Orange Cove Irrigation District
Water Management Plan

Five Year Update

July 29, 2010

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Section 1: Description of the District

District Name: Orange Cove Irrigation District

Contact Name: Fergus Morrissey

Title: Engineer- Manager

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Web Address

A. History

1. Date district formed: 1937 *Date of first Reclamation contract*: 1949
Original size (acres): 12,587 *Current year (last complete calendar year)*: 2009

2. Current size, population, and irrigated acres

	(enter data year)
Size (acres)	28,049
Population served	643
Irrigated acres	27,557

3. Water supplies received in current year

Water Source	*AF*
Federal urban water (Tbl 1)	34
Federal agricultural water (Tbl 1)	42,236
State water (Tbl 1)	
Other Wholesaler (define) (Tbl 1)	
Local surface water (Tbl 1)	
Upslope drain water (Tbl 1)	
District ground water (Tbl 2)	
Banked water (Tbl 1)	
Transferred water (Tbl 6)	-15,989
Recycled water (Tbl 3)	
Other (define) (Tbl 1)	
*Total**	26,281

* 2009 Water Year

4. Annual entitlement under each right and/or contract

	AF	*Source*	*Contract #*	*Availability period(s)*
Reclamation Urban AF/Y				
Reclamation Agriculture AF/Y	39,200	USBR	175r-2627-LTR1	No restrictions
Other AF/Y				
Other AF/Y				

5. *Anticipated land-use changes*

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 (1989)		*Previous Plan (2002)*		*2009*	
Crop Name	*Acres*	*Crop Name*	*Acres*	*Crop Name*	*Acres*
Citrus	20,490	Citrus	18,168	Citrus	21,051
Deciduous Fruits & Nuts	4,295	Deciduous Fruits & Nuts	3,096	Deciduous Fruits & Nuts	2,477
Grapes	1,993	Grapes	1,872	Grapes	1,100
				Olives	876
				Forage	940
				Fallow	884
Other (<5%)		*Other (<5%)*		*Other (<5%)*	229
Total	26,778	*Total*	23,894	*Total*	27,557

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

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

Original Plan (1989)		*Previous Plan (2002)*		*2009*	
Irrigation Method	*Acres*	*Irrigation Method*	*Acres*	*Irrigation Method*	*Acres*
Furrow	20,992	Furrow	6,338	Furrow	5,196
Border	430	Border	430	Border	502
Low Volume Mister/Drip/Micro Jet	5,356	Low Volume Mister/Drip/Micro Jet	16,726	Low Volume Mister/Drip/Micro Jet	20,876
				Sprinkler	983
Other		*Other*		*Other*	
Total	26,778	*Total*	23,894	*Total*	27,557

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

B. Location and Facilities

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

1. Incoming flow locations and measurement methods

Location Name System	*Physical Location Friant Kern Canal Mile Post*	*Type of Measurement Device*	*Accuracy*
1 North	35.85	Venturi	1%
1A/1B/1A East	35.87	Venturi	1%
2	36.79	Venturi	1%
3/3A	38.74	Venturi	1%
4	39.82	Venturi	1%
5	41.76	Venturi	1%
6	42.89	Venturi	1%
7	44.56	Venturi	1%
8	44.56	Venturi	1%
9	45.46	Venturi	1%
10	47.03	Venturi	1%
11	48.58	Venturi	1%
12	50.38	Venturi	1%
13	51.62	Venturi	1%
14	53.32	Venturi	1%

2. Current year Agricultural Conveyance System

Miles Unlined - Canal	*Miles Lined - Canal*	*Miles Piped*	*Miles - Other*
		116	

3 Current year Urban Distribution System

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

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

Name	*Type*	*Capacity (AF)*	*Distribution or Spill*
3A	Reservoir	10	Distribution
8	Reservoir	26	Distribution
11	Reservoir	8	Distribution
13	Reservoir	15	Distribution

5. Outflow locations and measurement methods (Agricultural only)

The District is primarily micro irrigation and what little amount is furrow irrigated, water is collected in tailwater basins and reused on the same farm.

Provide this information in Section 2 F.

6. *Description of the agricultural spill recovery system*

The District is a completely piped / pressurized system and there is no operational spill or need for recovery system.

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

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

8. *Restrictions on water source(s)*

Source	*Restriction*	*Cause of Restriction*	*Effect on Operations*
Friant Kern Canal	Class 1 Contract	Allocation and Inflow Prorate	Minimal effect on District

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

   Additional Off-Peak Reservoir for System 1A/B and 1N.
   Pump Station Outflow Metering.
   Solar installation (potential based on economic analysis).

C. Topography and Soils

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

   The terrain is sloping to the west from the Sierra Nevada foothills. The average slope is 5 to 10 feet per mile. Most soils range in texture classification from a sandy loam with intake characteristics ranging from moderately low. There is little impact from the soils or topography on water management practices.

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

   See Attachment B, District Soils Map

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	200	None
High or low infiltration rates	2,000	None
Other (define)		None

D. Climate

1. 2009/2010 Conditions in District service area

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Annual*
Avg Precip.	2.9	3.3	0.9	2.8	0.2	0	0	0	0	2.0	0.1	3.0	15.3
Avg Temp.	46	50	53	55	62	75	82	78	76	60	51	45	61
Avg. Max. Temp.	56	60	66	67	76	90	99	94	92	74	66	56	75
Avg. Min. Temp	38	41	39	42	45	55	61	59	58	46	37	35	46
ETo	.85	1.76	3.30	4.84	6.83	7.80	8.67	7.69	5.67	3.54	1.65	0.73	53.33

Weather station ID: *CIMIS # 142 – Orange Cove* *Data period:* *2009/2010*

Average wind velocity: 3.9 miles per hour NW *Average annual frost-free days:* 245 (mean)

2. Impact of microclimates on water management within the service area
The District is located in a microclimate that is less prone to frost damaging conditions relative to the San Joaquin Valley floor. This is due to its Sierra foothill location and the fact that much of the service are is located in coves.

E. Natural and Cultural Resources

1. Natural resource areas within the service area

Name	*Estimated Acres*	*Description*
none		

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

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

Name	*Estimated Acres*	*Description*
none		

F. Operating Rules and Regulations

1. Operating rules and regulations
See Attachment C, District Rules and Regulations

2. Water allocation policy (Agricultural only)

USE OF WATER

a. Water delivered by the District must be put toward an agricultural beneficial use within the District boundary. Caution: Water used for spraying purposes may ONLY be taken from a District delivery or other District facility provided a County-approved connection is made and maintained at all times between the District facility and the spray equipment.

b. Water usage statements will not be sent to the water user on a monthly basis (unless requested) but may be sent when less than 25% of a water user's purchased supply remains. When the water user's purchased supply is depleted, water delivery will be discontinued. Water delivery may be resumed if the water user acquires additional water by transfer(s) or additional purchases (if additional water is available). It will be the water user's responsibility, upon receiving the 25% notice, to make the necessary arrangements with the District for additional water. No other notification will be provided.

c. The ultimate disposition of water ordered, but not used or transferred by September 30th, is subject to the discretion of the District. Alternative disposition of this water may include, but is not limited to, outside exchange, transfer, or banking in accordance with Reclamation Law. The determination of an alternate disposition of unused water will be based on the projected end-of-Water-Year District use. Water deposits may be returned after September 30th unless alternative arrangements have been made with the District.

1. Dry Year Amendment: In years with less than an 85 percent Class One Friant Division supply allocation, the disposition of water ordered, but not used or transferred by January 31st (one month prior to the end of USBR contract year), is up to the discretion of the District. This determination will be based on the projected end-of-contract year District water use.

d. The Board of Directors may elect to carry unused water over (carryover) from one Water-Year to the next in accordance with Bureau of Reclamation policy. Unused water shall not be carried over into the next Water-Year on an individual landowner basis; however, unused landowner water deposits may be carried over into the next Water-Year.

ENTITLEMENT TO WATER

a. When the demand for water is greater than the available supply, available water will be distributed equitably among those who have filed an application in accordance with Paragraph l and as required by California State Water Code Section 22250 which reads in part as follows:

"All water distributed by districts for irrigation purposes shall be apportioned ratable to each landowner upon the basis or ratio which the last assessment against his land for district purposes bears to the whole sum assessed in the district."

b. Any landowner may assign for use within the District their full allocation pursuant to Section 22250 provided the water is first purchased in accordance with Paragraph 1.

3.Official and actual lead times necessary for water orders and shut-off (Agricultural only)

24 hours advance notice for turn on and shut off

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

TAILWATER

a. The District is required to regulate excessive tailwater. The United States Bureau of Reclamation Water Service Contract requires the District, as a provision of its conservation plan and as a condition of continued service, ensure water is put to beneficial use. Hence, the District must regulate excessive tailwater to avoid determinations that it is wastefully or unreasonably using the water supply provided to it. If the District is required to regulate tailwater because the grower does not do so, it needlessly expends District funds without providing specific benefit to the broad group of District landowners.

b. If the District determines that a landowner has improperly used irrigation water delivered to them, or improperly prepared the ground to receive irrigation water, such that excess tailwater, in the District's opinion, is leaving the landowner's property, the District shall notify the landowner with the appropriate steps to take to ensure that excess tail water is eliminated. If the landowner does not take appropriate steps to remedy the situation, the District will reduce and/or discontinue water delivery until the problem is rectified. Alternatively, the District may, at the landowner's expense, take corrective action in order to ensure that excess tailwater does not leave the landowner's property. Landowners will be charged the full cost to the District of any services provided to restrict tailwater runoff, and payment of these charges will be required as a condition of continued service.

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

a. Intra-district between **same entity**: A landowner having properties in two or more of the District's delivery systems (e.g. System 7 and System 11), may transfer water, without penalty, from one system to another system. The final charge for water will be based on water charges for the system in which it is used.

b. Intra-district between **different entities**: A landowner may transfer water to another landowner by filing a water transfer form with the District. The transferred water must have been purchased by the transferor prior to the transfer in accordance with Paragraph 1. The final charge for water will be based on water charges for the system **in which it is used**. The difference in cost, if any, must be paid to the District at the time of transfer. The District assumes no responsibility for collecting monies due to the transferor from the transferee. Both the transferor and the transferee must sign a water transfer form.

c. Inter-district between **same entity**: A landowner having properties in both the District and another Friant Division district (district), may transfer water from the District to the other district (inter-district). Payment for this transferred water shall be the greater of the average cost of water within the district where the water is used plus a 10% surcharge, or at the average cost of water within the District, whichever is greater.

G. Water Measurement, Pricing, and Billing

1. Agricultural Customers

a. Number of farms 588

b. Number of delivery points (turnouts and connections) 1,141

c. Number of delivery points serving more than one farm 0

d. Number of measured delivery points (meters and measurement devices) 1,141

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

f. Delivery point measurement device table (Agricultural only)

Measurement Type	*Number*	*Accuracy (+/- %)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
Orifices					
Propeller meter	1,141	2	30 days if deliveries are made during period	Manufacturers requirement *See attachment H	Manufacturers requirement *See attachment H
Weirs					
Flumes					
Venturi					
Metered gates					
Acoustic doppler					
Other (define)					
Total	1,141				

The District maintains an inventory of meter parts and performs meter repair in house. The District utilizes a contractor for meter testing and major repair needs.

2. Urban Customers

a. *Total number of connections* 130

b. Total number of metered connections 57

c. Total number of connections not billed by quantity 0

d. Percentage of water that was measured at delivery point 100

e. Percentage of delivered water that was billed by quantity 100

f. Measurement device table

Meter Size and Type	*Number*	*Accuracy (+/-percentage)*	*Reading Frequency (Days)*	*Calibration Frequency (Months)*	*Maintenance Frequency (Months)*
5/8-3/4"					
1"	2	2	30 days if deliveries are made during period	Manufacturers requirement *See attachment H	Manufacturers requirement *See attachment H
1 ½"	1	2	30 days if deliveries are made during period	Manufacturers requirement	*See attachment H
2"	54	2	30 days if deliveries are made during period	Manufacturers requirement	*See attachment H
Total	57				

3. Agriculture and Urban Customers

a. Current year agriculture and /or urban water charges - including rate structures and billing frequency

The District has three water rates it charges agricultural customers depending on whether the water is delivered by gravity, low-lift pumping or high-lift pumping. Those rates are as follow: Gravity $66.00 / af., low-lift pumping $75.50 / af., high-lift pumping $82.00 / af. The Bureau of Reclamation's base rate of service for Class 1 water in 2009 was $41.04 which are included in the below charges to agricultural users.

