.

Through these strategies, the District will remain familiar with the Plan Area's topographic, geologic and hydrologic conditions that may affect the groundwater resource. The Distsrict will have the capability to react to proposed projects and changing conditions and potentially avoid adverse groundwater impacts.

INFORMATION DISSEMINATION

Groundwater resource and basin information and knowledge will result from the active implementation of this Plan. The District will serve as the primary conduit of information regarding the Plan and subsequent results.

This Basin management objective will result from the following plan elements:

- Groundwater Basin and Resource Information Management;
- Groundwater Basin and Resource Reports; and
- Local Agency and Stakeholder Involvement.

The Plan and its management strategies will result in the compilation of various data and information regarding the groundwater basin and its resources. The District will compile, manage and disseminate this information to facilitate improved coordination and use of the Plan

Area's hydrologic resources. The Plan will also result in various opportunities for the Basin's stakeholders to respond to basin management efforts.

SECTION 5
MANAGEMENT STRATEGIES
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SECTION 5
MANAGEMENT STRATEGIES
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

GENERAL

California Water Code Sections 10753.7 and 10753.8 set forth required and recommended elements that establish strategies for groundwater management. Each strategy and the Shafter-Wasco Irrigation District's (District) planned activities conducted in support of the strategy are described in this section. Some activities have been in use since the inception of the District. Planned activities describe proposed District efforts that will be utilized during the implementation of this Plan.

SALINE WATER INTRUSION CONTROL

The Groundwater Basin underlying the District is a subbasin of the Tulare Lake Hydrologic Region. The western edge of the Plan Area is situated about 90 miles from the Pacific Ocean. The District does not consider saline water intrusion controls a management strategy that warrants consideration.

Plan Activities

None - The District reserves the right to decide whether or not it will be involved with this strategy in the future as authorized by Water Code Section 10753.8.

WELLHEAD AND RECHARGE AREA PROTECTION

The management strategy consists of the identification, establishment and management of wellhead and recharge protection areas. Areas where groundwater pumping and recharge occur warrant dedicated attention by the District. Wells represent a direct conduit to groundwater. No wells are currently owned by the District. No recharge basins currently exist within the District boundaries. The District does, however, participate in out of District recharge areas.

The District will monitor and participate in land use development activities within the recharge areas. As all areas within the District are currently farmed, the District has evaluated areas where land being farmed does not have to be taken out of production. Fortunately, these areas are adjacent to the District to the east and have a direct nexus to groundwater underlying lands within the District.

Plan Activities

1. Land use and development monitoring;
2. Participation in pertinent land use/zoning planning procedures; and
3. Incorporation of security measures such as fencing, as necessary.

MIGRATION OF CONTAMINATED GROUNDWATER CONTROLS

This management strategy incorporates regulations and controls for contaminated groundwater. The District has not identified specific plumes of contaminated groundwater. Source specific plumes of contaminated groundwater, such as those from leaking underground storage tanks, fall under the jurisdiction of various state and federal agencies. The District is not in a position at this time to pursue regulations regarding unattributed groundwater contamination.

The District will develop and implement protocols to obtain and compile information regarding contaminated groundwater. Monitoring of groundwater quality will also be conducted.

Plan Activities

1. Monitoring of regulatory activities and records regarding contaminated groundwater within Plan Area; and
2. Complete an inventory of and evaluate available groundwater quality data.

WELL ABANDONMENT/DESTRUCTION POLICIES

Improper well abandonment may allow contamination of the groundwater. Well abandonment must be conducted in conformance with standards adopted by the County of Kern. The District will monitor these activities by reviewing abandonment records compiled by the County. Appropriate information on proper abandonment of wells within the Plan area will be made available through the District.

In lieu of well abandonment, the District will pursue the conversion of a production well to a monitoring well if such suitable opportunities arise and funding is available.

Plan Activities

1. Establish and maintain a protocol with Kern County regarding review of well abandonment records;
2. Develop record keeping system/database of abandoned wells;
3. Establish public education activity to inform stakeholders of well standards and policies; and
4. Develop and implement program to convert abandoned production wells to monitoring wells.

WELL CONSTRUCTION POLICIES

The increase in groundwater extraction resulting from the construction of additional wells affects the long-term water balance of the region. Well construction may allow contamination of the groundwater if not done properly. Well construction must be conducted in conformance with standards adopted by the County of Kern. The District will monitor these activities by reviewing well construction records compiled by the County. Appropriate information on proper construction of wells within the Plan area will be made available through the District.

Opportunities for additional groundwater monitoring wells may arise through the abandonment of existing production wells. The District will consider such a conversion to eliminate the construction of additional wells.

Plan Activities

1. Establish and maintain a protocol with Kern County regarding review of well construction records;
2. Develop a record keeping system/database of constructed wells;
3. Establish public education activity to inform stakeholders of well construction standards and policies; and
4. Develop guidelines for monitoring well conversion.

OVERDRAFT MITIGATION

The groundwater basin is experiencing groundwater overdraft as evidenced by lower groundwater levels within the Plan Area.

This management strategy is best achieved through the implementation of several companion management strategies. Overdraft mitigation is accomplished through the integration of the following strategies:

- Groundwater Recharge/Management;
- Groundwater Extraction Policies;
- Conjunctive Use Policies; and
- Surface Water Management.

These strategies will be implemented to attempt to achieve a hydrologic balance within the Plan area, thereby reducing overdraft of the groundwater resource.

GROUNDWATER RECHARGE MANAGEMENT

The replenishment of the underlying groundwater occurs naturally and through deliberate, controlled means. The District's groundwater replenishment is achieved by controlled means principally through the delivery of surface water, when available, to lands otherwise relying on the groundwater resource.

Direct recharge is achieved through the placement of surface water in areas to the east of the District on permeable soils for the express purpose of percolation to the underground. It is the intention of the District to expand the opportunities with neighboring districts. The monitoring of groundwater conditions under this Plan will enable the District to identify the extent of need in this regard.

Delivery of surface water for irrigation purposes reduces the need for water users to draw on groundwater, thereby conserving the water available in the aquifer for later use. The use of surface water in this manner is known as in-lieu recharge and is practiced by the District landowners. Some additional benefit is derived when irrigation water applied beyond crop water needs percolates to the underground.

Plan Activities

1. Maintain and/or expand relationships involving networks of groundwater recharge facilities;
2. Maintain and/or expand surface water deliveries within the Plan area; and
3. Pursue additional surface water supplies for specific purposes of in-lieu groundwater recharge.

GROUNDWATER EXTRACTION POLICIES

Effective groundwater replenishment and maintenance of groundwater levels involves the management of water supplies available to the basin and extractions from the basin. Groundwater extractions within the management area are primarily by private wells. Management of groundwater extractions can best be achieved through economic incentives, rather than through the regulation of extractions. This current practice will continue to be implemented through the pricing of surface water at rates which encourage water users to use surface water in-lieu of pumping groundwater.

Plan Activities

1. Secure surface water quantities and establish subsequent pricing that encourages maximum surface water use;
2. Develop and implement an educational program focused on:
    a) Timing of use of groundwater;
    b) Timing of use of surface water; and
3. Evaluate grower incentive based banking program.

CONJUNCTIVE USE POLICIES

Groundwater management in California is rooted in the conjunctive use of surface and groundwater resources. Use of the water supplies from the two sources is integrated to accomplish the optimum utilization of each source.

In years of shortage, that previously stored water is pumped to supplement available surface water. District landowners will be encouraged to maximize the utilization of available facilities and resources for conjunctive use through cooperative management.

Conjunctive use opportunities motivated the District to enter into a long-term contract with the United States beginning in the 1950's for the importation of supplemental surface water supply from the Friant Unit of the CVP.

Water transfers and exchanges are an integral part of the existing conjunctive use programs. Under the Plan, the District will seek to preserve and enhance conjunctive use activities through coordinated use of available supplies made possible by water transfers and exchanges and through expansion of recharge facilities. Enhancement of conjunctive use activities could include the development of water banking arrangements with other agencies by utilizing available groundwater storage capacity for the temporary storage of water. This management strategy will result from the integration of the following plan elements:

- Groundwater Recharge Policies;
- Groundwater Extraction Policies; and
- Surface Water Management.

SURFACE WATER MANAGEMENT

Surface Water Quantity

The District imports surface water supplies from the Central Valley Project through the Friant Division under a long-term contract with the United States. Also, the District makes short-term and year-to-year arrangements to secure additional Central Valley Project (CVP) water and other supplies. The District has in place and operates an extensive system of conveyance, distribution and recharge exchange facilities throughout their service area to make use of available surface supplies. The contract of Class 1 supply and water supply amounts available to the District consist of 50,000 af of Class 1 supply and 39,600 af of Class 2 supply,

Under this Plan, the District will seek to preserve the existing water rights and contract and will pursue opportunities to supplement these supplies through importation of additional water supplies for District landowners. Supplemental supplies may be obtained through purchase of additional CVP water from other entities, "Section 215 water" from the United States and through other programs as may be available. Efficient water use and distribution within the management area will be encouraged through the use of transfers and exchanges among District water users.

Importation of affordable water supplies, in quantities sufficient to achieve a long-term water balance within the service area of the District, is a prerequisite for successful implementation of the recharge groundwater management strategy. All opportunities to supplement the regular supplies of the District through water exchange and banking agreements with outside entities, proposed by individual District landowners, will be evaluated for compatibility with the goals of this Plan.

This evaluation process will consist of the following steps:

1. Submittal of a written proposal and technical report to the District;
2. District and consultant evaluation;
3. Proponent and District Coordination; and
4. District staff recommendation and Board of Directors action.

For any proposed Project, the Proponent will initiate the process through the transmittal of a written proposal describing the Project, including the anticipated benefits. A technical report will be prepared by the Proponent and evaluated by the District. The report must describe:

1. Quantities and sources of water;
2. Structures and other physical features of the proposed Project;
3. Water accounting measures and/or methods;
4. Funding;
5. Schedule, including CEQA compliance;
6. Anticipated benefits; and
7. Proponent's evaluation of compliance with Plan's management objectives.

The District staff and consultant will evaluate the Technical Report prior to any Board determination regarding the proposed Project.

The District will utilize outside consultants, as necessary, for further evaluations. The proposal and technical report will be reviewed for consistency with the Plan's basin management objectives and utilization of adopted management strategies.

The resulting evaluation will be returned to the Project Proponent. The District will coordinate with the Proponent to develop the final proposed Project. Upon finalization of the

proposed Project, the District Board of Directors will act to determine the compatibility of the proposed Project with the goals of this Plan. Similarly, water exchange and banking agreements among the District and adjacent banking partners will be used where they may enable the District to distribute water to areas identified under this Plan as suffering from groundwater depletion and as being suitable for groundwater storage.

Surface Water Quality

The surface waters of the Plan area are singular. Imported surface water originates in the San Joaquin Delta for exchange with waters from the San Joaquin River watershed (Friant-Kern Canal). Current surface water monitoring programs are summarized in Table 5-1. Under this management strategy, the District will review results of existing monitoring programs. Additional surface water quality monitoring will be developed if deemed necessary.

Plan Activities

1. Maintain or increase quantities of imported surface water;
2. Preserve existing surface water rights;
3. Promote efficient water use through the use of water exchanges and transfers;
4. Investigate potential for water banking opportunities adjacent to the Plan area;
5. Develop additional water storage capacity within the Plan area; and
6. Monitor existing surface water quality testing efforts by other agencies.

TABLE 5-1
SURFACE WATER QUALITY MONITORING
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SURFACE WATER	MONITORING AGENCY	FREQUENCY
Friant-Kern Canal	Reclamation District 770	Annually
	Terra Bella Irrigation District	Varies - monthly to annually

OPERATION OF FACILITIES

This management strategy consists of the construction and operation of facilities that address groundwater recharge, storage extraction, conservation contamination clean-up and water recycling. Current efforts primarily address groundwater recharge through percolation basins and unlined irrigation distribution channels. In general, the current projects are implemented jointly with adjacent water supply districts.

Additional groundwater facilities will be needed to sustain the resource as demands placed on the groundwater resource increase. The District will evaluate potential projects that will address this need. The current scope of this strategy will be expanded as necessary. Opportunities to incorporate recycling and reclamation and water conservation may be possible through coordination with domestic utility providers.

Plan Activities

1. Maintain policy which facilitates maintenance of joint recharge areas.
2. Develop and implement protocol to identify operations projects.
3. Upgrade and expand surface water conveyance facilities.

GROUNDWATER MONITORING

Groundwater monitoring will be used by the District to assess the quantity and quality of the groundwater resource. The details of this management strategy are described in Section 6.

The District currently participates in annual monitoring of groundwater levels. Additional groundwater level information is available from domestic water providers.

In general, regular groundwater quality assessments are conducted by domestic water providers within the region. The District will develop a protocol to compile groundwater quality data. Additional groundwater quality monitoring efforts will be developed as needed.

LAND SUBSIDENCE MONITORING

The District does not have any substantial information regarding land subsidence within the Plan area. This management strategy consists of developing and implementing monitoring protocols to determine the pressure of land subsidence. The District's efforts will establish a starting point for future evaluations.

Plan Activities

1. Identify and establish an elevation control network throughout the Plan area.
2. Conduct periodic survey of control network to determine presence, if any, of land subsidence.

LAND USE PLANNING

This management strategy consists of reviewing land use plans and coordination with local planning agencies. Under this strategy, the District will review projects and basin activities that affect land use and the potential for groundwater resource impacts.

Plan Activities

1. Develop and maintain protocols to participate in local land use planning efforts.
2. Continue participation in California Environmental Quality Act as a responsible agency.

GROUNDWATER BASIN AND RESOURCE INFORMATION MANAGEMENT

Many strategies to be utilized by the District will produce groundwater resource and basin data or information. This information will need to be completed and inventoried.

The purpose of this management strategy is to ensure that data and information gathered during the implementation of the Plan is readily available for evaluation purposes. Many Plan efforts could be implemented by other Plan Participants. Centralizing this data and information will be critical to groundwater management.

Under this management strategy, the District will also conduct assessments and evaluations of the implementation data. These efforts will serve as the basis of development for the District's annual reports and other Plan documents.

A conjunctive groundwater use model has not been developed by the District. Such a model could be a productive tool which could provide an additional method to evaluate Plan data and conduct groundwater resource assessments.

Plan Activities

1. Establish data management authority and responsibilities.
2. Develop and implement data collection and inventory protocols and standards.
3. Determine feasibility of development and use of predictive groundwater model.

GROUNDWATER BASIN AND RESOURCE REPORTS

This management element consists of the preparation of reports and other documents used by the District to disseminate information and findings regarding its efforts under the Plan. Reports will be used to document Plan activities and subsequent effectiveness. These reports will also be used to present new and/or additional knowledge regarding the Basin characteristics and resources.

Detailed information regarding the District's reporting efforts can be found in Section 7, Implementation.

Plan Activities

1. Prepare Annual Groundwater Management Plan Report.
2. Prepare technical memoranda as necessary to disseminate information regarding Plan activities.

LOCAL AGENCY AND STAKEHOLDER INVOLVEMENT

This management strategy consists of efforts to engage individuals and agencies within the Plan area in Plan participation. Three primary elements will form the foundation of this management strategy: Plan participation, Advisory Committee and Public Review. The first element is Plan Participation. There exists many agencies within the Plan area that will realize benefits from the District's coordinated Plan efforts to manage the groundwater resource. The District will pursue opportunities to engage such agencies as Plan Participants. Additional Plan Participants increase the extent of coordinated groundwater resource management and the amount of resources available to implement the Plan.

The second element of this strategy is the consideration of the development and utilization of a Plan Advisory Committee (Committee) to assist in the implementation of the Plan. The District will establish the need for such a Committee and, if need is determined to exist, will establish the criteria regarding Committee formation and participation. To be effective, the Committee must include individuals and agencies that represent the various resource interests of the Plan area. The District will endeavor to enlist sufficient representation for the Committee. Additional committees may be created as necessary to facilitate implementation of the Plan.

The third element of this strategy consists of public participation and review. The meetings of the District are open to the public. Public notification will be developed to encourage public participation. During Plan reporting efforts, the public will be afforded opportunity to review and publicly comment on the Plan and its implementation. The Plan will be considered public record and available for inspection.

Plan Activities

1. Pursue Plan participation by local agencies within Plan Area;
2. Maintain advisory committee of Plan Participants and Plan stakeholders; and
3. Establish and maintain public notification and participation procedures regarding Plan activities.

SECTION 6
MONITORING
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SECTION 6
MONITORING
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

GENERAL

Optimal use of the groundwater resource is dependent on the acquisition of good basic data respecting both geology and hydrology. The purpose of this element of the Shafter-Wasco Irrigation District's (District) Groundwater Management Plan (Plan) is to monitor conditions within the groundwater basin to identify changing conditions which may require attention. Monitoring includes gathering and analyzing basic data generated from Plan management activities to characterize the basin to provide the information necessary for future management decisions. Existing and proposed management activities in this regard may be enhanced to provide a more complete picture of the condition of the groundwater resource. The Plan's primary monitoring effort will be directed at the groundwater resource. Additional monitoring efforts will result from activities proposed by management strategies.

GROUNDWATER MONITORING

Groundwater monitoring will consist of two components which are groundwater levels and groundwater quality.

Groundwater Levels

Data regarding groundwater levels is used to evaluate groundwater movement and storage conditions. Groundwater contour maps showing lines of equal elevation of the water surface indicate the direction of groundwater movement and can be used to develop estimates of

groundwater flow entering or leaving the management area. Maps of depth to groundwater can provide insight into the distribution of pumping lifts and resulting energy costs for extraction. Maps showing changes in groundwater levels, when used in conjunction with data on specific yield, can also be used to estimate changes in groundwater storage.

The District staff routinely measures groundwater levels in approximately 64 wells. The locations and details related to the current wells are presented in Table 6-1. Measurements are made in the spring and fall of each year. The present monitoring networks will be maintained or enhanced to assure the availability of sufficient data for the preparation of groundwater contour maps. Measurement of groundwater levels will continue to be performed in both spring and fall in order to show seasonal variations.

Groundwater Quality

Monitoring of groundwater quality provides the information required for determinations of the suitability of groundwater for various uses. Comprehensive groundwater quality data for the Plan area does not exist. The District will develop protocols to obtain groundwater quality data from domestic water providers and other sources and consolidate it for management purposes.

Sampling of District landowner wells will be considered, if necessary, to provide sufficient data to allow identification of water quality problem areas. Supplemental sampling may also be performed to better define localized areas of impaired water quality. Testing will typically include standard agricultural type analysis, but may also include additional testing such as Title 22 parameters, as required.

TABLE 6-1

GROUND-WATER MEASUREMENTS

AGENCY NO.		5614	AGENCY					Shafter-Wasco I.D					
USBR WELL NUMBER						Tape Reading		Date			N	Q	
TWP	Range	Sec.	Tr	No	BM	at M.P.	at W.S.	mm-dd-yy			M	M	Remarks
26S	24E	32	J	5	M	199		01	22	07			
26S	24E	34	R	1	M	216		01	22	07			
26S	24E	36	M	3	M						0		Removed
26S	24E	36	P	2	M	217		01	22	07			
27S	24E	3	H	2	M						0		Well Removed
27S	24E	3	M	2	M	211		01	22	07			
27S	24E	4	G	2	M	202		01	22	07			
27S	24E	10	G	1	M	219		01	22	07			
27S	24E	11	F	1	M	222		01	22	07			
27S	24E	13	N	1	M	232		01	22	07			
27S	24E	14	F	1	M	231		01	22	07			
27S	24E	15	R	2	M	229		01	22	07			
27S	24E	24	E	2	M						0		Filled in with Gravel
27S	24E	24	M	3	M	237		01	23	07			
27S	24E	26	H	2	M	241		01	23	07			
27S	24E	27	F	2	M	234		01	23	07			
27S	24E	28	R	2	M	233		01	23	07			
27S	24E	34	J	2	M	239		01	23	07			
27S	24E	35	J	1	M	241		01	23	07			
27S	24E	36	A	1	M	247		01	23	07			
27S	25E	7	R	1	M	249		01	23	07			
27S	25E	18	F	1	M	251		01	23	07			

NO MEASUREMENT		Questionable Measurement	
0. Measurement Disc.	6. Well destroyed	0. Caved or other Obs.	6.M.P change
1. Pumping	7.Special	1. Pumping	7.Recharge
2. Pump House locked	8. Casing leaking	2. Nearby Pumping	8.Oil in casing
3. Tape hung up	9.temporarily inaccessible	3.Casing leaking	9. Acoustical sounding
4. Can't get tape in casing		4.Pumped recently	
5. Unable to locate well		5. Air gauge mea.	

TABLE 6-1

GROUND-WATER MEASUREMENTS

AGENCY NO.		5614				AGENCY							Shafter-Wasco I.D
USBR WELL NUMBER						Tape Reading		Date			N	Q	
TWP	Range	Sec.	Tr	No	BM	at M.P.	at W.S.	mm-dd-yy			M	M	Remarks
27S	25E	19	C	2	M	245		01	23	07			
27S	25E	19	N	3	M								Removed
27S	25E	19	P	3	M	256		01	23	07			
27S	25E	28	F	1	M	261		01	24	07			
27S	25E	29	H	3	M	261		01	24	07			
27S	25E	30	J	3	M	259		01	24	07			
27S	25E	31	D	3	M	252		01	24	07			
27S	25E	32	A	3	M	259		01	24	07			
27S	25E	33	J	3	M	264		01	24	07			
27S	25E	34	E	3	M	264		01	24	07			
27S	24E	34	P	3	M	261		01	25	07			
28S	24E	1	L	1	M	242		01	25	07			
28S	24E	2	A	1	M	244		01	25	07			
28S	24E	3	R	1	M	241		01	25	07			
28S	24E	10	R	1	M	242		01	25	07			
28S	24E	11	F	2	M	246		01	26	07			
28S	24E	12	J	2	M	250		01	26	07			
28S	24E	12	M	2	M	252		01	26	07			
28S	25E	2	N	1	M	254		01	26	07			
28S	25E	3	J	2	M	255		01	26	07			
28S	25E	4	L	2	M	253		01	26	07			
28S	25E	5	F	1	M	252		01	26	07			

NO MEASUREMENT		Questionable Measurement	
0. Measurement Disc.	6. Well destroyed	0. Caved or other Obs.	6.M.P change
1. Pumping	7.Special	1. Pumping	7.Recharge
2. Pump House locked	8. Casing leaking	2. Nearby Pumping	8.Oil in casing
3. Tape hung up	9.temporarily inaccessible	3.Casing leaking	9. Acoustical sounding
4. Can't get tape in casing		4.Pumped recently	
5. Unable to locate well		5. Air gauge mea.	