For parcels less than 5 acres in size, the District rates correspond to the M&I rate established by the Bureau of Reclamation. The total cost to "M&I" users is $84.00 / af.

b. Annual charges collected from customers (current year data)

Fixed Charges			
Charges ($ unit)	*Charge units ($/acre), ($/customer) etc.*	*Units billed during year (acres, customer) etc.*	*$ collected ($ times units)*
*18.00	Acre	2,433	43,794
**60.00	Acre	87	5,220
***67	Acre	25,529	1,710,443

* Standby Charge on parcels not served by rehabilitation system for which bonds were secured.
** Tri Valley and Hills Valley Irrigation District Lands (no admin costs).
*** Rehabilitation + Administrative standby

Volumetric charges			
Charges ($ unit)	*Charge units ($/AF), ($/HCF), etc.*	*Units billed during year (AF, HCF) etc.*	*$ collected ($ times units)*
82.00	AF	11,620	952,840
75.50	AF	3,678	277,689
66.00	AF	11,830	780,780
84.00	AF	34	2,856

See Attachment D, District Sample Bills

c. Water-use data accounting procedures

Water-use data accounting procedures; The District utilizes a computer data base to track water use by delivery. The system is upgraded as needed. Records are maintained on an indefinite basis. Water is purchased before use in the District via water applications. Water use statements are furnished to water users on an as needed basis.

H. Water Shortage Allocation Policies

1. Current year water shortage policies

a. Attach District's current year water shortage policies or shortage response plan.

See Rules and Regulations Section 4 provided in **Attachment C.**

b. Specify how reduced water supplies are allocated.

See Rules and Regulations Section 4 provided in **Attachment C**.

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

Wasteful use of water within the District is usually associated with a lack of tail water management. That issue is addressed in the Districts Rules and Regulations (**See Attachment C**, section 8 Tailwater).

Section 2: Inventory of Water Resources

A. Surface Water Supply

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

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

B. Ground Water Supply

1. Acre-foot amounts of ground water pumped and delivered by the district
None

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

Name	*Size (Square Miles)*	*Usable Capacity (AF)*	*Safe Yield (AF/Y)*
Easterly fringe of Kings Basin	14	Unknown	27,800

3. Map of district-operated wells and managed ground water recharge areas
None

4. Description of conjunctive use of surface and ground water
None

5. Ground Water Management Plan
Groundwater Monitoring and Drought Preparedness Program (AB 303 Adopted June 2006) See Attachment E

6. Ground Water Banking Plan
None within District. Arrangements for banking are made with surrounding Friant Division Contractors.

C. Other Water Supplies

1. "Other" water used as part of the water supply
None

D. Source Water Quality Monitoring Practices

1. Potable Water Quality (Urban only)
None- Potable water is not delivered by OCID

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.*

Water quality analyses of the Friant-Kern Canal is conducted by Friant Water Authority on annual bases and the findings are shared with OCID.

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

Current water quality monitoring programs for groundwater by source (Agricultural only)
None

E. Water Uses within the District

1. *Agricultural*

See Water Inventory Tables, Table 5 - Crop Water Needs

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

Crop name	*Total Acres*	*Level Basin - acres*	*Furrow - acres*	*Sprinkler - acres*	*Low Volume - acres*	*Multiple methods - acres*
Citrus	21,050		3,700	750	16,600	
Deciduous Fruits/Nuts	3,380		720	60	2,600	
Grapes	1,100		50	50	1,000	
Olives	880	10	250	100	520	
Other	1,200	430	400	40	330	

3. Urban use by customer type in current year

Customer Type	*Number of Connections*	*AF*
Single-family		
Multi-family		
Commercial		
Industrial		
Institutional		
Landscape irrigation		
Wholesale		
Recycled		
Small Family Farms Landscape & Livestock	130	34
Other (specify)		
Other (specify)		
Unaccounted for		
Total	130	34

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

Treatment Plant	*Treatment Level (1, 2, 3)*	*AF*	*Disposal to / uses*
none			
	Total		
Total discharged to ocean and/or saline sink			

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

Recharge Area	*Method of Recharge*	*AF*	*Method of Retrieval*
none			
	Total		

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

From Whom	*To Whom*	*AF*	*Use*
OCID	Madera ID	1,875	Ag
OCID	Tulare ID	5,000	Ag
OCID	AEWSD	5,364	Ag
OCID	San Luis Water District	5,000	Ag
OCID	Hills Valley Water District	250	Ag

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

From Whom	*To Whom*	*AF*	*Use*
None			

8. Other uses of water in current year

Other Uses	*AF*

F. Outflow from the District (Agricultural only)

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

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

1. Surface and subsurface drain/outflow in current year

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

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.

None

G. Water Accounting (Inventory)

1. *Water Supplies Quantified*

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

2. *Water Used Quantified*

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

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

H. Assess Quantifiable Objectives:

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

QO #	*QO Description*	*Past, Present & Future Plans*

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

A. Critical Agricultural BMPs

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

Number of turnouts that are unmeasured or do not meet the standards listed above: ____0

Number of measurement devices installed last year:

Number of measurement devices installed this year:

Number of measurement devices to be installed next year:

Types of Measurement Devices Being Installed	*Accuracy*	*Total Installed During Current Year*

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

Name: Fergus Morrissey *Title:* Engineer-Manager

Address: *P.O. Box 308 Orange Cove, Ca 93646*

Telephone: 559-626-4461 *E-mail:* fmocid@sbcglobal.net

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

See **Attachment J** Friant Water Authority Water Line

a. On-Farm Evaluations

The District has provided training to water users in the past for self evaluations of on-farm irrigation systems. In addition, the District supports on-farm evaluations which are normally performed by students from Cal Poly, San Luis Obispo.

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	27,547	350	117	350	350
Number of farms	643	8	3	8	8

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

The District tracks water use by parcels and deliveries. Crop surveys are done annually but there is very little change in the District since most lands are planted to permanent crops. The District can then compute the water supplied by the District for the crop grown. The District's supply of 1.4 acre feet per acre is far less than the amount needed to produce a crop. Only a few growers receive enough water from the District for full crop product. This is due only to the fact their well water is extremely limited or non existent.

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

The District maintains a CIMIS station within the District boundaries. Water users are encouraged to use information from the station with their water management operations. Water users wanting this information are trained on how to access and use data from the station.

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

The District continues to provide customers with the quantity of surface water supply available from the District. The surface water supply from the San Joaquin River is of excellent quality and no reports are furnished to the end user. The District provides no ground water.

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

Program	*Co-Funders (If Any)*	*Yearly Targets*
Notice for workshops		As available
CIMIS training		One on one or small groups
Monthly flyers	Friant Water Authority	All landowners

See Attachment F for samples of provided materials and notices

e. other

4. Pricing structure - based at least in part on quantity delivered

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

The District has pricing structure in place that is based on the quantity of water used. The structure includes cost to purchase, power and delivery fees. The District has four basic rates which the rates are governed by the cost to get water to the end user (gravity, low-lift pumping, high-lift pumping and M&I). Rates are adjusted annually on the foregoing basis.

For parcels less than 5 acres in size, the District rates correspond to the M&I rate established by the Bureau of Reclamation.

5. Evaluate and describe the need for changes in policies of the institutions to which the district is subject
The limiting institutional constraint that prevents District from providing more flexibility to its water users is the fact that Friant-Kern Canal is not automated. With a reasonable level of automation, this District could deliver water on a demand basis.

6. Evaluate and improve efficiencies of district pumps
The District has a SCADA system that monitors electric load, pressure and flow and computes pumping plant efficiency. This provides the District with continues performance data and the ability to determine easily when pumps need attention.

B. Exemptible BMPs for Agricultural Contractors

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

1. *Facilitate alternative land use*

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

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

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

   The District has in the past worked with the City of Orange Cove in utilization of recycled water, but because of water quality concerns the program was stopped. The District is currently investigating new opportunities with the City of Orange Cove for recycled water.

Sources of Recycled Urban Waste Water	*AF/Y Available*	*AF/Y Currently Used in District*
City of Orange Cove (potential) 2,000 ac./ft.	0	0

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

Funding source Programs	*How provide assistance*
Costumers notified through Water Line	

4. *Incentive pricing*

Structure of incentive pricing	*Related goal*
Make surface water cost less than well water	

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*
Plastic and steel pressurized pipe system				

b) Construct regulatory reservoirs

Reservoir Name	*Size Ac/ft*	*Improvement*	*Accomplished/ Planned Date*
System 1 Reservoir	10	Reduce energy costs	2011

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

District is flexible with delivery changes required due to agronomic conditions. Closed systems requires different management of water when problems occur: ie: pipe breaks, valve malfunctions, canal shutdowns. The District is also look at constructing additional reservoir on systems See Attachment G, contractor 'agricultural water order' form

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

None

8. *Plan to measure outflow.*

None

9. Optimize conjunctive use of surface and ground water

10. Automate canal structure.

The OCID system is a closed pressurized pipe delivery system. Pumps are controlled via SCADA by note book or smart phones.

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

The District provides information on free pump testing at our office and in periodic mailings, (See attachment F).

12. Mapping

GIS maps	*Estimated cost (in $1,000s)*				
	2009	2010	2011	2012	2013
Layer 1 – Distribution system	1000	5000	3000	3000	3000
Layer 2 – Drainage system					
Suggested layers:					
Layer 3 – Ground water information	1000	1000	1000	1000	1000
Layer 4 – Soils map	1000	1000	1000	1000	1000

C. Provide a 3-Year Budget for Implementing BMPs

1. Amount actually spent during current year in expenses, hours or both.

Actual Expenditure

BMP #	*BMP Name*	*Spending*
A		
1	Measurement	$0
2	Conservation staff	$25,000
3	On-farm evaluation /water delivery info	$800
	CIMIS	$3,200
	Agricultural Education Program	$12,000
4	Quantity pricing	$1,000
5	Policy changes	$500
6	Contractor's pumps	$5,000
B		
1	Alternative land use	$0
2	Urban recycled water use	$10,000
3	Financing of on-farm improvements	$250
4	Incentive pricing	$500
5	Line or pipe canals/install reservoirs	$0
6	Increase delivery flexibility	$500
7	District spill/tailwater recovery systems	$0
8	Measure outflow	$00
9	Optimize conjunctive use	$5,000
10	Automate canal structures	$00
11	Customer pump testing	$5,000
12	Mapping	$5,000
Total		$73,750

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

Budgeted Expenditure

BMP #	*BMP Name*	
A		
1	Measurement	$0
2	Conservation staff	$25,000
3	On-farm evaluations/water delivery info	$800
	CIMIS	$3200
	Water quality	$2,160
	Agricultural Education Program	$12,000
4	Quantity pricing	$1,000
5	Policy changes	$500
6	Contractor's pumps	$500
B		
1	Alternative land use	$0
2	Urban recycled water use	$1,000
3	Financing of on-farm improvements	250
4	Incentive pricing	$500
5	Line or pipe canals/install reservoirs	$0
6	Increase delivery flexibility	$500
7	District spill/tailwater recovery systems	$0
8	Measure outflow	$0
9	Optimize conjunctive use	$10,000
10	Automate canal structures	$0
11	Customer pump testing	$500
12	Mapping	$0
Total		$57,910

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

Budgeted Expenditure

BMP #	*BMP Name*	
A		
1	Measurement	$0
2	Conservation staff	$25,000
3	On-farm evaluations/water delivery info	$800
CIMIS		$3200
Water quality		$2,160
Agricultural Education Program		$12,000
4	Quantity pricing	$1,000
5	Policy changes	$500
6	Contractor's pumps	$500
B		
1	Alternative land use	$0
2	Urban recycled water use	$1,000
3	Financing of on-farm improvements	250

4	Incentive pricing	$500
5	Line or pipe canals/install reservoirs	$0
6	Increase delivery flexibility	$500
7	District spill/tailwater recovery systems	$0
8	Measure outflow	$0
9	Optimize conjunctive use	$10,000
10	Automate canal structures	$0
11	Customer pump testing	$500
12	Mapping	$0
Total		$57,910

Section 4: Best Management Practices for Urban Contractors

A. Urban BMPs

1. *Utilities Operations*
   - 1.1 Operations Practices
   - 1.2 Water Loss Control
   - 1.3 Metering
   - 1.4 Pricing

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

3. *Residential*

4. *CII*

5. *Landscape*

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

1. Amount actually spent during current year in expenses, hours or both.

Year 2010

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 Pricing	$0	0
2. Education		
2.1 Public Information Programs	$0	0
2.2 School Education	$0	0

3. Residential		$0	0
4. CII		$0	0
5. Landscape		$0	0
	Total	$0	0

2. Projected budget summary for 2nd year in expenses, hours or both .

Year 2011 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 Pricing	$0	0
2.	Education		
	2.1 Public Information Programs	$0	0
	2.2 School Education	$0	0
3.	Residential	$0	0
4.	CII	$0	0
5.	Landscape	$0	0
	Total	$0	0