TABLE 6-1

GROUND-WATER MEASUREMENTS

AGENCY NO.		5614	AGENCY					Shafter-Wasco I.D					
USBR WELL NUMBER						Tape Reading		Date			N	Q	
TWP	Range	Sec.	Tr	No	BM	at M.P.	at W.S.	mm-dd-yy			M	M	Remarks
28S	25E	6	B		M	254		01	29	07			
28S	25E	7	J	2	M	250		01	29	07			
28S	25E	8	M	1	M	252		01	29	07			
28S	25E	10	D	2	M	253		01	29	07			
28S	25E	14	C	3	M	249		01	29	07			
28S	25E	14	L	1	M	228		01	29	07			
28S	25E	15	R	1	M	239		01	29	07			
28S	25E	16	R	1	M	240		01	29	07			
28S	25E	17	G	1	M	242		01	25	07			
28S	25E	17	R	1	M	244		01	25	07			
28S	25E	18	C	1	M	246		01	25	07			
28S	25E	20	J	1	M	240		01	25	07			
28S	25E	21	M	1	M	237		01	25	07			
28S	25E	22	G	1	M	231		01	25	07			
28S	25E	23	K	1	M	237		01	26	07			
28S	25E	26	C	2	M	226		01	26	07			
28S	25E	26	N	2	M	218		01	26	07			
28S	25E	28	R	2	M	235		01	26	07			
28S	25E	29	L		M	238		01	26	07			
28S	25E	36	J	1	M	200		01	26	07			
28S	26E	19	A	2	M	240		01	26	07			
28S	26E	30	A	1	M	224		01	26	07			
28S	26E	30	J	1	M	206		01	26	07			
28S	26E	31	J	1	M	196		01	26	07			

NO MEASUREMENT		Questionable Measurement	
0. Measurement Disc.	6. Well destroyed	0. Caved or other Obs.	6.M.P change
1. Pumping	7.Special	1. Pumping	7.Recharge
2. Pump House locked	8. Casing leaking	2. Nearby Pumping	8.Oil in casing
3. Tape hung up	9.temporarily inaccessible	3.Casing leaking	9. Acoustical sounding
4. Can't get tape in casing		4.Pumped recently	
5. Unable to locate well		5. Air gauge mea.	

ADDITIONAL MONITORING

Data related to the hydrologic inventory will be collected annually for quantification and analysis. Components of the inventory include precipitation, runoff, imported supplies, amounts of groundwater replenished and quantities of groundwater extracted. Additional monitoring efforts will result from the following Plan management strategies:

- Groundwater Recharge Management;
- Groundwater Extraction Policies;
- Surface Water Management;
- Land Use Planning;
- Well Abandonment/Destruction Policies; and
- Well Construction Policies.

SECTION 7
PLAN IMPLEMENTATION
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

SECTION 7
PLAN IMPLEMENTATION
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

GENERAL

The Shafter-Wasco Irrigation District (District) will serve as the custodian of the District's Groundwater Management Plan (Plan). The District will act as the Plan's resource center and data clearinghouse. Monitoring Data and information gathered during Plan Implementation will be compiled and stored at the District office. The District will also lead Plan activity, report preparation and information dissemination efforts.

PLAN PARTICIPATION

The Plan officially recognizes stakeholders through the execution of a Memorandum of Understanding (MOU) between the District and an interested entity. The purpose of the MOU is to document the interests and responsibilities of participants in the adoption and implementation of the Plan. The MOU also promotes the sharing of information, the development of a course of action and the resolving of differences that may arise regarding the Plan. It is foreseen that stakeholder involvement will increase with time. The District will continue to pursue new stakeholder involvement and shall endeavor to enter into an agreement with other local agencies in the form of a Memorandum of Understanding in compliance with California Water Code § 10750.8. A sample of one form of Memorandum of Understanding is included in Appendix "B".

DISPUTE RESOLUTION

The Plan acknowledges that controversial issues could arise concerning the groundwater resource. Stakeholders are encouraged to work through the Plan in addressing and resolving differences. When this process proves insufficient, the District has adopted in this Plan, an applicable policy for dispute resolution. The policy is presented in Appendix "C".

ANNUAL REPORT

Documentation in the form of an annual report will be prepared as required to record the results of the management activities monitoring elements of the Plan. The contents of the annual report will include:

1. Maps and/or tables showing:
   - spring and fall groundwater elevations;
   - changes in groundwater levels between subsequent spring readings; and
   - groundwater quality;
2. Estimation of the changes in groundwater storage computed using specific yield data and maps of change in groundwater levels;
3. Summary of water resource data; and
4. Assessment of the effectiveness of management activities.

PLAN OF EVALUATION

The Plan will be re-evaluated annually subsequent to the findings of the Plan's annual report. The District staff will be responsible for monitoring the Plan's activities and progress towards its management objectives.

The re-evaluation of the Plan will include an assessment of the effectiveness of Plan activities and a determination of potential modification(s) to the Plan.

ADDITIONAL REPORTS

Additional reports and technical memoranda may be produced as a result of Plan activities, grant funding requirements or other need for documentation. The content of any supplemental documents will address the informational requirements.

SCHEDULE

Implementation of the District's Plan will be structured according to the schedule presented in Table 7-1.

TABLE 7-1
IMPLEMENTATION SCHEDULE
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

PLAN ACTIVITY	OCCURRENCE
Plan Management Strategies and Activities	Monthly (As Required)
District General Meeting	Monthly
Plan Report	Annually
Plan Re-evaluation	5-year Basis
Groundwater Monitoring	Annually (Additional As Required)

PLAN FUNDING

Implementing the Plan will require dedicated funding through the District and potentially with Plan Participants. In general, funding for the Plan and its activities will be derived from grants, in-lieu contributions, cost-sharing agreements and/or assessments.

Grants

The District will pursue opportunities to fund Plan activities through grants offered by DWR and other agencies. Plan participants may be asked to support grant applications.

Cost-Sharing Agreements

Costs for annual groundwater reports, Plan updates and other reporting efforts will be distributed according to any cost-sharing provisions entered into as part of participation agreement provisions.

Additional cost-sharing agreements may be developed as necessary to fund other projects considered during the implementation of the Plan.

In-lieu Contributions

Some Plan activities, such as groundwater elevation activities will be funded through the District's own operations.

Assessments

Upon adoption of this Plan, the District is authorized to levy and collect general groundwater replenishment assessments, as well as water extraction fees based on the amount of groundwater extracted from the aquifer within the Plan Area. Any assessment or fees proposed to be collected by the District under this Plan for the purpose of groundwater management must be approved by an area-wide election as provided in AB 3030.

APPENDIX A
PLAN PARTICIPANTS AND STAKEHOLDERS
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

TABLE A-1
PLAN PARTICIPANTS
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

PARTICIPANT	DATE OF FORMALIZED PARTICIPATION

TABLE A-2
STAKEHOLDERS
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

STAKEHOLDER	INTEREST
	District Landowners
	District Landowners
	District Landowners
	District Landowners
	District Landowners
	District Landowners
City of Wasco	Domestic Water Supply/Use
City of Shafter	Domestic Water Supply/Use
	Domestic Water Supply/Use
	Domestic Water Supply/Use
	Domestic Water Supply/Use
Kern Wildlife Refuge	Wildlife
Bureau of Reclamation	Surface Water Supplies
Friant Water Authority	Surface Water Supplies
National Resources Conservation Service	Natural Resources
Audubon Society	Wildlife/Monitoring
Kern County	Land Use/Planning

APPENDIX B
SAMPLE MEMORANDUM OF UNDERSTANDING
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

MEMORANDUM OF UNDERSTANDING

_____

AND

SHAFTER-WASCO IRRIGATION DISTRICT

ARTICLE I – AGREEMENT

The articles and provisions contained herein constitute a bilateral and binding agreement by and between SHAFTER-WASCO IRRIGATION DISTRICT (hereinafter the "District") and _____ (hereinafter "Agency").

ARTICLE II – RECOGNITION

The District has developed a Groundwater Management Plan (hereinafter the "Plan") with input from several local agencies located within the District. It is the intent of the District to allow and encourage such agencies to coordinate efforts and be a part of the District's Plan by means of a separate Memorandum of Understanding (hereinafter the "MOU") between each agency and District.

ARTICLE III – PURPOSE

It is the purpose of the MOU, entering into willingly, between District and Agency, to document the interests and responsibilities of both parties in the adoption and implementation of the Plan. It is also hoped that such MOU will promote and provide a means to establish an orderly process to share information, develop a course of action and resolve any misunderstandings or differences that may arise regarding the Plan.

ARTICLE IV – COORDINATE

There shall be an annual coordinating meeting (hereinafter the "Meeting") between the District and the Agency. District shall give notice to the Agency thirty (30) days prior to date of the Meeting to discuss the manner in which the Plan is being implemented and other items related to the Plan. If there are concerns or questions regarding the Plan, Agency shall transmit its concerns in writing to District seven (7) days prior to the Meeting.

ARTICLE V – OBLIGATIONS

The Plan shall be binding on the parties hereto unless superseded by the MOU or amendment thereto.

ARTICLE VI – AREA OF PLAN

The Plan shall be effective in all areas within the Agency boundaries. The Plan shall also be effective in any area annexed to the Agency subsequent to the adoption of the Plan.

ARTICLE VII – TERM

The initial term of the MOU shall commence on the date hereof and continue for five (5) years, and shall continue year to year thereafter, unless terminated by written notice given at least one (1) year prior to such termination.

This Memorandum of Understanding is made and entered into this _____ day of _____, 2007.

SHAFTER-WASCO IRRIGATION DISTRICT _____

By: _____ By: _____

Title: _____ Title: _____

By: _____ By: _____

Title: _____ Title: _____

APPENDIX C
ALTERNATIVE DISPUTE RESOLUTION POLICY
GROUNDWATER MANAGEMENT PLAN
SHAFTER-WASCO IRRIGATION DISTRICT

ALTERNATIVE DISPUTE RESOLUTION POLICY
SHAFTER-WASCO IRRIGATION DISTRICT

Purpose. The District recognizes that defending or prosecuting lawsuits can be expensive and time-consuming, resulting in a drain on District resources that should be avoided, if reasonably possible. To that end, the District hereby implements this policy to encourage the resolution of disputes, claims and lawsuits through alternative dispute resolution procedures related to their adopted Groundwater Management Plan.

Procedures. Whenever the District is named in a lawsuit or receives a written claim or a serious threat of imminent litigation, the District staff shall immediately consult with the District General Counsel regarding the same. Together, the District staff and the District General Counsel shall formulate a recommended response to be considered by the Board of Directors at its next meeting.

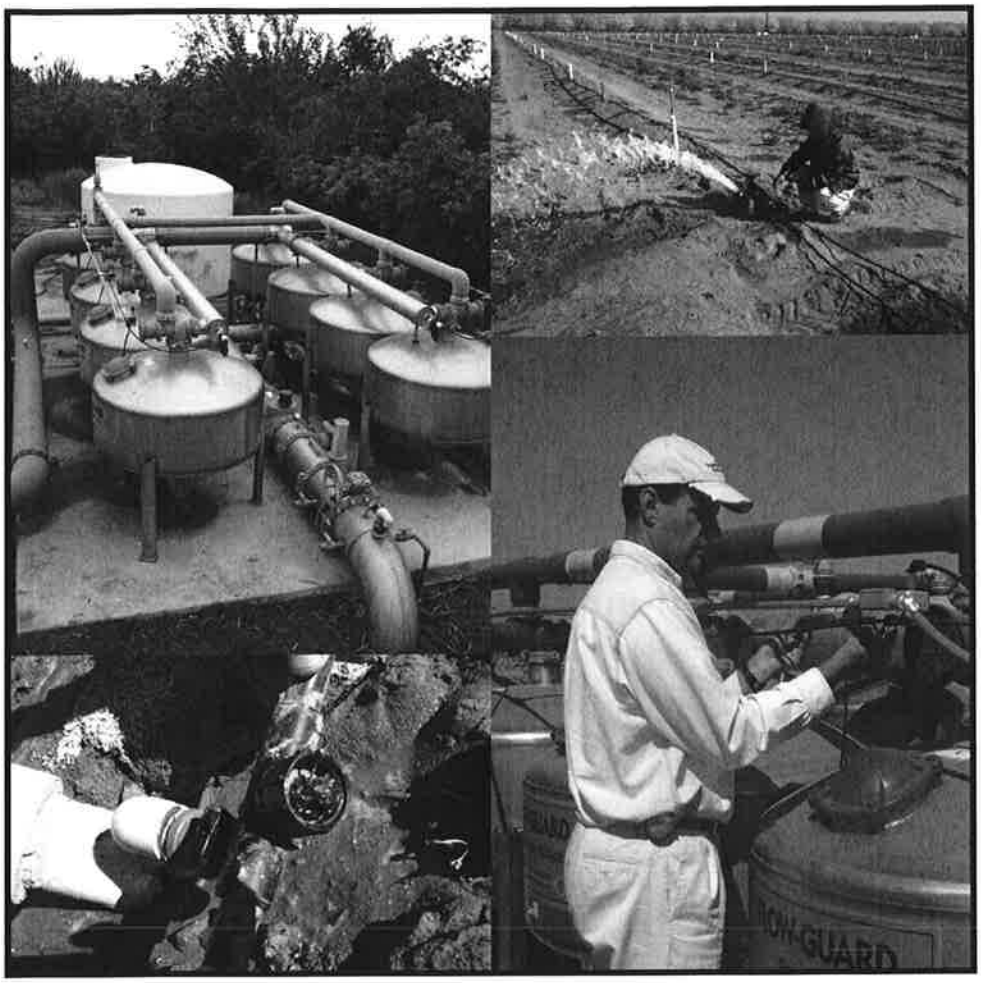
Whenever the District becomes aware of any unasserted potential lawsuit, claim or dispute, with a reasonable likelihood of being asserted, against the District, the District staff shall consult with the District's counsel regarding the best method for responding to the same. Possible responses include, but are not limited to, the following:

1. Do nothing.
2. A verbal communication from the District or its general counsel.
3. A written communication from the District or its general counsel.
4. An offer to meet and discuss the matter with District personnel.
5. An offer to mediate the matter before a neutral third-party mediator.
6. An offer to arbitrate the matter before the American Arbitration Association.
7. An offer to arbitrate the matter using the rules of judicial arbitration found in California statutes.

District staff shall advise the Board of Directors of any unasserted lawsuit, claim or dispute, with a reasonable likelihood of being asserted, including the District's response to the same. The Board of Directors shall be advised whether or not the matter is resolved. If the potential lawsuit, claim or dispute becomes an actual lawsuit, claim or dispute, the response of the District shall be handled as set forth above in the previous paragraphs.

It shall be the practice of the District to encourage mediation of lawsuits, claims or disputes, whenever reasonably practical, in order to resolve such matters. Mediation shall be by a neutral third-party qualified to mediate such matters.

ATTACHMENT F



Evaluate the Performance of Your Irrigation System

Your irrigation system works most effectively when it distributes the right amount of water uniformly. This fact sheet explains how you can use an evaluation to determine if your system is performing as well as it can.

What's involved in an evaluation?

The main part of the evaluation is a field test of your irrigation system. With pressurized systems, trained Mobile Lab technicians will check the operation of your filters, and emitters or sprinklers. Pressures and flow rates are carefully measured throughout the field to determine how uniformly water is being applied to your crop. With this information along with observations made in the field, a report is generated that will be given to the grower when the evaluation is completed

How long does it take?

The Mobile Lab technicians will need only a few minutes of your time to answer some basic questions about your system. After that, the technicians will spend between three and eight hours performing a careful examination of your system. Additional time is then needed to compile the information and assemble a report. After the report is complete, the technicians will need a few more minutes of your time to meet with you and go over the results of the evaluation.

How much does it cost?

Thanks to support from local water districts and other concerned agencies, the North West Kern RCD can provide its Mobile Lab Services at a **minimal cost to water users.**

What does poor uniformity cost you?

Too Much! Poor uniformity means that your water bill is higher and your energy bill is higher. And, when water moves below the crop's root zone, the fertilizer moves too. This means that your fertilizer bill is higher also. Increased uniformity not only decreases costs, it increases your crop's growth, yield quality, and harvest profits.

How can you get your system evaluated?

Call the Irrigation Mobile Lab at (661) 336-0967 ext. 138 and ask for Brian.

Brian Hockett is the District Manager of the North West Kern RCD and the Mobile Lab team leader. He has been performing irrigation system evaluations since March of 1988. Brian graduated from UC Davis with a degree in Agricultural Science and Management.

Brian has attended the Irrigation Training and Research Center (ITRC) program at Cal Poly, San Luis Obispo. He and his team use a software program specially designed by Dr. Charles Burt at the Cal Poly ITRC.

To schedule an evaluation, call (661) 336-0967 ext. 138

You can also drop by the USDA Natural Resource Conservation Service office at 5000 California Ave. #100. Bakersfield, CA 93309.

Who Sponsors the Irrigation Mobile Lab?

The Irrigation Mobile Lab is sponsored and administered by the North West Kern Resource Conservation District. The funding is provided through these local and state agencies:

- Arvin-Edison WSD
- Belridge Water Storage District
- Buena Vista WSD
- Cawelo Water District
- Delano-Earlimart ID
- Dept. of Water Resources
- Kern-Tulare Water District
- Henry Miller Water District
- Kern Delta Water District
- Lost Hills Water District
- Natural Resources Conservation Service
- North Kern WSD
- Rosedale-Rio Bravo WSD
- Semitropic WSD
- Shafter-Wasco Irrigation District
- So. San Joaquin Municipal Utility District
- Tehachapi-Cummings County Water District
- U.S. Bureau of Reclamation
- Wheeler Ridge-Maricopa WSD

The USDA Natural Resources Conservation Service is providing in-kind services for the Irrigation Mobile Lab by providing office space for the staff of the North West Kern Resource Conservation District and providing soil survey information useful to irrigation system evaluations. The NRCS also uses the evaluation within the context of their own Irrigation Water Management Program.

The Mobile Lab will test any kind of system. What are some potential uniformities?

Furrows.....85%
Border Strips.....85%
Hand-move sprinklers.....75%
Solid Set Sprinklers.....75%
Micro drip/Fanjet.....90%

If your district is not on the list (left), please ask them to support the Mobile Lab program.

Kern County growers respond to irrigation system evaluations...

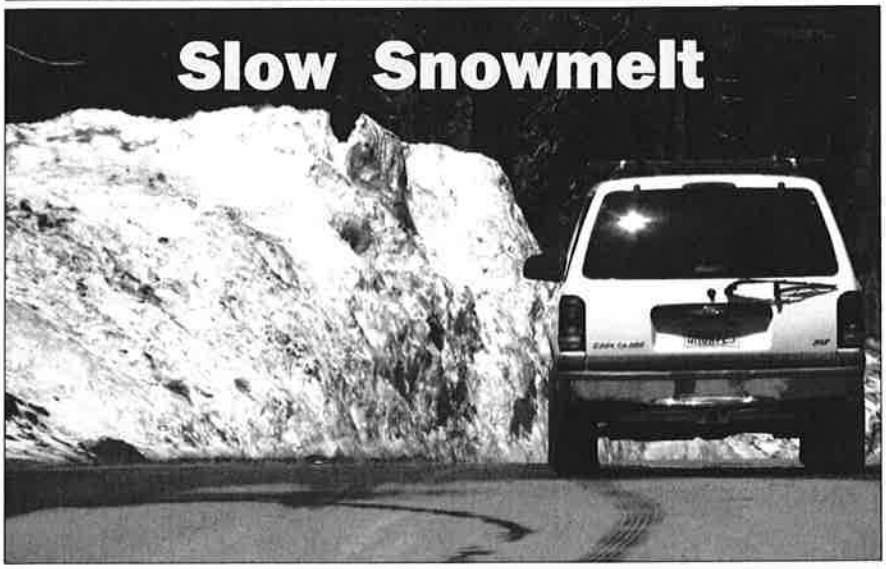
- *"We have improved our linear system distribution from 67 percent to 85 percent. This is a direct result of recommendations from the Mobile Lab"*
- *"After I made the recommended changes to my drip system, the Lab returned to do a follow-up evaluation. The results of the follow-up showed an 11 percent increase in uniformity"*
- *"Results of the micro tests showed that uniformity and efficiency were up to 90 percent and 89 percent respectively, and the linear was at 90 percent and 96 percent respectively. This gives us a better idea of our operating status and how we can better manage our water."*
- *"The Mobile Lab came out and tested one of our flood-irrigated vineyards. It was an eye-opening experience to see how inefficient my irrigation practices were."*
- *"Brian (Hockett) has been very helpful in evaluating our drip systems, and has carefully explained and interpreted the findings to me."*
- *"As a result of their survey, I was able to see that with a little inexpensive maintenance, we could make better use of our water, get it where we need it and improve the fuel efficiency of our pumping engine."*

FRIANT WATER AUTHORITY

FRIANT Waterline

May 2011

Volume 23, No. 207



Friant Water Authority / J. Randall McFarland

Mountains of snow tower over a motorist driving along Huntington Lake Road near Lakeshore on May 30 but the greatest remaining accumulations are residue from snowplowing during big winter and spring storms. Many large expanses of bare ground are now evident around the scenic lake at the 7,000 foot elevation although much snow remains to melt at higher elevations of the San Joaquin River watershed. *(Additional photos on back page.)*

Late Runoff Follows Cool May Weather

Flood Release Scaled Back; Friant Supply Remains Full

Within much of the San Joaquin River watershed's recreational areas over the Memorial Day weekend's traditional start of summer, winter weather ruled.

Not only did cold rain fall, so did snow. Temperatures took a nose dive from seasonal normals.

So it has been for most of the past several weeks in May and into the first few days of June as weather patterns have had a chilling look and feel of winter and early spring.

'NO SUMMER YET'

"No summer yet," National Weather Service meteorologist Steve Anderson said in a San Francisco *Chronicle* report. "We're just locked in a cool pattern on the West Coast." Another cold late-season storm was predicted for the

Please see **Late Snow**, back page

Hearing Held On New San Joaquin Water Bill

San Joaquin Valley water legislation introduced in May by three valley Republican Congressmen has gone through its first House Water and Power Subcommittee hearing but a second hearing has been requested by some Democratic members.

The June 2 hearing in Washington was conducted on H.R. 1837, the San Joaquin Valley Water Reliability Act sponsored by Reps. Devin Nunes (*R-Visalia*), Kevin McCarthy (*R-Bakersfield*) and Jeff Denham (*R-Modesto*).

No action was taken although it is known the bill's authors hope that the measure will be passed out of committee and on to action by the full House later in the summer. *(The Friant Water Authority's position on the measure, adopted unanimously by the Board of Directors May 26, is in the box at right.)*

It was not immediately known when the second hearing, formally requested by Ranking Subcommittee Member Grace Napolitano (*D-Norwalk*), would be held.

'DEVASTATED'

Water and Power Subcommittee Chairman Tom McClintock (*R-Granite Bay*) said in opening the hearing, "California's Central Valley was devastated in 2009 and 2010 by the deliberate diversion of hundreds of billions of gallons of water away from Central Valley agriculture to satisfy environmental edicts for salmon and Delta smelt. The practical effect of this action was to destroy a quarter million acres of the most productive farmland in America and throw thousands of hard-working families into unemployment."

McClintock said Central Valley Project (CVP)

Please see **House Hearing**, back page

FWA Offers Comments On Valley Water Reliability Act

This policy statement on the San Joaquin Valley Water Reliability Act (H.R. 1837) was adopted unanimously by the Friant Water Authority Board of Directors on May 26.