3. Projected budget summary for 3rd year in expenses, hours or both.

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

Attachment A

District Facilities Map

Attachment B

District Soil Maps

Attachment C
District Rules and Regulations

RULES AND REGULATIONS FOR WATER DELIVERIES
2010 WATER-YEAR

1. APPLICATION FOR WATER

a. Applications for water will be accepted at the District office until 4:00 P.M., February 20, 2010, and must include the amount of District water the landowner anticipates using during the water season. **Please Note: Having a credit balance on an individual water account does not negate or diminish the need to submit an application for water; it only has bearing on the payment due at this time. NO WATER IS CARRIED OVER IN INDIVIDUAL ACCOUNTS FROM ONE YEAR TO THE NEXT – AN APPLICATION IS REQUIRED EACH AND EVERY YEAR TO SECURE WATER FOR THAT YEAR.** Minimum payment due at this time (when added to your credit balance) must cover one-half of the water reserved and the final balance will be due by June 20, 2010. Applications received and/or postmarked on or before February 20th will be accepted. Applications received or postmarked after February 20th and before March 21st will be subject to a $20.00 per acre-foot administrative charge. Applications received or postmarked on or after March 21st, will be subject to availability and a $20.00 per acre-foot administrative charge. No water will be delivered before it is purchased.

b. Water will not be delivered until all outstanding customer charges, including, but not limited to Standby Charges, have been paid District-wide.

c. **Unpaid or delinquent water charges and unauthorized operation or tampering with water delivery meters will cause the District to "lock-up" subject water delivery meters.** Unpaid water charges will become a lien against the landowner's property. Interest will accrue on all delinquent accounts at the legal rate permitted by law. A $100 administrative fee will be assessed to the Applicant to UNLOCK any delivery that has been locked-up due to delinquency, unauthorized operation or tampering with water delivery meters. Cutting chains and locks will result in an additional $100 administrative fee ($200 total). All water illegally used shall be purchased at $500 per acre-foot. If the District is unable to determine how much water was illegally used through the meter, the District will estimate the amount through water orders, previous year's water usage history, or field estimates and charge the landowner accordingly.

d. Water applications filed with the District by persons other than the property owner (lessees, renters, etc.) shall be countersigned by the property owner, authorizing the applicant to use water and assuming responsibility for any unpaid water bills.

e. If available, additional water may be purchased during the water-year without penalty provided the full allocation of 1.4 acre-feet per acre is purchased as of February 20th in accordance with Paragraph 1.a. above.

f. Taking water from the District in violation of these Rules and Regulations is a violation of law. Any landowner using District water prior to purchasing it from the District may be prosecuted for theft, and will be liable for the administrative fees and water payments described in Paragraph 1.c. above.

2. WATER-YEAR

The Water-Year shall be the period from January 1 through December 31 unless otherwise designated by the District Board of Directors. For example, a circumstance where the Water-Year may not coincide with the calendar year would be in a "dry year" which shall be effective when the federal water allocation is below 85 percent for Class One Friant Division Contractors. In this instance the Water-Year shall coincide with the United States Bureau of Reclamation's Contract Year (March 1st to the last day of February) to ensure that the District does not allocate more water than is made available to it under its Long

Term Friant Division Contract with the United States. Water delivery may be requested at any time during the Water-Year provided water is available and the applicable provisions of Paragraph 1 are satisfied. Water rates are established annually by the Board of Directors and will apply on a Water-Year basis unless otherwise modified by the Board of Directors.

3. USE OF WATER

a. Water delivered by the District must be put toward an agricultural beneficial use within the District boundary. Caution: Water used for spraying purposes may ONLY be taken from a District delivery or other District facility provided a County-approved connection is made and maintained at all times between the District facility and the spray equipment.

b. Water usage statements will not be sent to the water user on a monthly basis (unless requested) but may be sent when less than 25% of a water user's purchased supply remains. When the water user's purchased supply is depleted, water delivery will be discontinued. Water delivery may be resumed if the water user acquires additional water by transfer(s) or additional purchases (if additional water is available). It will be the water user's responsibility, upon receiving the 25% notice, to make the necessary arrangements with the District for additional water. No other notification will be provided.

c. The ultimate disposition of water ordered, but not used or transferred by September 30th, is subject to the discretion of the District. Alternative disposition of this water may include, but is not limited to, outside exchange, transfer, or banking in accordance with Reclamation Law. The determination of an alternate disposition of unused water will be based on the projected end-of-Water-Year District use. Water deposits may be returned after September 30th unless alternative arrangements have been made with the District.

1. Dry Year Amendment: In years with less than an 85 percent Class One Friant Division supply allocation, the disposition of water ordered, but not used or transferred by January 31st (one month prior to the end of USBR contract year), is up to the discretion of the District. This determination will be based on the projected end-of-contract year District water use.

d. The Board of Directors may elect to carry unused water over (carryover) from one Water-Year to the next in accordance with Bureau of Reclamation policy. Unused water shall not be carried over into the next Water-Year on an individual landowner basis; however, unused landowner water deposits may be carried over into the next Water-Year.

4. ENTITLEMENT TO WATER

a. When the demand for water is greater than the available supply, available water will be distributed equitably among those who have filed an application in accordance with Paragraph l and as required by California State Water Code Section 22250 which reads in part as follows:

> *"All water distributed by districts for irrigation purposes shall be apportioned ratable to each landowner upon the basis or ratio which the last assessment against his land for district purposes bears to the whole sum assessed in the district."*

b. Any landowner may assign for use within the District their full allocation pursuant to Section 22250 provided the water is first purchased in accordance with Paragraph 1.

5. WATER TRANSFERS

a. Intra-district between **same entity**: A landowner having properties in two or more of the District's delivery systems (e.g. System 7 and System 11), may transfer water, without penalty, from one system to another system. The final charge for water will be based on water charges for the system in which it is used.

b. Intra-district between **different entities**: A landowner may transfer water to another landowner by filing a water transfer form with the District. The transferred water must have been purchased by the transferor prior to the transfer in accordance with Paragraph 1. The final charge for water will be based on water charges for the system **in which it is used**. The difference in cost, if any, must be paid to the District at the time of transfer. The District assumes no responsibility for collecting monies due to the transferor from the transferee. Both the transferor and the transferee must sign a water transfer form.

c. Inter-district between **same entity**: A landowner having properties in both the District and another Friant Division district (district), may transfer water from the District to the other district (inter-district). Payment for this transferred water shall be the greater of the average cost of water within the district where the water is used plus a 10% surcharge, or at the average cost of water within the District, whichever is greater.

6. WATER DELIVERY PROCEDURES

a. Orders for turn on and turn off must be scheduled with the District at least 24 hours before the service is to be provided. Also, notify the District as soon as possible when making changes or shutoffs not previously scheduled with the District. **The District's policy is to deliver water in quantities and flow rates that are economically feasible and within the operating limits of the delivery systems and flow meters. Extenuating circumstances, where it may not be economical to provide water to a particular delivery point, will be considered by the District on a case by case basis. Fulfilling orders that create the potential to harm the District's facilities will be denied.**

b. Water for the following day is ordered from the Friant Water Authority at 8:30 A.M. Monday through Friday. **Orders must be received at the District Office before 8:00 A.M to receive next day water delivery**. Sunday and Monday orders must be received before Noon the preceding Friday. Water orders may be made as follows:

DISTRICT OFFICE - Office is open for water orders 7:00 A.M. to 4:00 P.M. Monday through Friday. You may also place a water order by calling the District Office at (559) 626-4461. During non-business hours, water orders may be placed with the District's answering service. Water orders may be placed by emailing the request to dacocid@sbcglobal.net with electronic copies sent to rmocid@sbcglobal.net and rtrocid@sbcglobal.net. District receipt of orders submitted by email will be provided by an electronic response (reply) from District staff.

HOLIDAY SCHEDULE – The District office will be closed in observance of the following holidays: afternoon of New Years Eve, New Years Day, President's Day, afternoon of Good Friday, Memorial Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day and the day after, afternoon of Christmas Eve, and Christmas Day. Water orders for holidays and the day following a holiday shall be made by 8:00 A.M. on the business day prior to the holiday.

c**. The timing requirements shall be relaxed for the delivery of water for frost protection.** Frost water must be ordered by 1:00 P.M. to receive water for that night and the following day. For pumped systems, a notice as early as possible is desirable in case the system has to be filled. Order your water by system(s) and delivery(ies) and provide the desired flow and duration as you would for the regular irrigation season. When ordering, provide the District with your name and a telephone number where you can be reached, if possible, during the period when you intend to be taking water. Failure to take delivery of water that is ordered for frost protection can severely damage the District's pumps. Landowners that have placed

frost water orders and later decide not to take delivery must make every effort to contact District Operation's staff to avoid being liable for damage to District infrastructure.

d. Landowners will be permitted to operate their turnout provided it is operated in accordance with District procedures. Water must be used at a rate that will accurately register on the meter. Landowners shall immediately inform the District office of any maintenance required on their turnout due to normal wear, vandalism, accident, or other cause. Landowners shall be responsible for all water delivered or spilled through their turnouts.

e. A change of water from one delivery point to another on the same system will be permitted without a 24-hour notice provided that you notify the District in advance of the change to be made.

f. No person, other than a District employee unless otherwise designated, shall operate any of the District's facilities. Tampering with or changing the adjustment of any pump or valves, other than the delivery assigned for your use, is prohibited. **Any interference with facilities under the jurisdiction of the District is a criminal offense and will be prosecuted accordingly.**

7. DISTRICT LIABILITY

a. The District is not responsible for the quality of water delivered as that ability is outside of the District's jurisdiction and control. The Friant Water Authority is responsible for the operation and maintenance of the Friant-Kern Canal and from time to time they perform treatment (i.e. application of copper sulfate or other chemicals) and or maintenance (i.e. mechanical removal of invasive weeds within the system) that may result in water of variable quality. The District interfaces with the Friant Water Authority routinely and there is a concerted effort to maximize and stabilize the quality of water made available. **The water delivered by the District is not intended for human consumption.**

b. Water shortages may occur during any year which may affect the amount of water furnished to the District by the United States pursuant to the District's Central Valley Project Friant Division Water Service Contract. In no event shall any liability accrue against the District or any of its officers, agents or employees for any damages, direct or indirect, arising from a water shortage due to errors in operation, drought or unavoidable cause(s).

8. TAILWATER

a. The District is required to regulate excessive tailwater. The United States Bureau of Reclamation Water Service Contract requires the District, as a provision of its conservation plan and as a condition of continued service, ensure water is put to beneficial use. Hence, the District must regulate excessive tailwater to avoid determinations that it is wastefully or unreasonably using the water supply provided to it. If the District is required to regulate tailwater because the grower does not do so, it needlessly expends District funds without providing specific benefit to the broad group of District landowners.

b. If the District determines that a landowner has improperly used irrigation water delivered to them, or improperly prepared the ground to receive irrigation water, such that excess tailwater, in the District's opinion, is leaving the landowner's property, the District shall notify the landowner with the appropriate steps to take to ensure that excess tail water is eliminated. If the landowner does not take appropriate steps to remedy the situation, the District will reduce and/or discontinue water delivery until the problem is rectified. Alternatively, the District may, at the landowner's expense, take corrective action in order to ensure that excess tailwater does not leave the landowner's property. Landowners will be charged the full cost to the District of any services provided to restrict tailwater runoff, and payment of these charges will be required as a condition of continued service.

9. RECLAMATION REFORM ACT OF 1982 (RRA)

The District is subject to the discretionary provisions of the Reclamation Reform Act of 1982 (RRA). If you own, lease, rent or have an interest in land "West wide" (17 Western States), that totals more than two hundred forty (240) acres (40 acres for Limited Recipients) you must certify your landholdings to the District each year before water can be delivered to your property. This includes land that lies within a water or irrigation district other than the District, that is subject to the discretionary provisions of the RRA. The certification of your landholdings is due in the District office by March 1st each year. If your landholdings have not changed during the period of your last certification, you need complete only the verification form. **If your landholdings have changed, you have 30 days from the date of change to report those changes to the District**. Assistance in completing the RRA forms and answering any questions you may have is achievable by calling or stopping-by the District office. Your water application may indicate whether or not you are required to submit the RRA forms. **It is the responsibility of the landowner, not the District, to provide the proper landholder forms. Failure to provide the proper landholder forms prior to the use of District water will result in an administrative fine to the landholder as determined by the United States Bureau of Reclamation.**

Attachment D
District Sample Bill

Attachment E
Ground Water Management Plan

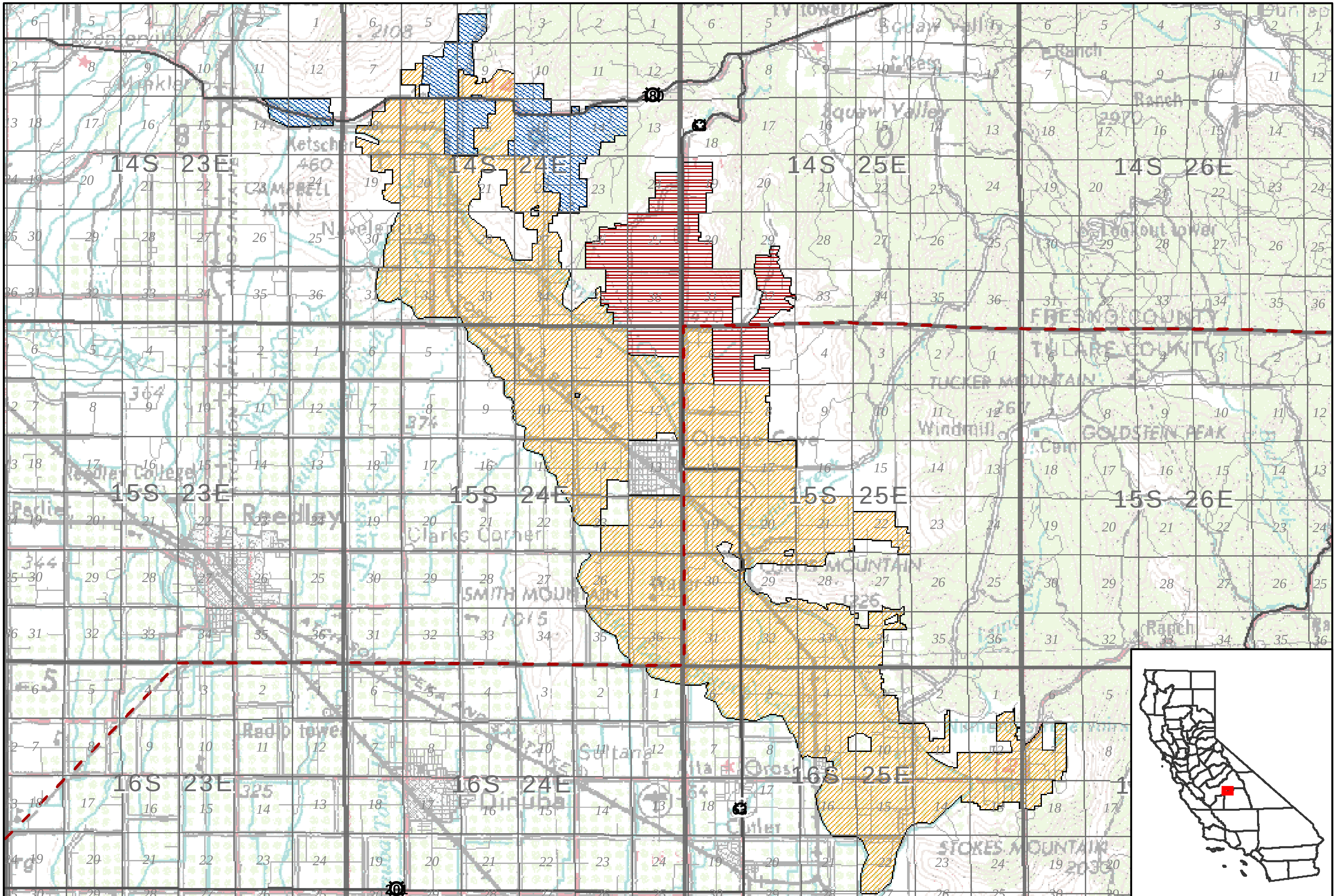
Attachment F
Notice of District Education Program and Services Available to Customers

Attachment G
District Agriculture Water Order Form

Attachment H
Meter Maintenance Schedule

Attachment I
Friant-Kern Canal Water Analyses

Attachment J
Friant Water Authority Water Line



PROVOST & PRITCHARD ENGINEERING GROUP

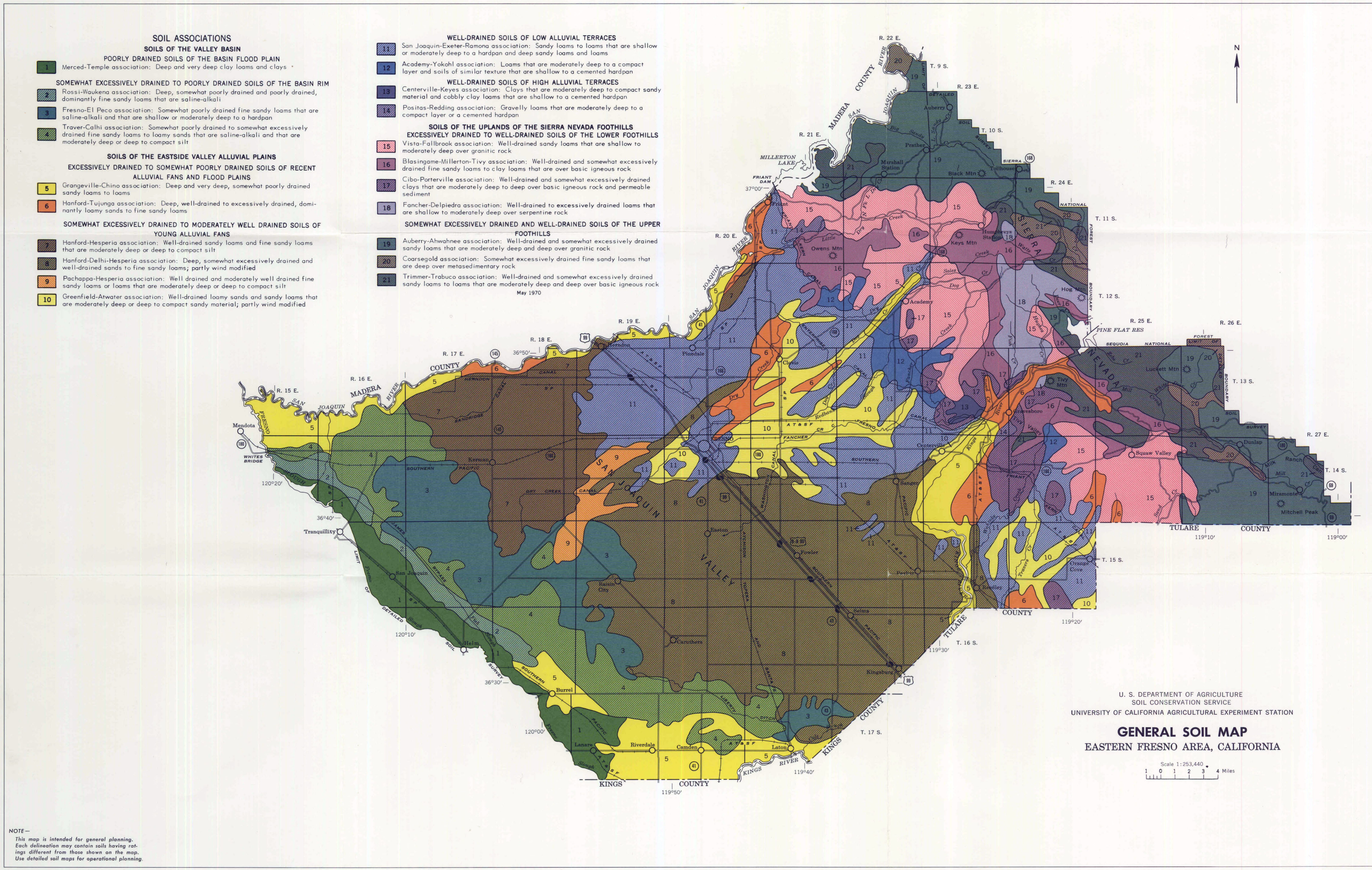
0 0.75 1.5 2.25 3 Miles

12/20/2004
\\gis\gis\Clients\OrangeCove_1093\OCID_districts_location.mxd

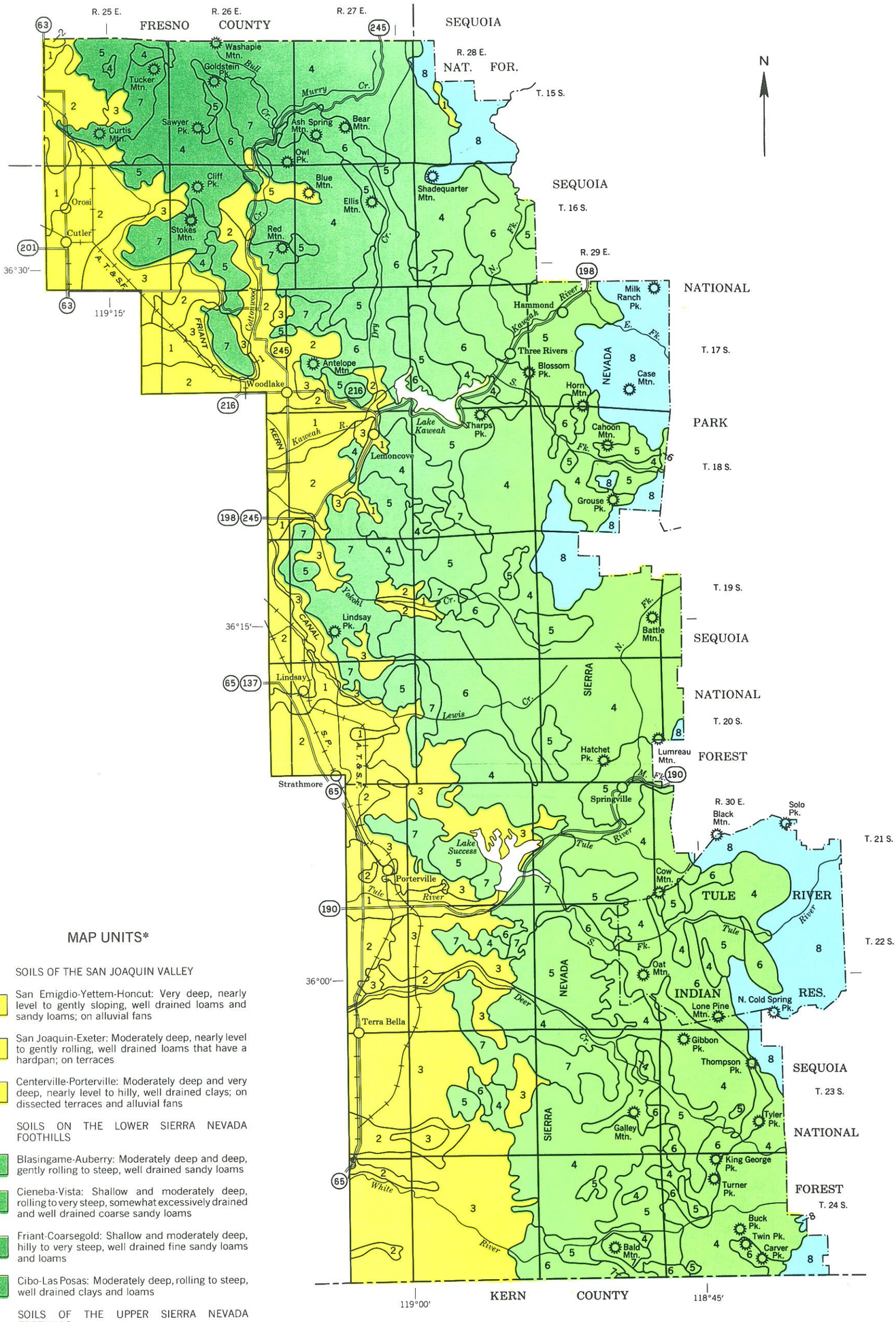
County
Township / Range
9 Section
HILLS VALLEY I.D.
ORANGE COVE I.D.
TRI-VALLEY W.D.