◊

The Friant Water Authority (FWA) greatly appreciates that the Members of the San Joaquin Valley Congressional Delegation regard protection and enhancement of agricultural water supplies as critically important to the San Joaquin Valley and California and the Nation as a whole. We are encouraged that Members of the Delegation continue to offer legislative proposals intended to restore certainty and flexibility in the management of water for the beneficial uses that are the foundation of our economy.

Please see **FWA Comments**, back page

Few Comment On River Environmental Reports

Friant Water Authority / J. Randall McFarland

Madera Irrigation District Vice President Carl Janzen (left) speaks with U.S. Bureau of Reclamation staff member David Mooney during the Fresno hearing May 24.

Members of the public did not exactly beat a path to a series of May workshops and hearings aimed at gaining comment and opinion on the San Joaquin River Comprehensive Plan's environmental documents.

Attendance was several dozen or less at each of the four sessions, held in Visalia, Fresno, Los Banos and Sacramento, and only a handful of people offered any testimony. Many of those attending were federal or state staff members, or local water district officials.

LOS BANOS COMMENTS

The Los Banos hearing resulted in the most oral comments, including a statement from DeeDee D'Adamo from the

Please see **Restoration**, Page 3

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May 2011
Page 2
Volume 23, No. 207
Published by the Friant Water Authority, as a review of issues and developments to inform those interested in water supplies along the East Side of the southern San Joaquin Valley. To comment or ask any questions, please write or call us at (559) 562-6305, visit our web site at *www.Friantwater.org* or contact your local irrigation district. This issue was printed June 3.

FRIANT WATER AUTHORITY

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- Ronald D. Jacobsma, *General Manager*
- Mario Santoyo, *Assistant General Manager*
- J. Randall McFarland, *Waterline Editor*

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Delano-Earlimart Irrigation District
Exeter Irrigation District
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Ivanhoe Irrigation District
Kaweah Delta Water Conservation District
Kern-Tulare Water District
Lindmore Irrigation District
Lindsay-Strathmore Irrigation District
Lower Tule River Irrigation District
Madera Irrigation District
Orange Cove Irrigation District
Pixley Irrigation District
Porterville Irrigation District
Saucelito Irrigation District
Shafter-Wasco Irrigation District
Stone Corral Irrigation District
Tea Pot Dome Water District
Terra Bella Irrigation District
Tulare Irrigation District

OBITUARIES

Veteran Water Attorney Green Dies At 89

Denslow Brooks Green, longtime attorney for the Madera Irrigation District, died May 15 at the age of 89.

Mr. Green was born February 4, 1922, and was a lifelong resident of Madera where he graduated from high school.

He served in World War II as an Army Captain and was awarded the Bronze Star and Air Medal.

After graduating Stanford University and Stanford Law School, he joined his father, Sherwood Green, in practicing law.

Denslow Green

Mr. Green was well respected as a water law attorney and served many water districts besides MID.

He tried a case before the U.S. Supreme Court and several cases before the California State Supreme Court.

He was among the many Friant attorneys involved in the San Joaquin River litigation in the U.S. District Court in Sacramento.

Mr. Green and his wife Helen had three children, two of whom survive.

WESTLANDS WATER DISTRICT

Water Leader Jack Stone Dies

Jack Stone, one of the San Joaquin Valley's best known and most effective Central Valley Project water leaders, died May 17 in Hanford. He was 93.

Mr. Stone was a Westlands Water District director for 21 years and farmed in Fresno and Kings counties, heading the J.G. Stone Land Company.

He became an outspoken advocate for valley agriculture.

A Corcoran native, Mr. Stone attended Hanford High School and the University of California at Davis to study engineering.

During World War II, he helped construct many military airports.

Among his many affiliations, Mr. Stone was Western Cotton Growers Association and National Cotton Council President.

Most recently, Mr. Stone was a California Farm Water Coalition director.

AROUND FRIANT

MILLERTON LAKE STATE RECREATION AREA

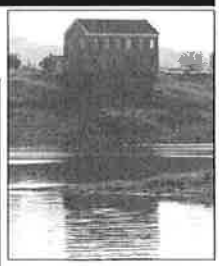
Friant Park Escapes Budget Ax

Seventy of California's 278 state parks have been listed by Governor Brown's administration as targets for closing due to the state's massive budget crisis but Millerton Lake State Recreation Area near Friant Dam is not among them.

Millerton is a favorite for water-oriented recreation due to its proximity to the Fresno-Clovis metropolitan area. It is located along the reservoir's shorelines in both Fresno and Madera counties.

Millerton features more than 40 miles of shore line for water sports and other activities.

The park features a reconstruction of the original Fresno County Courthouse, built in 1867 in the old county seat of Millerton.


Friant Water Authority
The old courthouse on the shore of Millerton Lake.

Viewing Valley Water History

Friant Water Authority / J. Randall McFarland
Members of the Tulare County Historical Society look over a parapet atop the southern end of Friant Dam during a May 14 history-related tour that the Friant Water Authority and U.S. Bureau of Reclamation helped facilitate. The tour included Friant Division and Kings River features, and featured visits to the Orange Cove and Alta irrigation districts.

ISABELLA DAM

Scoping Sessions Focus On Repairs

Major deficiencies in the condition of Isabella Dam and an auxiliary dam were discussed at recent scoping meetings held by the U.S. Army Corps of Engineers.

The Corps is dealing with problems of internal erosion, an active earthquake fault directly beneath the auxiliary dam, and a spillway that is considered too small. The dams now carry the Corps' most at-risk status. The dams control Kern River flows.

Sized-Down Delta Bypass Will Be Administration's Focus

Governor Jerry Brown, a leading proponent of the voter-defeated Peripheral Canal proposal three decades ago, will consider less ambitious plans for alternative state and federal projects to move water around the troubled and fragile Delta.

An administration official announced in May that the Bay Delta Conservation Plan (BDCP) will analyze alternative proposals including a relatively small diversion concept proposed originally by some in the environmental community.

TUNNEL NO LONGER NO. 1 PLAN

Jerry Meral, Natural Resources Agency Deputy Secretary, told an Assembly committee that a program to develop large tunnels to convey water under and through the Delta – a plan favored by former Governor Schwarzenegger – no longer leads the Brown administration's list of Delta solution options.

Along with the Delta's well-known fishery and related environmental issues, the estuary of the

Please see **Delta Bypass**, Page 3

Jerry Meral

SAN JOAQUIN RIVER AND RESERVOIR WATER CONDITIONS

WATERSHED PRECIPITATION

Inches	2010-11 *including May 31*	2009-2010 *including June 2*	Season Avg. *Through May*
Huntington Lake	59.31	42.41	29.60
Bass Lake	53.36	41.36	27.98
Friant	24.15	17.41	9.98

SEASONAL RUNOFF

Acre-Feet	In 2010-11	Predicted	Prev. Year
May (31st)	545,187	715,000	
April-July period	937,912	1,680,000	625,771
Water Year	1,819,679	2,150,000	1,660,000

2009-2010 Total *(October 1-September 30)* — 2,027,693

FLOWS

San Joaquin River

Cubic Feet Per Second	May 31	June 2, '10
Calculated Natural Flow (Friant)	7,100	10,268
Actual Millerton Lake Inflow	6,684	6,537
Actual Flow At Friant	2,881	791
Flow at Gravelly Ford	2,740	
Flow below Mendota Dam	433	
Flow at Vernalis *(San Joaquin County)*	11,589	
Total Delta Inflow	50,023	
Delta outflow index	44,557	
Delta conditions	*Excess*	

Diversions at Friant Dam

Friant-Kern Canal	3,506	4,209
Madera Canal	835	1,048

RESERVOIR STORAGE

Acre-Feet	May 31	Last Year	Capacity
U.S. Bureau of Reclamation			
Millerton Lake	276,557	193,121	*520,500*
Southern California Edison Company			
Edison Lake	48,561	51,472	*125,000*
Florence Lake	25,500	30,008	*64,400*
Huntington Lake	67,997	58,605	*89,000*
Shaver Lake	100,447	104,137	*135,300*
Mammoth Pool	121,592	122,127	*122,000*
Redinger Lake	24,614	24,521	*26,120*
Pacific Gas and Electric Company			
Bass Lake	34,650	34,640	*35,000**
Kerckhoff Lake	3,686	3,981	*4,200*
Upstream Total	427,077	429,491	*611,400*
OVERALL	703,634	622,612	*1,131,900*

**—Temporary capacity pending Crane Valley Dam seismic retrofit*

OTHER SOUTH VALLEY DAMS AND RESERVOIRS

Acre-Feet	May 31	Capacity
Chowchilla River / *Buchanan*	143,332	*150,000*
Fresno River / *Hidden*	66,384	*90,000*
Merced River / *New Exchequer*	751,539	*1,024,600*
Kings River / *Pine Flat*	705,957	*1,000,000*
Wishon, Courtright total	156,489	*251,900*
Kaweah River / *Terminus*	128,090	*185,600*
Tule River / *Success*	38,623	*40,000**
Kern River / *Isabella*	332,326	*360,000**

**—Capacity for emergency flood control, 82,314 acre-feet.*
**—Capacity for emergency flood control, 570,000 acre-feet.*

San Luis Reservoir / *CVP*	699,398	*980,000*
State Water Project portion	931,405	*1,060,000*
San Luis Reservoir total	1,830,803	*2,040,000*

During The River Restoration Program's Fresno Hearing

Left: Consultant Bill Swanson explains the location of proposed San Joaquin River Restoration Program activities to people attending a Fresno hearing. Right: Hearing Officer Pete Lucero has a lonely feeling during the hearing's public testimony portion. Only one person spoke at the Fresno session.

Friant Water Authority / J. Randall McFarland

Restoration: River's EIS-EIR Hearings Are Lightly Attended

Continued from front page

office of Rep. Dennis Cardoza *(D-Merced)*.

She said the Congressman believes the San Joaquin River Settlement's restoration and water management schedules need to be re-examined, and new timetables be established with a realistic funding plan before spring run salmon are reintroduced into the San Joaquin River.

Several landowners and local water agency officials from the San Joaquin River Exchange Contractors service area spoke with a consistent message: That they support the river Settlement but want it implemented in an intelligent manner, by completing the river improvements before salmon are reintroduced.

Representatives of many water agencies, including the Friant Water Authority, have indicated they plan to submit comments on the 8,000-page environmental impact statement and report in writing before the comment period – now extended to 5 p.m. September 21 – closes.

"Getting public review and comment is important," said the Restoration Program's Manager, Alicia Forsythe.

2006 SETTLEMENT

The Restoration Program and its implementing legislation resulted from the 2006 Settlement of 18-year litigation. Reaching the Settlement was an environmental coalition headed by the Natural Resources Defense Council, the U.S. Departments of the Interior and Commerce, and the Friant Water Authority and its member districts.

The Settlement states spring-run Chinook salmon are to be reintroduced to the river by December 31, 2012. However, the Fresno *Bee* quoted Forsythe as saying, "The process has been more complicated and time-consuming than anyone thought" and indicated the timetable may be delayed.

Forsythe said the draft environmental documents include no preferred alternative. A final document is expected to be completed early in 2012 and will include responses to all comments.

ALTERNATIVES

The environmental study examines implementation of the Settlement through:

- Improved channels and structures to convey flows, and provide fish passage and habitat.
- Modified Friant Dam operations to release interim and restoration flows downstream.
- Reintroduction of spring-run and fall-run Chinook salmon below Friant Dam.
- Implementing the Settlement's co-equal Water Management Goal to recapture, recirculate, reuse, exchange and transfer restoration flows in order to eliminate or minimize water supply impacts on Friant users.

Six action alternatives are evaluated that differ in two basic ways – on how flows are to be routed through Reach 4B northeast of Los Banos in Merced County, a section of vegetation-choked channel that has carried no flows since 1969.