Location Map For:

Hills Valley Irrigation District
Orange Cove Irrigation District
Tri-Valley Water District



SOIL ASSOCIATIONS
SOILS OF THE VALLEY BASIN
POORLY DRAINED SOILS OF THE BASIN FLOOD PLAIN
1 Merced-Temple association: Deep and very deep clay loams and clays
SOMEWHAT EXCESSIVELY DRAINED TO POORLY DRAINED SOILS OF THE BASIN RIM
2 Rossi-Waukena association: Deep, somewhat poorly drained and poorly drained, dominantly fine sandy loams that are saline-alkali
3 Fresno-El Peco association: Somewhat poorly drained fine sandy loams that are saline-alkali and that are shallow or moderately deep to a hardpan
4 Traver-Calhi association: Somewhat poorly drained to somewhat excessively drained fine sandy loams to loamy sands that are saline-alkali and that are moderately deep or deep to compact silt
SOILS OF THE EASTSIDE VALLEY ALLUVIAL PLAINS
EXCESSIVELY DRAINED TO SOMEWHAT POORLY DRAINED SOILS OF RECENT ALLUVIAL FANS AND FLOOD PLAINS
5 Grangeville-Chino association: Deep and very deep, somewhat poorly drained sandy loams to loams
6 Hanford-Tujunga association: Deep, well-drained to excessively drained, dominantly loamy sands to fine sandy loams
SOMEWHAT EXCESSIVELY DRAINED TO MODERATELY WELL DRAINED SOILS OF YOUNG ALLUVIAL FANS
7 Hanford-Hesperia association: Well-drained sandy loams and fine sandy loams that are moderately deep or deep to compact silt
8 Hanford-Delhi-Hesperia association: Deep, somewhat excessively drained and well-drained sands to fine sandy loams; partly wind modified
9 Pachappa-Hesperia association: Well drained and moderately well drained fine sandy loams or loams that are moderately deep or deep to compact silt
10 Greenfield-Atwater association: Well-drained loamy sands and sandy loams that are moderately deep or deep to compact sandy material; partly wind modified
WELL-DRAINED SOILS OF LOW ALLUVIAL TERRACES
11 San Joaquin-Exeter-Ramona association: Sandy loams to loams that are shallow or moderately deep to a hardpan and deep sandy loams and loams
12 Academy-Yokohl association: Loams that are moderately deep to a compact layer and soils of similar texture that are shallow to a cemented hardpan
WELL-DRAINED SOILS OF HIGH ALLUVIAL TERRACES
13 Centerville-Keyes association: Clays that are moderately deep to compact sandy material and cobbly clay loams that are shallow to a cemented hardpan
14 Positas-Redding association: Gravelly loams that are moderately deep to a compact layer or a cemented hardpan
SOILS OF THE UPLANDS OF THE SIERRA NEVADA FOOTHILLS
EXCESSIVELY DRAINED TO WELL-DRAINED SOILS OF THE LOWER FOOTHILLS
15 Vista-Fallbrook association: Well-drained sandy loams that are shallow to moderately deep over granitic rock
16 Blasingame-Millerton-Tivy association: Well-drained and somewhat excessively drained fine sandy loams to clay loams that are over basic igneous rock
17 Cibo-Porterville association: Well-drained and somewhat excessively drained clays that are moderately deep to deep over basic igneous rock and permeable sediment
18 Fancher-Delpiedra association: Well-drained to excessively drained loams that are shallow to moderately deep over serpentine rock
SOMEWHAT EXCESSIVELY DRAINED AND WELL-DRAINED SOILS OF THE UPPER FOOTHILLS
19 Auberry-Ahwahnee association: Well-drained and somewhat excessively drained sandy loams that are moderately deep and deep over granitic rock
20 Coarsegold association: Somewhat excessively drained fine sandy loams that are deep over metasedimentary rock
21 Trimmer-Trabuco association: Well-drained and somewhat excessively drained sandy loams to loams that are moderately deep and deep over basic igneous rock
May 1970
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF CALIFORNIA AGRICULTURAL EXPERIMENT STATION
GENERAL SOIL MAP
EASTERN FRESNO AREA, CALIFORNIA
Scale 1:253,440
1 0 1 2 3 4 Miles
NOTE—
This map is intended for general planning. Each delineation may contain soils having ratings different from those shown on the map. Use detailed soil maps for operational planning.



MAP UNITS*

SOILS OF THE SAN JOAQUIN VALLEY

1 — San Emigdio-Yettem-Honcut: Very deep, nearly level to gently sloping, well drained loams and sandy loams; on alluvial fans

2 — San Joaquin-Exeter: Moderately deep, nearly level to gently rolling, well drained loams that have a hardpan; on terraces

3 — Centerville-Porterville: Moderately deep and very deep, nearly level to hilly, well drained clays; on dissected terraces and alluvial fans

SOILS ON THE LOWER SIERRA NEVADA FOOTHILLS

4 — Blasingame-Auberry: Moderately deep and deep, gently rolling to steep, well drained sandy loams

5 — Cieneba-Vista: Shallow and moderately deep, rolling to very steep, somewhat excessively drained and well drained coarse sandy loams

6 — Friant-Coarsegold: Shallow and moderately deep, hilly to very steep, well drained fine sandy loams and loams

7 — Cibo-Las Posas: Moderately deep, rolling to steep, well drained clays and loams

SOILS OF THE UPPER SIERRA NEVADA FOOTHILLS

8 — Holland-Crouch-Sheephead: Very deep, deep, and shallow, hilly to very steep, well drained and somewhat excessively drained loams and coarse sandy loams

*The terms for texture used in the descriptive heading apply to the surface layer of the major soils

Compiled 1979

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS
UNIVERSITY OF CALIFORNIA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

TULARE COUNTY, CALIFORNIA, CENTRAL PART

Scale 1:316,800

1 0 1 2 3 4 5 Miles

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

RULES AND REGULATIONS FOR WATER DELIVERIES
2010 WATER-YEAR

1. APPLICATION FOR WATER

a. Applications for water will be accepted at the District office until 4:00 P.M., February 20, 2010, and must include the amount of District water the landowner anticipates using during the water season. **Please Note: Having a credit balance on an individual water account does not negate or diminish the need to submit an application for water; it only has bearing on the payment due at this time. NO WATER IS CARRIED OVER IN INDIVIDUAL ACCOUNTS FROM ONE YEAR TO THE NEXT – AN APPLICATION IS REQUIRED EACH AND EVERY YEAR TO SECURE WATER FOR THAT YEAR.** Minimum payment due at this time (when added to your credit balance) must cover one-half of the water reserved and the final balance will be due by June 20, 2010. Applications received and/or postmarked on or before February 20th will be accepted. Applications received or postmarked after February 20th and before March 21st will be subject to a $20.00 per acre-foot administrative charge. Applications received or postmarked on or after March 21st, will be subject to availability and a $20.00 per acre-foot administrative charge. No water will be delivered before it is purchased.

b. Water will not be delivered until all outstanding customer charges, including, but not limited to Standby Charges, have been paid District-wide.

c. **Unpaid or delinquent water charges and unauthorized operation or tampering with water delivery meters will cause the District to "lock-up" subject water delivery meters.** Unpaid water charges will become a lien against the landowner's property. Interest will accrue on all delinquent accounts at the legal rate permitted by law. A $100 administrative fee will be assessed to the Applicant to UNLOCK any delivery that has been locked-up due to delinquency, unauthorized operation or tampering with water delivery meters. Cutting chains and locks will result in an additional $100 administrative fee ($200 total). All water illegally used shall be purchased at $500 per acre-foot. If the District is unable to determine how much water was illegally used through the meter, the District will estimate the amount through water orders, previous year's water usage history, or field estimates and charge the landowner accordingly.

d. Water applications filed with the District by persons other than the property owner (lessees, renters, etc.) shall be countersigned by the property owner, authorizing the applicant to use water and assuming responsibility for any unpaid water bills.

e. If available, additional water may be purchased during the water-year without penalty provided the full allocation of 1.4 acre-feet per acre is purchased as of February 20th in accordance with Paragraph 1.a. above.

f. Taking water from the District in violation of these Rules and Regulations is a violation of law. Any landowner using District water prior to purchasing it from the District may be prosecuted for theft, and will be liable for the administrative fees and water payments described in Paragraph 1.c. above.

2. WATER-YEAR

The Water-Year shall be the period from January 1 through December 31 unless otherwise designated by the District Board of Directors. For example, a circumstance where the Water-Year may not coincide with the calendar year would be in a "dry year" which shall be effective when the federal water allocation is below 85 percent for Class One Friant Division Contractors. In this instance the Water-Year shall coincide with the United States Bureau of Reclamation's Contract Year (March 1st to the last day of February) to ensure that the District does not allocate more water than is made available to it under its Long

Term Friant Division Contract with the United States. Water delivery may be requested at any time during the Water-Year provided water is available and the applicable provisions of Paragraph 1 are satisfied. Water rates are established annually by the Board of Directors and will apply on a Water-Year basis unless otherwise modified by the Board of Directors.

3. USE OF WATER

a. Water delivered by the District must be put toward an agricultural beneficial use within the District boundary. Caution: Water used for spraying purposes may ONLY be taken from a District delivery or other District facility provided a County-approved connection is made and maintained at all times between the District facility and the spray equipment.

b. Water usage statements will not be sent to the water user on a monthly basis (unless requested) but may be sent when less than 25% of a water user's purchased supply remains. When the water user's purchased supply is depleted, water delivery will be discontinued. Water delivery may be resumed if the water user acquires additional water by transfer(s) or additional purchases (if additional water is available). It will be the water user's responsibility, upon receiving the 25% notice, to make the necessary arrangements with the District for additional water. No other notification will be provided.

c. The ultimate disposition of water ordered, but not used or transferred by September 30th, is subject to the discretion of the District. Alternative disposition of this water may include, but is not limited to, outside exchange, transfer, or banking in accordance with Reclamation Law. The determination of an alternate disposition of unused water will be based on the projected end-of-Water-Year District use. Water deposits may be returned after September 30th unless alternative arrangements have been made with the District.

1. Dry Year Amendment: In years with less than an 85 percent Class One Friant Division supply allocation, the disposition of water ordered, but not used or transferred by January 31st (one month prior to the end of USBR contract year), is up to the discretion of the District. This determination will be based on the projected end-of-contract year District water use.

d. The Board of Directors may elect to carry unused water over (carryover) from one Water-Year to the next in accordance with Bureau of Reclamation policy. Unused water shall not be carried over into the next Water-Year on an individual landowner basis; however, unused landowner water deposits may be carried over into the next Water-Year.

4. ENTITLEMENT TO WATER

a. When the demand for water is greater than the available supply, available water will be distributed equitably among those who have filed an application in accordance with Paragraph 1 and as required by California State Water Code Section 22250 which reads in part as follows:

> *"All water distributed by districts for irrigation purposes shall be apportioned ratable to each landowner upon the basis or ratio which the last assessment against his land for district purposes bears to the whole sum assessed in the district."*

b. Any landowner may assign for use within the District their full allocation pursuant to Section 22250 provided the water is first purchased in accordance with Paragraph 1.

5. WATER TRANSFERS

a. Intra-district between **same entity**: A landowner having properties in two or more of the District's delivery systems (e.g. System 7 and System 11), may transfer water, without penalty, from one system to another system. The final charge for water will be based on water charges for the system in which it is used.

b. Intra-district between **different entities**: A landowner may transfer water to another landowner by filing a water transfer form with the District. The transferred water must have been purchased by the transferor prior to the transfer in accordance with Paragraph 1. The final charge for water will be based on water charges for the system **in which it is used.** The difference in cost, if any, must be paid to the District at the time of transfer. The District assumes no responsibility for collecting monies due to the transferor from the transferee. Both the transferor and the transferee must sign a water transfer form.

c. Inter-district between **same entity**: A landowner having properties in both the District and another Friant Division district (district), may transfer water from the District to the other district (inter-district). Payment for this transferred water shall be the greater of the average cost of water within the district where the water is used plus a 10% surcharge, or at the average cost of water within the District, whichever is greater.

6. WATER DELIVERY PROCEDURES

a. Orders for turn on and turn off must be scheduled with the District at least 24 hours before the service is to be provided. Also, notify the District as soon as possible when making changes or shutoffs not previously scheduled with the District. **The District's policy is to deliver water in quantities and flow rates that are economically feasible and within the operating limits of the delivery systems and flow meters. Extenuating circumstances, where it may not be economical to provide water to a particular delivery point, will be considered by the District on a case by case basis. Fulfilling orders that create the potential to harm the District's facilities will be denied.**

b. Water for the following day is ordered from the Friant Water Authority at 8:30 A.M. Monday through Friday. **Orders must be received at the District Office before 8:00 A.M to receive next day water delivery**. Sunday and Monday orders must be received before Noon the preceding Friday. Water orders may be made as follows:

DISTRICT OFFICE - Office is open for water orders 7:00 A.M. to 4:00 P.M. Monday through Friday. You may also place a water order by calling the District Office at (559) 626-4461. During non-business hours, water orders may be placed with the District's answering service. Water orders may be placed by emailing the request to dacocid@sbcglobal.net with electronic copies sent to rmocid@sbcglobal.net and rtrocid@sbcglobal.net. District receipt of orders submitted by email will be provided by an electronic response (reply) from District staff.

HOLIDAY SCHEDULE – The District office will be closed in observance of the following holidays: afternoon of New Years Eve, New Years Day, President's Day, afternoon of Good Friday, Memorial Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day and the day after, afternoon of Christmas Eve, and Christmas Day. Water orders for holidays and the day following a holiday shall be made by 8:00 A.M. on the business day prior to the holiday.

c. **The timing requirements shall be relaxed for the delivery of water for frost protection.** Frost water must be ordered by 1:00 P.M. to receive water for that night and the following day. For pumped systems, a notice as early as possible is desirable in case the system has to be filled. Order your water by system(s) and delivery(ies) and provide the desired flow and duration as you would for the regular irrigation season. When ordering, provide the District with your name and a telephone number where you can be reached, if possible, during the period when you intend to be taking water. Failure to take delivery of water that is ordered for frost protection can severely damage the District's pumps. Landowners that have placed

frost water orders and later decide not to take delivery must make every effort to contact District Operation's staff to avoid being liable for damage to District infrastructure.

d. Landowners will be permitted to operate their turnout provided it is operated in accordance with District procedures. Water must be used at a rate that will accurately register on the meter. Landowners shall immediately inform the District office of any maintenance required on their turnout due to normal wear, vandalism, accident, or other cause. Landowners shall be responsible for all water delivered or spilled through their turnouts.

e. A change of water from one delivery point to another on the same system will be permitted without a 24-hour notice provided that you notify the District in advance of the change to be made.

f. No person, other than a District employee unless otherwise designated, shall operate any of the District's facilities. Tampering with or changing the adjustment of any pump or valves, other than the delivery assigned for your use, is prohibited. **Any interference with facilities under the jurisdiction of the District is a criminal offense and will be prosecuted accordingly.**

7. DISTRICT LIABILITY

a. The District is not responsible for the quality of water delivered as that ability is outside of the District's jurisdiction and control. The Friant Water Authority is responsible for the operation and maintenance of the Friant-Kern Canal and from time to time they perform treatment (i.e. application of copper sulfate or other chemicals) and or maintenance (i.e. mechanical removal of invasive weeds within the system) that may result in water of variable quality. The District interfaces with the Friant Water Authority routinely and there is a concerted effort to maximize and stabilize the quality of water made available. **The water delivered by the District is not intended for human consumption.**

b. Water shortages may occur during any year which may affect the amount of water furnished to the District by the United States pursuant to the District's Central Valley Project Friant Division Water Service Contract. In no event shall any liability accrue against the District or any of its officers, agents or employees for any damages, direct or indirect, arising from a water shortage due to errors in operation, drought or unavoidable cause(s).

8. TAILWATER

a. The District is required to regulate excessive tailwater. The United States Bureau of Reclamation Water Service Contract requires the District, as a provision of its conservation plan and as a condition of continued service, ensure water is put to beneficial use. Hence, the District must regulate excessive tailwater to avoid determinations that it is wastefully or unreasonably using the water supply provided to it. If the District is required to regulate tailwater because the grower does not do so, it needlessly expends District funds without providing specific benefit to the broad group of District landowners.

b. If the District determines that a landowner has improperly used irrigation water delivered to them, or improperly prepared the ground to receive irrigation water, such that excess tailwater, in the District's opinion, is leaving the landowner's property, the District shall notify the landowner with the appropriate steps to take to ensure that excess tail water is eliminated. If the landowner does not take appropriate steps to remedy the situation, the District will reduce and/or discontinue water delivery until the problem is rectified. Alternatively, the District may, at the landowner's expense, take corrective action in order to ensure that excess tailwater does not leave the landowner's property. Landowners will be charged the full cost to the District of any services provided to restrict tailwater runoff, and payment of these charges will be required as a condition of continued service.

9. RECLAMATION REFORM ACT OF 1982 (RRA)

The District is subject to the discretionary provisions of the Reclamation Reform Act of 1982 (RRA). If you own, lease, rent or have an interest in land "West wide" (17 Western States), that totals more than two hundred forty (240) acres (40 acres for Limited Recipients) you must certify your landholdings to the District each year before water can be delivered to your property. This includes land that lies within a water or irrigation district other than the District, that is subject to the discretionary provisions of the RRA. The certification of your landholdings is due in the District office by March 1st each year. If your landholdings have not changed during the period of your last certification, you need complete only the verification form. **If your landholdings have changed, you have 30 days from the date of change to report those changes to the District.** Assistance in completing the RRA forms and answering any questions you may have is achievable by calling or stopping-by the District office. Your water application may indicate whether or not you are required to submit the RRA forms. **It is the responsibility of the landowner, not the District, to provide the proper landholder forms. Failure to provide the proper landholder forms prior to the use of District water will result in an administrative fine to the landholder as determined by the United States Bureau of Reclamation.**

ORANGE COVE IRRIGATION DISTRICT

P.O. BOX 308
ORANGE COVE, CA. 93646-0308
(559) 626-4461

STATEMENT OF STANDBY CHARGES FOR THE YEAR 2011

CUSTOMER NUMBER: 2

ASSESSOR PARCEL NUMBER

005	220	05
SEC	TWP	RANGE
30	15	25

IMPORTANT INFORMATION
WATER CODE SECTION 22280 (a)

ANY DISTRICT MAY FIX AND COLLECT CHARGES FOR ANY SERVICE FURNISHED BY THE DISTRICT, INCLUDING A STANDBY CHARGE WHETHER THE WATER IS ACTUALLY USED OR NOT. WATER CODE SECTION 25806 PERMITS THE DISTRICT TO RECORD A LIEN UPON ALL THE REAL PROPERTY FOR WHICH CHARGES REMAIN UNPAID. FIRST INSTALLMENTS BECOME DELINQUENT IF NOT RECEIVED OR POSTMARKED ON OR BEFORE **20-Dec-2010**.
THE SECOND INSTALLMENT IS DUE ON OR BEFORE **20-Jun-2011**.
LATE PAYMENT INSTRUCTIONS:
ADD A 10% PENALTY TO THE FIRST INSTALLMENT IF LATE.
ADD A 5% PENALTY, PLUS $12.00 COST TO THE SECOND INSTALLMENT IF IT IS A LATE PAYMENT. INTEREST WILL ACCRUE AT A RATE EQUAL TO THE ANNUAL ADJUSTED RATE ESTABLISHED BY THE FRANCHISE TAX BOARD AS PROVIDED IN SECTION 18269 OF THE CALIFORNIA REVENUE AND TAXATION CODE.

DESCRIPTION OF PROPERTY:

ANCHOR ORANGE COLONY: E 1/2 OF LOT 31 AND ALL OF LOT 32
REMAPPED OLD APN#

ASSESSED ACRES	STANDBY RATE/ACRE	CREDIT RATE/ACRE	NET STANDBY RATE/ACRE	TOTAL STANDBY CHARGES
30.00	$86.00	$19.00	$67.00	$2,010.00
NDOWNER 3ATE		$0.00	NET DUE AMOUNT	**$2,010.00**

CUT HERE AND MAIL BOTTOM PORTION TO PAY BOTH INSTALLMENTS ON OR BEFORE DEC 20, 2010 **$2,010.00**

If paying the second installment please cut and mail this portion with your remittance.

CUSTOMER NUMBER 2 DUE BY JUNE 20, 2011

APN

	SECOND INSTALLMENT	
	BEFORE JUNE 20	AFTER JUNE 20
STANDBY CHARGE	$1,005.00	$1,005.00
LATE PAYMENT CHARGES		
PENALTY 5%		$50.25
PLUS COSTS		$16.00
TOTAL	**$1,005.00**	**$1,071.25**

If paying only the first installment please cut and mail this portion with your remittance.

CUSTOMER NUMBER 2 DUE BY DECEMBER 20, 2010

APN

	FIRST INSTALLMENT	
	BEFORE DEC 20	AFTER DEC 20
STANDBY CHARGE	$1,005.00	$1,005.00
LATE PAYMENT CHARGES		
PENALTY 10%		$100.50
TOTAL	**$1,005.00**	**$1,105.50**

Orange Cove Irrigation District

APPLICATION FOR 2011 WATER

Customer#

Please check the indicated water allocations available for the following season and make any adjustments you desire. Any additional water orders placed after this order is complete will have a penalty added to the base rate.

THE LAND REPRESENTED BY THIS APPLICATION IS SUBJECT TO THE RULES AND REGULATIONS OF THE RECLAMATION REFORM ACT OF 1982 (SEE SECTION 9 OCID RULES AND REGULATIONS FOR WATER DELIVERY). YOU MUST FILE THE PROPER CERTIFICATION FORMS BEFORE WATER CAN BE DELIVERED TO THIS LAND. IF POSSIBLE, PLEASE RETURN THE PROPER FORMS WITH YOUR APPLICATION. IF YOU HAVE ANY QUESTIONS, PLEASE CALL THE DISTRICT OFFICE

System	*Outlet*		*Owner*	*Acres*	*Allotment*	*Rate*	*Amount*
21	210420	ID 3 #42 (F/C)	879	20.00	28.000	$90.00	$2,520.00
			System	*20.00*	28.000		$2,520.00
27	270170	ID 5A #17 (F/C)	879	20.00	28.000	$90.00	$2,520.00
27	270180	ID 5A #18 (F/C)	879	44.92	62.888	$90.00	$5,659.92
27	270200	ID 5A #20 (F/C)	879	18.00	25.200	$90.00	$2,268.00
			System	*82.92*	116.088		$10,447.92
36	360190	ID 6-1 #19 (F/C)	879	64.92	90.888	$90.00	$8,179.92
			System	*64.92*	90.888		$8,179.92
39	390500	ID 6 #50 (F/C)	879	17.81	24.934	$90.00	$2,244.06
			System	*17.81*	24.934		$2,244.06
45	450380	ID 8 #38 (F/C)	879	24.89	34.846	$90.00	$3,136.14
			System	*24.89*	34.846		$3,136.14
			Total Acres	210.54	294.756		$26,528.04

Enter the totals for water order in the space below (if your order is different than indicated above).

Totals for which water is ordered

Acres	*Water A.F.*	*$Amount*	*Deposit (Min 50%)*

ORANGE COVE IRRIGATION DISTRICT

1130 Park Blvd.
P. O. Box 308
Orange Cove, CA 93646-0308
(559) 626-4461

APPLICATION FOR 2011 WATER

Cust #

_____

Please reserve _____ acre feet of water for use in 2011 . I understand that a minimum of one-half the deposit is required before FEBRUARY 22,2011 , with the remainder due by JUNE 20 2011. I further understand that the water, electrical power and delivery charge will be adjusted to actual cost at the end of the water season and that any water I may request in excess of the amount ordered at this time will be Subject to Availability.

_____
Applicant

(If applicant is not the LEGAL OWNER)
I understand the any unpaid water charges not paid by applicant will become a lien against my property.

I approve this transaction. _____
Legal Owner

Name of person to contact:
(in case of an emergency) _____

Phone Number: _____

THIS APPLICATION IS SUBJECT TO RULES AND REGULATIONS FOR WATER DELIVERIES.

The following information is for the water that you are currently making a deposit on:

For Office Use Only Late Payment Penalty (If Applicable) _____	_____ Acre feet $ _____
	ADD or (Deduct) Balance from Previous Year: (\$2,813.00)
	Total Due ==========
	Amount Remitted (Minimum 50% Deposit) ==========

Please read the attached page(s) to determine the total acre-feet to order based on the allotments established by OCID.

ORANGE COVE IRRIGATION DISTRICT

GROUNDWATER MONITORING AND DROUGHT PREPAREDNESS PROGRAM

Submitted to the Department of Water Resources

Local Groundwater Management Assistance Act of 2000
Grant No. 4600003659

July 2006

REGISTERED PROFESSIONAL ENGINEER
OWEN KUBIT
No. C66552
EXPIRES: 6-30-08
Civil
STATE OF CALIFORNIA

DATE SIGNED: 7-27-06

Prepared by :

Provost and Pritchard
Engineering Group, Inc.

Orange Cove Irrigation District

EST. 1968
PROVOST & PRITCHARD INC
ENGINEERING GROUP

ORANGE COVE IRRIGATION DISTRICT

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List of Abbreviations

AB	Assembly Bill
AID	Alta Irrigation District
CEQA	California Environmental Quality Act
CFS	Cubic feet per second
CVP	Central Valley Project
DPP	Drought Preparedness Program
DWR	Department of Water Resources
ESRI	Environmental Systems Research Institute
GAC	Groundwater Advisory Committee
GIS	Geographic Information System
GMP	Groundwater Management Plan
GPM	Gallons per minute
GPS	Global Positioning System
HVID	Hills Valley Irrigation District
OCID	Orange Cove Irrigation District
P&P	Provost and Pritchard Engineering Group, Inc.
RTK	Real time kinematic
SB	Senate Bill
SCADA	Supervisory control and data acquisition
TDS	Total dissolved solids
TVWD	Tri-Valley Water District
USBR	United States Bureau of Reclamation
USGS	United States Geologic Survey
WSD	Water Storage District
WWTF	Waste water treatment facility

EXECUTIVE SUMMARY

The Orange Cove Irrigation District (OCID) was awarded a grant in June 2004 from the Local Groundwater Management Assistance Act of 2000 (Grant No. 4600003659) to prepare a Groundwater Monitoring and Drought Preparedness Program. This report includes the products, data, findings, and conclusions from the study.

The original goals of the study included the following:

- Updating of the OCID Groundwater Management Plan (GMP) to satisfy new State requirements.
- Groundwater quality testing in areas of concern and comparison of the results to historical water quality data.
- Completion of a report on a proposed Drought Preparedness Program (DPP) that includes incentives for groundwater pumpers to pump more groundwater in drought years and thereby reserve surface water supplies for growers that do not have a reliable groundwater supply.
- Development of a groundwater database linked to a Geographic Information System.
- Development of an expanded groundwater-level monitoring network and construction of new monitoring wells.
- Formation of a Groundwater Advisory Committee to review and advise on all major groundwater management decisions.

The actual work completed matched the original goals with the exception that groundwater quality testing was not performed due to reluctance from growers to share information with the public. With DWR approval, funding for groundwater quality testing was instead used for a public outreach program for the DPP, which OCID saw as a higher priority than groundwater quality testing.