Differing flow regimes are analyzed as is potential use of nearby flood control bypass channels and facilities. A "no-action" alternative is also discussed.

Draft Delta Conservation Plan Incomplete?

That's The Suggestion Of National Research Council Scientists On BDCP Study

A much-anticipated draft scientific study on conserving habitat for endangered and threatened Delta fish while continuing to divert water for agricultural and urban uses is hardly complimentary about the Bay Delta Conservation Plan (BDCP).

A National Research Council (NRC) statement contends the BDCP draft study "has critical missing components, including clearly defined goals and a scientific analysis of the proposed project's potential impacts on Delta species.

In addition, the scientific information in the plan is fragmented and presented in an unconnected manner, making its meaning difficult to understand," the NRC asserted.

PLAN WASN'T COMPLETE

The California Farm Water Coalition quickly responded, "It was no surprise that the National Research Council concluded that gaps exist in the Bay Delta Conservation Plan since the plan they reviewed was not complete."

According to the Coalition, several revised versions have been released since the version that NRC reviewed and there will be others as further study is conducted.

"More important are the words spoken by the NRC scientists when they termed the science being used to develop the BDCP as 'sound' and that BDCP planners should not start over again," the Coalition said.

'A SNAPSHOT'

"It only represents a snapshot of where this process was seven months ago," said California Resources Secretary John Laird.

Deputy Interior Secretary David Hayes, President Obama's point person on California water, said a great deal of additional planning work is being undertaken.

"We are midstream," Hayes told McClatchy Newspapers. He said planners soon will "move toward a much more mature draft."

'It only represents a snapshot'
—JOHN LAIRD, *Resources Secretary*

The BDCP is aimed at gaining authorization under the federal Endangered Species Act and companion California legislation for a proposed project to convey water around or through the Delta in a canal or tunnel while protecting the region's ecosystems.

According to the NRC, "The BDCP lacks clarity in its purpose, which makes it difficult to properly understand, interpret, and review the science that underlies the plan."

BDCP ORIGINS

The study was sponsored by the Interior and Commerce departments at the urging of Senator Dianne Feinstein after court-mandated water pumping restrictions in 2009 to protect the threatened Delta smelt led to massive economic and job losses, as well as social damage, along the valley's West Side.

Delta Bypass: Brown Administration Looks At Scaled-Down Options

Continued from Page 2

San Joaquin and Sacramento rivers also is plagued by deteriorating levees, land subsidence, and water supply and quality problems.

At the same time, the Delta is at the heart of California's basic water supply strategy of moving water from the sparsely-settled north state to central and southern regions where it is used by more than 26 million Californians and well over 3 million acres of irrigated agriculture.

FRIANT'S DELTA CONNECTION

The Central Valley Project's Friant Division relies upon water pumped from the Delta into the Delta-Mendota Canal.

That water is a substitute supply which enables a vital exchange with historic water rights holders on the valley's West Side (the San Joaquin River Exchange Contractors).

As a result of the substitute Delta supply, Friant water users are provided with supplies diverted into the Friant-Kern Canal and Madera Canal at Friant Dam.

Friant water is in turn used to irrigate some 1.3 million acres of incredibly productive East Side farmland in the southern San Joaquin Valley.

WON'T 'PRE-COMMIT'

"If you pre-commit to a project, you're going to fail," Meral testified at a committee hearing in describing California Environmental Quality Act review requirements. "We're not going to do that."

He said a tunnel, that was planned to carry up to 15,000 cubic feet per second of Sacramento River water from a location near Hood in Sacramento County to the federal and state pumping plants northwest of Tracy, has not been ruled out.

Laura King-Moon, State Water Contractors Assistant General Manager, said $150 million has already been spent by major California water agencies on studies with another $100 million now being sought from users.

She added, "Our organization believes that 15,000 c.f.s. is the optimal size and we continue to believe that."

Friant Water Authority / J. Randall McFarland

Above: Fed by melting San Joaquin River watershed snow, Pitman Creek thunders down the steep slope of Big Creek Canyon past trees turned white by a Memorial Day weekend snowfall near Big Creek in Fresno County. **Below Right:** Many slopes were largely bare of snow around 7,000-foot Huntington Lake by May 30. This rocky hill is just west of China Peak ski resort.

Smelt Plan Is Granted Extension

USFWS Must Write 2nd New Plan In Past 4 Years

Another two years has been given the federal government in its latest court-ordered effort to update a plan protecting the threatened Delta smelt.

U.S. District Judge Oliver W. Wanger, who last December acted to invalidate key parts of the Delta smelt plan and its frequent curtailments of Delta water export pumping that frequently resulted in water-pumping cutbacks from the Sacramento-San Joaquin Delta.

NOT WARRANTED

That ruling said pumping restrictions aimed at protecting the fish were not warranted. Wanger ordered the federal government to rewrite the plan for the second time in less than four years.

Originally, the jurist ordered the U.S. Fish and Wildlife Service to complete its rewrite by the end of 2011 but the USFWS appealed, claiming it could not complete the planning process by then. Wanger's new deadline is December 2013.

Westlands Water District General Manager Thomas Birmingham said, "We certainly appreciate Judge Wanger's sense of urgency, and from our perspective, it is important that we continue to approach this with a sense of urgency. However, to ensure sufficient time do a good job, this extension, I believe, is in our collective interest."

Late Snow: Runoff Is Delayed

Continued from Page 1

of June 4-5. Much anticipated heavy snowmelt-driven natural runoff flows down the San Joaquin River and other western Sierra Nevada rivers have mostly failed to materialize although full water supply availability continues for Friant users even as flood releases from Friant Dam have been trimmed.

Still, the Sierra snowline continues its spring retreat.

Friant Water Authority / J. Randall McFarland

Two kinds of white blend as heavy May 29 snow falls atop dogwood blooms near Camp Sierra near Big Creek.

Despite a number of May storms and the Memorial Day weekend accumulations of generally less than two inches of snow, large expanses of bare ground are now evident around Huntington Lake at the 7,000-foot elevation.

However, big piles of snow still lining some plowed roads provide evidence of just how big a winter storm season was experienced this year.

INCREASE IN RUNOFF

San Joaquin River runoff is now predicted to be 175% of average in the April-through-July peak period, or 2,190,000 acre-feet. That is an increase of 130,000 acre-feet in the past month.

In May, precipitation at Huntington Lake was nearly twice average for the month.

May's natural San Joaquin River runoff was 545,187 acre-feet, well below the 715,000 acre-feet that had been anticipated in May.

U.S. Bureau of Reclamation staff member Ed Salazar said the cool May weather resulted in slowed-down snowmelt but has pushed the June runoff forecast up to 825,000 acre-feet with another 333,000 acre-feet expected in July.

"We expect to fill Millerton Lake by the end of June," Salazar said. Millerton on June 1 contained 276,557 acre-feet, 53% of its capacity of 520,500 acre-feet.

Reservoir storage behind Friant Dam was brought down during the spring through flood releases and water orders from Friant contractors and other valley water agencies.

FULL SUPPLIES

The Bureau continues to make available full supplies to Friant contractors as well as low-cost "Section 215" (unstorable) water. Many Friant Friant Division long-term water service and repayment contractors have also been using Recovered Water Account (RWA) water credits under the San Joaquin River Restoration Program's Water Management Goal.

"We still need to move some water," Salazar said.

He said the current Friant "uncontrolled season" water supply conditions – featuring full supplies of Class 1 and Class 2 water – may continue into July.

FWA Comments

Continued from Page 1

The San Joaquin Valley Water Reliability Act (H.R. 1837) includes a number of provisions that FWA believes would substantially improve the availability and management of water supplies throughout the Central Valley.

Titles I and III of H.R. 1837 would:

- Make changes to the Central Valley Project Improvement Act (CVPIA) and other laws to eliminate out-dated federal and state protections for invasive fish species.
- Restore certainty for Central Valley Project water supply contracts.
- Facilitate water transfers.
- Establish a stakeholder oversight panel for the CVP Restoration Fund.
- Strengthen requirements to enhance CVP water yields.
- Provide a common-sense framework for environmental protections in the Delta.

Some sections of Title I need to be modified to ensure that regulatory burdens are not inadvertently shifted from one agency to another, and one of the funding provisions in Title I is inconsistent with the San Joaquin River Restoration Settlement Act.

TITLE II

Title II of the H.R. 1837 would repeal the San Joaquin River Restoration Settlement Act and prohibit further federal participation in the San Joaquin River Restoration Settlement. The FWA is a party to the Settlement as approved by the Federal Courts in 2006 and thus has a contractual obligation to comply with the Settlement and therefore opposes amendments to the Settlement Act that are not agreed to by the Settling Parties. FWA will continue to fulfill its obligations under the Settlement so long as the other Settling Parties, including the Federal Government, continue to fulfill their obligations.

House Hearing

Continued from Page 1

and State Water Project Delta export pumping restrictions implemented by the federal government occurred under the Endangered Species Act despite other identified causes of declines in Chinook salmon and Delta smelt populations.

RESTORE BALANCE

He called the situation a "government created disaster" and contended the recently-introduced bill would "bring the pendulum back to a sensible balance between the environment and humans."

Two of the bill's three titles would substantially improve availability and management of water supplies throughout the CVP, including the Friant service area's Cross Valley Canal Division. The other title would, as the FWA's board noted in its policy statement, "repeal the San Joaquin River Restoration Settlement Act and prohibit further federal participation in the San Joaquin River Restoration Settlement."

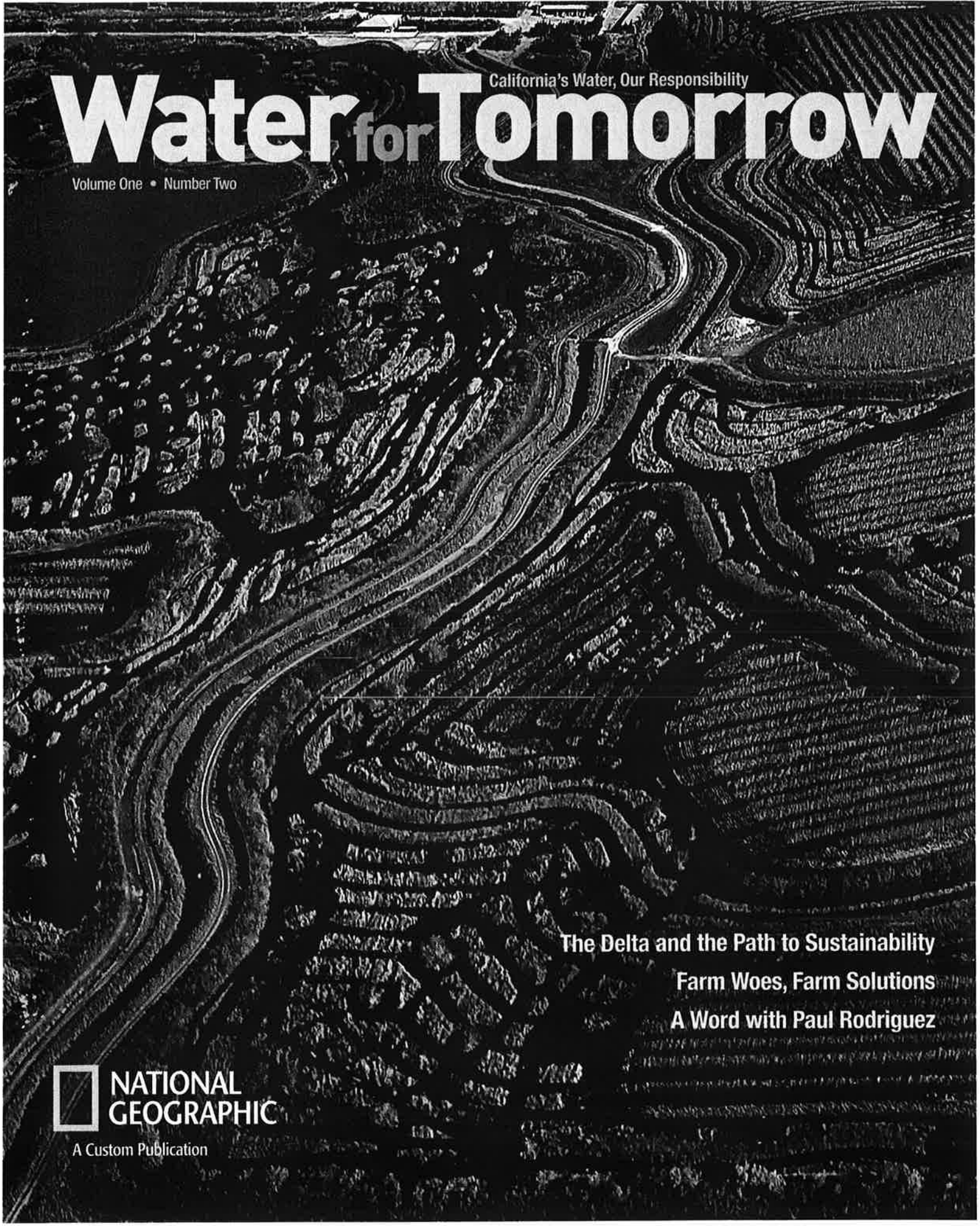
Comments from Congressmen generally appeared to follow party lines, although Rep. Jim Costa (*D-Fresno*) said he would support the bill. Costa said, however, unless efforts are made to work with the Democrat-controlled Senate, "This measure will never become law in 112th Congress."