Important information gained from the project included the following:

- Various information on the local groundwater was gathered and incorporated into the Districts updated GMP, which will serve as a useful reference and guidebook for making future groundwater management decisions.
- A review of historical groundwater quality data showed that the water quality was suitable for irrigation uses, confirming previous beliefs.
- Detailed information on the local geology was gathered during the installation of six new monitoring wells.

In addition, the District now has several tools that will allow them to gather, store and evaluate groundwater data more efficiently. These tools include:

- Newly established and more comprehensive groundwater monitoring network.

- New groundwater database linked to a Geographic Information System.
- Six new monitoring wells fitted with data loggers.
- The detailed framework for a DPP, including specific comments and recommendations from local growers. As a result, the District now has most of the guidelines needed to begin implementing a pilot DPP.

Some of the important recommendations/findings from the study include the following:

- The groundwater near the City of Orange Cove wastewater treatment plant has elevated levels of nitrates and dissolved solids. Although the groundwater quality is suitable for agricultural use, OCID should regularly review groundwater quality reports prepared by the City of Orange Cove to monitor for any changes.
- A pilot program is recommended to evaluate the feasibility of a district wide in-lieu groundwater recharge program (drought preparedness program). Monitoring wells and data loggers have been installed in System Area 9 where the pilot program would be performed. No other new facilities would be needed to implement the pilot program.
- A public outreach program indicates that there is some interest from local growers in the drought preparedness program.
- Other recommended measures to improve groundwater management include preparing annual groundwater reports (including groundwater contour maps), and holding annual Groundwater Advisory Committee meetings.

As a consequence of this study, OCID has clearly defined goals and guidelines for groundwater management, and has the tools to better monitor groundwater conditions and prepare annual groundwater reports. The Groundwater Advisory Committee, which was formed as part of the study, will continue to be an important aspect of managing the local groundwater supplies.

1 - INTRODUCTION

This report documents the findings from the Orange Cove Irrigation District's (OCID) Groundwater Monitoring and Drought Preparedness Program study. The report includes discussions on the scope of work, budget, schedule, and conclusions and recommendations from the studies and investigations. All data that was collected as part of the study is included in this report.

1.1 - Authority

The study was funded with a grant (No. 4600003659) from California Assembly Bill 303, the Local Groundwater Management Assistance Fund Act. The grant of $250,000 was awarded to the Orange Cove Irrigation District (OCID). OCID hired Provost and Pritchard Engineering Group, Inc. (P&P or District's engineering consultant) to perform the majority of the work outlined in the scope of work. P&P hired Kenneth D. Schmidt and Associates, Mel Simmons and Associates, and Twining Laboratories as subconsultants, all for work related to hydrogeologic evaluations and construction of monitoring wells. All of the work was completed between September 2004 and July 2006. The scope of work for the study is included in **Appendix A**.

1.2 - Background Information on Orange Cove Irrigation District

The Orange Cove Irrigation District (OCID) is a political subdivision of the State of California, formed for the purpose of delivering water to growers. OCID was organized in February 1937, and, at the time, comprised an area of 12,587 acres. The Navelencia and East Orosi areas were annexed in March of 1946, and, with minor inclusions and exclusions, the service area has increased to the present total of approximately 28,000 acres.

OCID is located in both Fresno and Tulare Counties at the eastern edge of the San Joaquin Valley. Refer to **Exhibit 1.1** for a map of the District.

The water needs of OCID are approximately 76,000 acre-feet of water annually.[1] In a year with full CVP contract entitlement, OCID has 39,200 acre-feet of surface water. The safe yield of the groundwater underlying the surface area is 27,800 acre-feet[2]. The surface water supply and groundwater safe yield are still about 9,000 acre-feet short of the total crop needs. In average and wet years, the shortage is made up from rainfall. In water short years, the only way to make up the shortfall is from water purchases on the open market and overdrafting the groundwater supplies.

[1] Friant Unit Contractors, *Water Needs Analysis*, March 7, 1988.
[2] USBR, *Geologic Study of the Orange Cove Irrigation District*, August 1947.

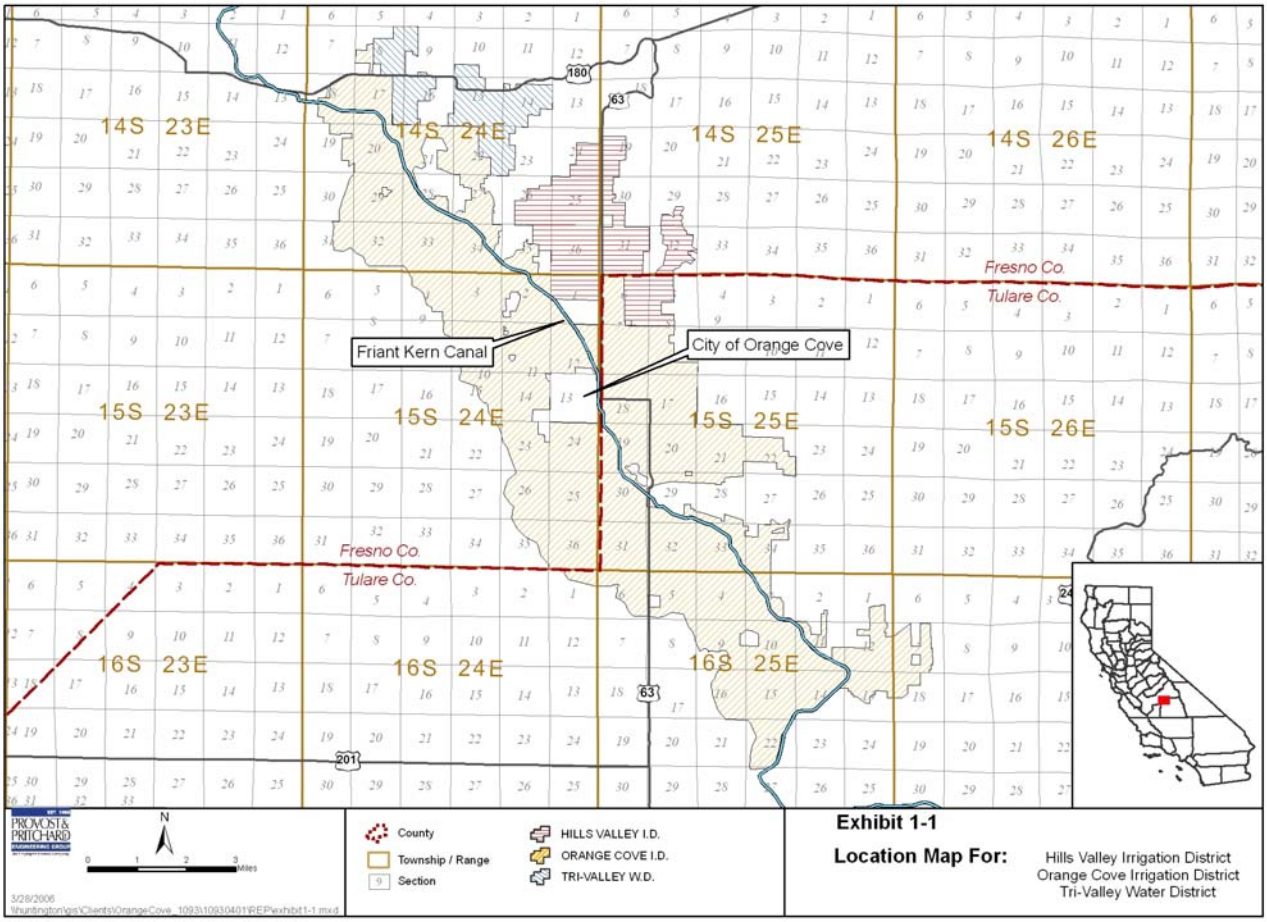


Exhibit 1-1: Orange Cove Irrigation District Map

OCID was formed to import surface water into the area to offset a fairly extensive reduction in cropping caused by over pumping of a very limited groundwater supply. In the mid 1930's, an extensive effort was made to secure a 250 cfs diversion entitlement from the Kings River. This effort was abandoned when an opportunity arose to contract for Central Valley Project (CVP) water.

OCID entered into a contract for CVP (Friant Division) water on May 20, 1949, and started deliveries that same year, starting the term of its first 40-year contract. A renewal contract was entered into on May 23, 1989, again for a 40-year term, but has encountered extensive legal challenges on whether the Bureau of Reclamation had adequately complied with federal environmental law. Following a series of interim renewal contracts, OCID executed a long-term renewal contract in February 2001.

The Friant-Kern Canal is the main source of water, with OCID having 15 turnouts located from milepost 35.87 to milepost 53.32 along the Canal. The OCID service area

comprises a strip of land approximately 3 miles wide and 14 miles long along the western foothills of the Sierra Nevada Mountains.

The Orange Cove Irrigation District has defined a 9,000-acre area in the southern portion of the District as the 'Most Productive Groundwater Area'. This area lies south of South Avenue to the southern end of the District, and is enclosed by the Alta Canal on the west and the Friant-Kern Canal on the east. This area covers approximately one-third of the District and is the only portion of the District that has reliable wells with meaningful yields (>100 gpm). The groundwater monitoring program and drought preparedness program both focused on this area.

Refer to the Orange Cove Groundwater Management Plan (**Appendix B**) for detailed information on the geology and hydrogeology of the District.

1.3 - Goals and Objectives

The original goals of the study included the following:

1. Update the District's Groundwater Management Plan (GMP) to satisfy new State requirements.
2. Develop an updated GMP that will include goals and guidelines to steer groundwater management decisions.
3. Develop a more comprehensive well water-level monitoring network.
4. Upgrade the District's groundwater database to store data for an expanded well water-level monitoring network, include a link to a Geographic Information System, and have functions to assist with the development of annual groundwater reports.
5. Review historical groundwater quality data for comparison to present and future test results.
6. Perform groundwater quality testing throughout the usable groundwater area and in specific areas of concern to determine the state of the existing groundwater quality, and establish baseline data for future testing.
7. Establish a Groundwater Advisory Committee to assist with all major groundwater related decisions that are a part of this study and future groundwater management efforts.
8. Evaluate the engineering and hydrogeologic feasibility of a Drought Preparedness Program that provides incentives to some growers to pump more groundwater in dry years so that surface water supplies are available to growers that lack a reliable groundwater supply.

All of these goals were met except for new groundwater quality testing, which was replaced with an educational program for the drought preparedness program (see Section 1.4).

1.4 - Scope of Work

The scope of work for the project includes the following primary tasks:

Task 1 - Update Existing Groundwater Management Plan to meet Senate Bill 1938 Requirements
Task 2 - Well Water Level Monitoring
Task 3 - Groundwater Quality Monitoring
Task 4 - Prepare Drought Preparedness Program
Task 5 - Project Reporting

See **Appendix A – Scope of Work** for a detailed description of the work in each of these tasks.

The original scope of work was revised to remove groundwater quality testing (Task 3.2 - Conduct Additional Water Quality Monitoring) and use the funds for an educational program for the drought preparedness program (Task 5.5 – Educational Program). This change was originally proposed by the Groundwater Advisory Committee (GAC) as described below.

Groundwater Quality Monitoring/Educational Program

At a meeting on November 2, 2005, the GAC members expressed reluctance in allowing groundwater quality testing from their wells because the information would be released to the public. (Task 3.2 – Conduct Additional Water Quality Monitoring, includes groundwater quality testing throughout the district to establish baseline data.) In addition, the GAC members, who are all local landowners, spoke to other landowners who showed similar reluctance with participating in a groundwater-quality testing program. OCID does not own any wells and would need permission from local landowners to perform groundwater quality sampling. As a consequence, at the next GAC meeting on December 6, 2005, the GAC members recommended that the groundwater quality testing not be pursued, due to a lack of available participants, and that the funds from Task 3.2 ($17,560) instead be used for an education program for the Drought Preparedness Program.

Elimination of Task 3.2 meant that OCID would not be able to collect groundwater samples for baseline data. However, the GAC stated that many growers already have groundwater quality data, and they are willing to share it with OCID, but typically not with the general public. At the meeting OCID also said that they were amenable to paying for groundwater quality tests with their own funds if it is ever deemed necessary. Hence, elimination of Task 3.2 was not anticipated to have a major impact on the District's groundwater quality management program.

As previously mentioned, the GAC recommended that the $17,560 originally budgeted for groundwater quality testing (Task 3.2) instead be used for a program to educate growers on the Drought Preparedness Program (DPP). The GAC members were enthusiastic about the DPP and wanted to see more efforts to help launch the program. In addition, OCID is comprised of many small landholdings, and numerous growers will need to participate for the DPP to be effective. The program is a fairly complex and it was felt that small-group meetings with growers were necessary to educate them on the

benefits, impacts, and economics of the program. Such an education program was not included in the original scope of work for the DPP. This work entailed the preparation of educational materials by the District's engineering consultant, and small group meetings between growers and a semi-retired OCID staff member who most of the growers have known and respected for many years. It was believed that the educational program will be beneficial in marketing the concept of the DPP, increasing participation, and allowing OCID to soon realize the benefits of the program.