AUTHORS' VIEWS

When the bill was introduced May 18, Nunes said, "The days of hiding behind judges, settling parties, and the promise of a new study have passed. Congress needs to enact laws for the people. That means ending the grip on our water supply by obsessed ideologues whose environmental record can only be measured a success if you count increased human suffering as the goal."

McCarthy, the House Majority Whip, called the measure "common sense legislation that aggressively tackles our man-made drought and turns the faucet back on for our local farmers and ranchers."

"Outdated environmental policies have hindered valley farmers for too long and this hearing is the next step towards ensuring that our farmers have a reliable water source," Denham said. "With sustainable, predictable resources valley farmers will be able to grow their crops, create jobs and drive our economy."



California's Water, Our Responsibility

Water for Tomorrow

Volume One • Number Two

The Delta and the Path to Sustainability

Farm Woes, Farm Solutions

A Word with Paul Rodriguez

NATIONAL GEOGRAPHIC

A Custom Publication

TECHNICAL ADVISORY

Customer Energy Efficiency Program

Pump Efficiency Tests from the Advanced Pumping Efficiency Program

The Advanced Pumping Efficiency Program (APEP) provides subsidized pump efficiency tests (subject to available funding). If you are thinking about retrofitting an inefficient pump, APEP may also be able to provide a cash incentive to help you make that decision.

To obtain a subsidized pump test under the Advanced Pumping Efficiency Program you must use one of our participating pump test companies. Please call or log on to our web site at **www.pumpefficiency.org** for a current list of these companies. A full explanation of how to obtain an APEP-sponsored test is contained at the end of this Advisory.

New pumps should be tested to provide a baseline for later performance measurements.

Pumps become inefficient for one of two reasons:

1. They are physically worn.
2. The pump is not matched to the current required operating conditions. An example of this would be where a water table has dropped substantially over time, increasing the total lift above the original engineering specifications.

Periodic pump efficiency tests can alert you when a pump is becoming, or already is, inefficient. It provides vital information that can help you decide when to retrofit or repair an inefficient pump. In conjunction with the original pump performance curve and specifications, it can also indicate which of the reasons above are to blame. This Technical Advisory explains the pump efficiency test and describes what is contained in the report.

WHAT IS A PUMP EFFICIENCY TEST?

A pump test measures important aspects of the pump's operation including flow, discharge pressure, well lift (if applicable), and power use. The end result of a pump test is an estimate of the overall efficiency of your pump and the cost of running it under the conditions of the test. The test may also give an indication of water well performance.

WHO DOES THE PUMP TESTING?

Pump tests may be available from:

- Public utilities - using either their own employees or contract testers.
- Pump dealers - using their own employees or contract testers.
- Independent pump test companies - many of these testers have a public utility background.

WHAT DOES A PUMP TESTER MEASURE?

The tester measures at least four variables:

1. Water flow rate.
2. Pumping lift for a well or inlet pressure for a booster pump.
3. Pump discharge pressure.
4. Energy input to the pumping plant.

Calculations are performed with the flow, lift, and discharge pressure measurements and the results are compared to the energy input to the pumping plant. A sample pump test report and an explanation of what it measures and calculates is shown in **Figure 1.**

WHY SHOULD I TEST MY PUMP?

Regular pump testing can identify problems before a breakdown occurs or energy bills climb. This allows you to perform an objective economic analysis to identify when it can be profitable to invest in a retrofit. On a new pump, a test will establish a baseline of performance and verify that equipment is operating as designed. A typical analysis of pumping costs derived from a test, along with explanations of the variables used in the calculations is shown in **Figure 2.**

HOW DO I PREPARE FOR A PUMP TEST?

Check with your pump tester about how to prepare for a pump test. Some testers use flow measurement equipment that requires an access hole in the pump discharge pipe. Generally, the pump needs to be off in order to cut the hole and insert the device. Some measurement devices do not require this provision. The pump must be running during the test and there must be some place for the pumped water to go. If the pump is in a water well, the tester may need to run the pump as long as 30-45 minutes to stabilize the pumping water level.

PG&E

The pump tester will also need information regarding the pump's management and design in order to do a complete cost analysis. Key information will include:

- Annual acre-feet pumped (or hours of operation).
- Average cost of energy ($ per kWh or $ per therm) for the year.
- Intended operating condition.
- Required flow rate.
- Required discharge pressure of the pump.

If a water well is running when the tester arrives, the tester will want to shut it off after the test measurements are taken in order to measure the "recovered water level" of the well. (Generally, this shut-off time is at least 15 minutes.) This valuable information indicates current well performance.

INTERPRETING THE PUMP TEST REPORT

A test report from an APEP-approved tester will have two basic sections, the Pump Test Report **(Figure 1)** and the Pumping Cost Analysis **(Figure 2).**

TO EXPLAIN THE NUMBERS IN FIGURE 1:

1. **Pumping Water Level (ft) -** Where the water level in the well stabilizes under constant pumping conditions.
2. **Standing Water Level (ft) -** The water level in the well when a pump has not been running.
3. **Draw Down (ft) -** The difference between the pumping water level and the standing water level.
4. **Recovered Water Level (ft) -** The water level in the water well 15 minutes after shutting the pump off (check with the tester for how much time was allowed before making this measurement).
5. **Discharge Pressure at Gauge (psi) -** The pressure on the outlet side of the pump in pounds-per-square-inch (1 psi = 2.31 feet of water head).
6. **Total Lift (ft) -** Includes the pumping water level, discharge pressure, and any gauge corrections. There are also minor losses due to inlet restrictions, column friction, and fittings. These minor losses are not measured during the test.
7. **Flow Velocity (fps) -** How fast the water is moving in the discharge pipe. It should be 1 foot per second or faster to ensure an accurate test.
8. **Measured Flow Rate (gpm) -** The flow rate measured in gallons per minute by the tester.
9. **Customer Flow Rate (gpm) -** The flow rate measured with the customer's flow meter (if one is present).
10. **Well Specific Capacity (gpm/ft draw) -** The measured flow rate divided by the draw down (line 8 divided by line 3). It is a measure of well performance, not pump performance.
11. **Acre-Feet per 24 Hours -** The number of acre-feet pumped in 24 hours at the measured flow rate. One acre-foot of water is about equal to 325,900 gallons of water.
12. **Cubic Feet per Second (cfs) -** The measured flow rate expressed as cubic feet of water per second.
13. **Horsepower input to Motor-** The horsepower input to the motor read at the utility meter.
14. **Percent of Rated Motor Load -** The estimated horsepower output of the motor divided by the name plate horsepower. If this is not between 80% and 115% it is an indication that the motor is not matched to the pumping condition.
15. **Kilowatt Input to Motor -** The power input to the motor in terms of kilowatts. One horsepower is equal to 0.746 kilowatts.
16. **Kilowatt-hours per Acre-Foot -** The amount of kilowatt-hours required to pump an acre-foot of water at the operating condition measured.
17. **Cost to Pump an Acre-Foot -** Kilowatt-hours per acre-foot multiplied by the base cost per kWh (line 19).
18. **Energy Cost ($/hour) -** The cost per hour to run the pump at the base cost per kWh (line 19).

Pump Test Report Sample

Run	1	2
1. **Pumping Water Level (ft):**	175	171
2. **Standing Water Level (ft):**	155	155
3. **Draw Down (ft):**	20	16
4. **Recovered Water Level (ft):**	155	155
5. **Discharge Pressure at Gauge (psi):**	5	15
6. **Total Lift (ft):**	187	206
7. **Flow Velocity (fps):**	5.3	4.3
8. ***Measured Flow Rate (gpm):***	**1,350**	**1,100**
9. **Customer Flow Rate (gpm):**	0	0
10. **Specific Capacity (gpm/ft draw):**	67.5	68.5
11. **Acre Feet per 24 Hr:** **Million Gallons per 24 Hr:**	6.0 1.944	4.86 1.584
12. **Cubic Feet per Second (cfs):**	3.0	2.4
13. **Horsepower Input to Motor**	161	168
14. **Percent of Rated Motor Load**	117	122
15. **Kilowatt Input to Motor**	120	125
16. **Kilowatt Hours per Acre-Foot**	482	620
17. **Cost to Pump an Acre-Foot**	$65.03	$83.70
18. **Energy Cost ($/Hour)**	$16.16	$16.87
19. **Base Cost per kWh:**	$0.135	$0.135
20. **Nameplate RPM:**	1780	17809
21. **RPM at Pump Shaft:**	0	0
22. ***Overall Pumping Efficiency (%):***	**39**	**34**

Tester's Remarks
All results are based on conditions during the time of the test. If these conditions vary from the normal operation of your pump, the results shown may not describe the pump's normal performance.

Figure 1 – Measurements and Test Results Section of a Pump Efficiency Test Report (two conditions tested)

Pumping Cost Analysis Sample

* Denotes a value that was assumed or provided by customer.	Measured Pump Condition	Assumed After Retrofit	Notes
1. **Overall Pumping Efficiency:**	39%	65%	
2. **Nameplate Horsepower:**	125.0 HP	125.0 HP	
3. **Motor Efficiency:**	91%	91%	
4. **Actual Motor Input Horsepower:**	160.5 HP	134.3 HP	
5. **Motor Loaded at:**	117%	98%	
6. **Flow Rate (gpm):**	1,350 gpm	1,800 gpm	
7. **Pumping Level (ft):**	175 ft	182 ft	
8. **Discharge Pressure (psi):**	5 psi	5 psi	
9. **Total Dynamic Head (feet):**	187 ft	194 ft	Rounded TDH = line 7. + (2.31 x line 8.)
10. **Acre-feet Pumped per year:**	248.56 AF/Yr*	248.56 AF/Yr*	Same AF/Yr AFTER
11. **Average Cost per kWh:**	$0.135/kWh*	$0.135/kWh*	Same $/kWh AFTER
			Estimated Savings from Retrofit
12. **Estimated Total kWh per Year:**	122,043 kWh/Yr	75,811 kWh/Yr	46,232 kWh/Yr
13. **Hours of Operation per year:**	1,000 Hr/Yr*	750 Hr/Yr	250 Hr/Yr
14. **Kilowatt-hours per Acre-Foot:**	491 kWh/AF	305 kWh/AF	186 kWh/AF
15. **Average Cost Per Acre-Foot:**	$66.29/AF	$41.18/AF	$25.11/AF = 37.9%

- Estimated savings = $25.11/AF = 37.9% of energy costs
- If pumping 248.56 AF/year this equals about $6,241 annual savings

Figure 2 – Example Pumping Cost Analysis Section of an APEP Test Report - Using Run 1 from Figure 1 as the Measured Pump Condition (note that many numbers are rounded during calculations)

19. **Base Cost per kWh** - The average cost of a kilowatt-hour for this account.
20. **Name Plate RPM -** The rated speed of the motor.
21. **Measured RPM at Pump Shaft -** The actual rotational speed measured.
22. **Overall Pumping Efficiency (%) -** The power output of the pump (a function of the flow rate and total lift) divided by the input power.

The pumping cost analysis presented is only valid for the "assumed after retrofit" conditions and for the conditions measured during the test. One or more of the assumed variables resulting from a pump repair could be in error and the economics presented would be misleading. Use this section only as a guide to the magnitude of potential savings. Always consult with your pump service company and other available experts before making the decision to retrofit a pump.

If your pumping plant includes a very old motor, or one that has been rewound more than once, it may be a significant contributor to a low measured pumping efficiency.

TO EXPLAIN THE NUMBERS IN FIGURE 2:

1. **Overall Pumping Efficiency -** The improvement expected in overall pump efficiency after retrofit.
2. **Nameplate Horsepower -** This may change if the proposed retrofit includes a horsepower change.
3. **Motor Efficiency -** This may change if the proposed retrofit includes installing a premium high efficiency motor.
4. **Actual Motor Input Horsepower -** The power going through the electrical meter to the motor.
5. **Motor Loaded at -** Motor load based on the brake-horsepower output.
6. **Flow Rate -** Flow rate at current and assumed conditions.
7. **Pumping Level (or Input Water Level) -** This will change if this is a well and the flow changes.
8. **Discharge Pressure -** Discharge pressure at the current and assumed conditions.
9. **Total Dynamic Head -** The total of inlet pressure (or lift) and discharge pressure. There are also minor losses due to inlet restrictions, column friction, and fittings. These minor losses are not measured during the test.
10. **Acre-Feet Pumped per Year -** Annual water requirements will be assumed to be unchanged. You may want to discuss this assumption with the tester so that they match your expectations (or the expectations of your pump repair company).
11. **Average Cost per kWh -** The average cost per kilowatt-hour as stated by you, or estimated by the tester based on your pump size and rate schedule. The potential savings from a pump retrofit are directly related to this number. Check with your PG&E account representative if you are unsure of this value.
12. **Estimated Total kWh -** The total kilowatt-hours used annually if the hours of operation or total acre-feet pumped per year are known.
13. **Hours of Operation per Year -** Based on the current and assumed flow rate and the amount of water pumped per year.
14. **Kilowatt-Hours per Acre-Foot -** The kilowatt-hours required to pump an acre-foot through the system.
15. **Average Cost per Acre-Foot -** The average cost to pump an acre-foot of water through the system.

The estimated annual cost of energy noted at the bottom of this section may not include demand charges or other surcharges to run the pump. This will be zero if the annual hours of operation or annual acre-feet pumped are not known. If a total annual cost is not calculated you can use the average cost per acre-foot as an indicator to potential energy use and cost savings.

WHAT IS A MULTI-CONDITION PUMP TEST?

A pump can operate with a wide variety of flow and pressure outputs. A multi-condition test consists of making the required measurements at several different flow rates. This type of test is useful in situations where the pump design is unknown or where aquifer or discharge conditions have changed substantially. It may also lead to a decision to install a variable frequency drive (VFD). **Figure 1** gives an example of a multi-condition pump test.

CAN TWO PUMPS BE TESTED TOGETHER?

Pumping plants may be designed with a well pump to lift the water to the surface and a booster pump to supply pressure to the irrigation system. Typically, the well pump is tested first and then the well/booster combination is tested. The booster pump efficiency is determined by subtracting the inlet pressure into the booster from the discharge pressure and using the flow rate from the well. The electrical panel must be opened and power meter readings for each pump taken to determine input horsepower.

Accurate flow measurement is essential for both day-to-day management and the pump efficiency test. When installing a new pump make sure that your pump company includes discharge piping that will allow for an accurate flow measurement. Also, always consider installing a flow meter at the same time.

WHAT IS NEEDED FOR ACCURATE MEASUREMENT?

Water flow in a pipe can only be accurately determined if the location for flow measurement (known as the "test section") is free from turbulence. Ideally, the test section should be a run of straight pipe with lengths of eight to ten pipe diameters upstream and two to four pipe diameters downstream of the measurement point that are free of obstructions or turns (see the **Figure 3** below). In addition, access via a sounding tube or a factory-made hole in the discharge head may be needed to determine standing and pumping water levels in a well.

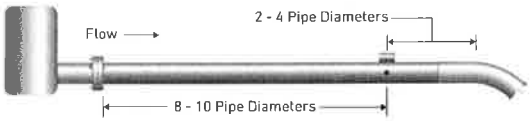


Figure 3 – Schematic of an Ideal Test Section

This schematic shows an ideal test section:

- Eight to ten pipe diameters upstream.
- Two to four pipe diameters downstream, clear of obstructions or turns. (For a 6-inch diameter pipe this would mean 48" to 60" upstream and 12" to 24" downstream clear.)

HOW DO I USE THE DATA FROM A PUMP TEST?

You should have a copy of your pump's original pump performance curve. Record the results of each pump test and compare them to that curve and to previous tests. Consult with your pump dealer to determine if a pump adjustment or repair will be profitable.

It is important to realize that the pump test results are only valid for the combination(s) of flow and total lift measured. You should try to ensure that the test conditions are as close as possible to typical operating conditions. For example, it is probably better to test a water well used for irrigation of annual crops during the growing season and not during the winter.

HOW OFTEN SHOULD I TEST MY PUMP?

A pump should be tested every one to three years depending on the annual usage and severity of operating conditions. For example, you might want to test a well that is pumping a lot of sand every year. On the other hand, a booster pump supplied by clean water, might only need to be tested once every two to three years.

The average pumping efficiency for all turbine pump tests in the APEP database is approximately 53%.

WHAT SHOULD BE MY PUMP'S OVERALL PUMPING EFFICIENCY (OPE)?

Overall pump efficiency can be generally characterized as follows:

- 60% and higher is excellent.
- 50% to 60% is good.
- 49% or less indicates a pump that may need a retrofit.

Pumps with submersible motors will usually run about 10% lower efficiency in each of the categories above. For example 50% or above would be considered excellent for a submersible pump. These are general characterizations. Always consult with your pump service company and other available experts before making the decision to retrofit/repair a pump.

HOW DO I GET A SUBSIDIZED PUMP EFFICIENCY TEST?

Subsidized pump efficiency tests are available (subject to available funding) from APEP-approved "participating pump test companies" for agricultural and municipal pumps. Residential, sewage and industrial process pumps are not eligible.

The test is subsidized. You are responsible for knowing how much the test company will charge you and whether you will have to provide funds in addition to the program subsidy.

Important restrictions include:

- Only one test is available every 23 months.
- The pump must be 25 horsepower or greater.
- In the case of a water well we must be able to measure the pumping water level.
- If the pump has been tested before by APEP testers with an overall efficiency less than 30% (6% for natural gas-powered pumps) and it has not been retrofitted, it is not eligible.
- Subsidized tests are not available for real estate transactions or to satisfy a mandate of any government or quasi-government agency.

To participate:

1. Contact the participating pump test company of your choice to arrange a test. Log on to the web site or call one of the Program offices listed below if you need assistance in locating a test company.
2. You will have to sign an Access Agreement before the test (granting legal access to your pump) and a Record of Test after the test (providing proof to the California Public Utilities Commission that the test was performed).
3. The tester will provide both you and the Program with a pump test report. You can discuss the results of the test with the pump test company and/or Program personnel.

Call to see how a pump efficiency test can provide you with the critical information required to make a decision about a pump retrofit.

APEP CAN HELP YOU MAINTAIN AN EFFICIENT PUMP

Log on to the web site at **www.pumpefficiency.org**. Here you will find summaries of all Program components, a calendar of upcoming events, application forms, phone numbers and e-mail addresses of the regional offices, and a knowledge-base to help you conserve energy and water. Or, call one of our offices:

- Northern California regional office – **1-559-260-6148**
- San Joaquin Valley (main office) – **1-800-845-6038** / fax to **1-559-278-2998**
- Central Coast regional office (San Mateo County to Ventura County) – **1-805-547-1130 / 1-805-709-4180**

Or, call your PG&E account representative.

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These offerings are funded by California utility customers and administered by PG&E under the auspices of the California Public Utilities Commission

June 2011

ATTACHMENT G

WATER ORDER

The undersigned Landowner and/or Tenant certifies that he has read, understands and agrees to be bound by each and all of the Shafter-Wasco Irrigation District Rules and Regulations which govern orders for the delivery and acceptance of Central Valley Project water delivered by SHAFTER-WASCO IRRIGATION DISTRICT.

If the property for which the Water Order is placed is leased, the undersigned Landowner hereby consents to the use on said property of the SHAFTER-WASCO IRRIGATION DISTRICT water ordered hereby.

In case any charges for water and other services or either (including charges for water ordered but not used) remain unpaid, both the undersigned Landowner and/or Tenant shall be held jointly and severally liable for the unpaid charges. Signatures of both are required.

It is further agreed and understood that SHAFTER-WASCO IRRIGATION DISTRICT is not liable for the delivery of all or any part of the above-ordered water, and that the District assumes no responsiblity for the availability of all or any part of said water.

The undersigned hereby orders _____ acre-feet of water to be delivered by SHAFTER-WASCO IRRIGATION DISTRICT for use during this water year on the land served by the following District outlets. Water orders must be made in person.

Operator	Outlet Number	Acres	Standby Charge

ATTACHMENT H

Shafter-Wasco Irrigation District
Water Banking Program

Water Banking With North-Kern Water Storage District (A/F)

Calendar Year	Exchanged or Water Banked	Water Returned	Balance
1993	17,990	0	17,990
1994	0	2,016	-2,016
1995	9,989	116	9,873
1996	2,000	5,126	-3,126
1997	8,549	0	8,549
1998	0	0	0,000
1999	0	0	0,000
2000	0	0	0,000
2001	0	1,073	-1,073
2002	0	2,509	-2,509
2003	279	279	0,000
2004	0	500	-0,500
2005	0	0	0,000
2006	0	34	-0,034
2007	0	2,091	-2,091
2008	3,528	5,728	-2,200
2009	4,571	5,564	-0,993
2010	0	0	0,000
2011	1,981	1,263	0,718
2012	9,006	13,698	-4,692
	57,893	39,997	17,896

Shafter-Wasco Irrigation District
Water Banking Program

Water Banking With Semitropic Water Storage District (A/F)

Calendar Year	Water Banked	Water Returned	Balance
1995	2,290	0	2,290
1996	5,004	0	5,004
1997	2,023	0	2,023
1998	126	0	126
1999	504	0	504
2000	0	0	0
2001	0	0	0
2002	0	547	-547
2003	0	247	-247
2004	0	1,284	-1,284
2005	0	0	0
2006	0	0	0
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0
2011	0	0	0
Sub-Totals	9,947	2,078	7,869
Storage Loss 6 %	-597		-597
Balance	9,350	2,078	7,272
To Arvin WSD	-4900		-4900
Totals	4,450	2,078	2,372