A new task was added to the budget (Task 5.5 – Educational Program) to reflect the aforementioned modifications to the scope of work and budget. The revised budget has the same total ($250,000) as the original budget, but with some funds moved in-between different tasks.

SCADA

The scope of work said that OCID will install 3-7 monitoring wills and will 'likely tie these monitoring wells into it's SCADA system for real time groundwater elevation data capabilities." SCADA, or Supervisory Control and Data Acquisition, would have allowed OCID to remotely monitor groundwater levels in real time from their SCADA control system in their main office.

SCADA equipment would require a radio, solar panel, and either a programmable logic controller or remote telemetry unit at each well site. It was estimated that this would cost around $12,000 to 15,000 per well. Therefore, if SCADA were installed then probably only two wells could have been constructed and fitted with data loggers (sensory devices installed in wells to measure and store water level data) with the available well construction budget of $35,000. OCID determined two wells would not provide enough useful information, and instead six wells fitted with data loggers (but no SCADA) would provide a better network for monitoring groundwater levels. SCADA would also have limited benefits since 'real time' information is probably not needed for groundwater level monitoring and the data loggers can instead be accessed periodically by OCID field staff.

OCID installed six wells and fitted each with data loggers for a total cost of approximately $23,800. The driller typically provides a geologist to oversee the drilling and log the soils, however the District's engineering consultant instead provided the geologist and his salary costs used the remainder of the budget for the monitoring well construction.

2 - PROJECT ADMINISTRATION

2.1 - Project Budget

The project was completed within the original budget as outlined in the contract with DWR. **Table 2.1** summarizes the initial budget for each task with the actual expenditures.

Table 2.1 – Budget versus Actual Expenditures

Task No.	Description	Original Budget	Revised Budget[1]	Estimated Expenditures[2]
1	Update Existing Groundwater Management Plan	$32,840	$32,840	$33,500
2	Well Water Level Monitoring	$109,900	$109,900	$109,850
3	Groundwater Quality Monitoring	$28,620	$11,060	$11,500
4	Prepare Drought Preparedness Plan	$50,440	$68,000	$67,300
5	Project Reporting	$28,200	$28,200	$27,850
	Total	$250,000	$250,000	$250,000

[1] See Section 1.4 – Scope of Work for discussions on the budget revision.
[2] The actual expenditures were not known at the time this report was completed, however the estimated expenditures are all anticipated to be close to the budgeted amounts. Refer to Payment Request No. 7 for the actual expenditures on each task.

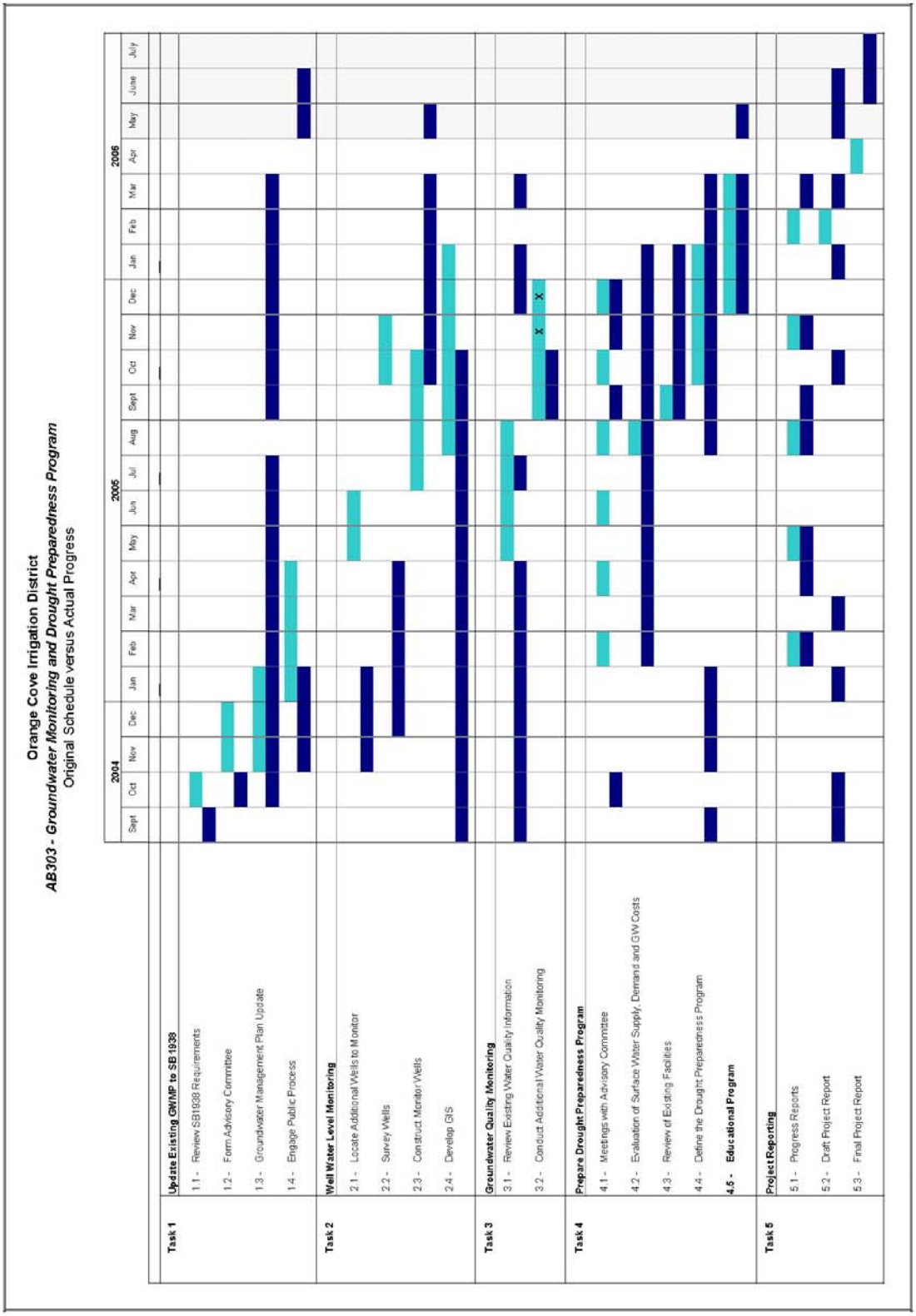
2.2 - Project Schedule

The original schedule included work on the project from October 1, 2004 to April 30, 2006. Work actually began one month early in September 2004. The Orange Cove Irrigation District submitted a letter to DWR in April 2006 requesting a one-month extension on the contract deadline. The motive for the extension included: 1) The extremely wet weather that caused delays in construction of monitoring wells, and 2) time necessary to schedule meetings for a public outreach program which was recently added to the scope of work. The DWR granted a time extension of three months with a new contract deadline of August 1, 2006. Actual progress on most tasks and sub-tasks varied from the original schedule, but the project was still completed before the final modified deadline of August 1, 2006. **Exhibit 2.1** shows a comparison of the original schedule with actual progress.

2.3 - Legal Matters

OCID legal counsel provided guidance on public participation requirements for the Groundwater Management Plan update. No other legal involvement has occurred as part of this project.

Exhibit 2.1 - Project Schedule



3 - GROUNDWATER MANAGEMENT PLAN

The Orange Cove Irrigation District adopted a Groundwater Management Plan (GMP or Plan) on October 27, 1997. The GMP was prepared in accordance with the requirements prescribed in Assembly Bill No. 3030 (California water code section 10750 et seq.). The GMP has been updated to include some other required and recommended components and was adopted by the OCID Board of Directors on June 14, 2006. A copy of the GMP can be found in **Appendix B**. The tasks that were followed in updating and adopting the new GMP are described below.

3.1 - Review Senate Bill No. 1938 Requirements

In September 2002 the California State Senate passed Bill No. 1938 establishing new requirements for GMPs. In addition, the Department of Water Resources published some additional recommended components for GMPs in Appendix C of Department of Water Resources Bulletin 118 (2003 Update). Refer to **Table 3.1** for a comparison of the components in the 1997 OCID GMP to other required and recommended components. Table 3.1 showed that the 1997 OCID GMP needed to address the following additional topics:

- Groundwater Basin Description
- Basin Management Objectives
- Saline Water Intrusion
- Wellhead Protection
- Migration of Contaminated Water
- Well Abandonment
- Overdraft Mitigation
- Groundwater Replenishment
- Groundwater Extractions
- Water Recycling
- Well Construction Policies
- Operation of Facilities
- Land Use Planning
- Land Subsidence
- Changes in Surface Flow and Water Quality
- Monitoring Protocols
- Advisory Committee of Stakeholders
- Groundwater Reports
- Plan Re-evaluation
- Program Funding and Fees
- Monitor Well Map
- Monitor Well Data

Table 3.1 – New Components in Groundwater Management Plan

Subject	New Sections Required	Existing OCID GWMP	Senate Bill 1938 Requirements	Other Components[1]
Background and History		X		
Description of District		X		X
Groundwater Basin Description	X			X
Groundwater Monitoring Activities		X	X	
Water levels		X	X	
Water quality		X	X	
Historic conditions		X		X
Groundwater levels		X		X
Water quality		X		X
Basin Management Objectives	X		X	
Components of Groundwater Management Plan				
Saline Water Intrusion	X		X	
Wellhead Protection	X		X	
Migration of Contaminated Water	X		X	
Well Abandonment	X		X	
Overdraft Mitigation	X		X	
Groundwater Replenishment	X		X	
Groundwater Monitoring		X	X	
Groundwater Extractions	X		X	
Well Construction Policies	X		X	
Operation of Facilities	X		X	
Relationships with other Agencies		X	X	
Conjunctive Use		X	X	
Land Use Planning	X		X	
Land Subsidence	X		X	
Changes in Surface flow/water quality	X		X	
Plan to involve other agencies		X	X	
Monitoring Protocols	X		X	
Advisory Committee of Stakeholders	X			X
Groundwater Reports	X			X
Plan Re-evaluation	X			X
Program Funding and Fees	X			
Monitor Well Map	X			X
Monitor Well Data	X			X

[1]Other Components includes sections that the DWR recommended be included in GMPs (see Appendix C of DWR Bulletin 118-2003)

3.2 - Form Advisory Committee

A Groundwater Advisory Committee (GAC) was formed to assist with the development and review of the new GMP. The GAC also played an important role in reviewing and advising on other project tasks, particularly the Drought Preparedness Program (see Section 6). OCID surveyed local growers for their interest in participating in the study as a GAC member. Several growers showed interest and were invited to attend GAC meetings. The GAC also included members of OCID staff and an engineering consultant representing Hills Valley Irrigation District (HVID) and Tri-Valley Water District (TVWD). Specifically, the GAC members included the following:

- James Chandler, OCID Manager-Engineer (retired)
- John Roldan, OCID Manager-Engineer
- Dennis Keller, Keller-Wegley Consulting (engineering consultant for HVID and TVWD)
- David Brown, OCID Landowner
- Arlen Miller, OCID Landowner
- Jay Gillette, OCID Landowner
- Marco Rinaldi, OCID Landowner
- Robin Salwasser, OCID Landowner
- Patrick Kurihara, OCID Landowner

The GAC provides a broad representation of interests in the district as it includes landowners, OCID staff, engineering consultants, and a representative from neighboring water and irrigation districts.

3.3 - Groundwater Management Plan Update

The GMP was updated to satisfy requirements of Senate Bill No. 1938 and the recommended components for GMP's as described in Appendix C of DWR Bulletin 118-2003. A copy of the updated GMP is included in **Appendix B**. The GMP was expanded to include the topics listed in Section 3.1. In addition, many of the sections in the old GMP were updated and expanded. The new GMP also addresses the results and goals of this AB303 study. Similar to the 1997 GMP, the updated GMP is a regional effort and was prepared in cooperation with the neighboring Hills Valley Irrigation District and Tri-Valley Water District. Pertinent sections of the GMP were reviewed by OCID legal counsel.

3.4 - Engage Public Process

The public was involved in updating the GMP through public notices and public hearings. OCID also solicited comments on the draft GMP from the City of Orange Cove. Evidence of the public participation is included in the updated GMP (**Appendix B**). A broad representation of public interests was also present in the membership of the GAC who reviewed and commented on the draft GMP (see GAC meeting minutes in **Appendix C**).

4 - WELL WATER LEVEL MONITORING

4.1 - Locate Additional Wells to Monitor

OCID identified spatial gaps in their monitoring well network and located suitable wells to fill in the gaps and ultimately help generate more accurate groundwater contours. A discussion on the process that was followed is given below.

OCID's original groundwater database had water level information on 28 wells (the database included locations for 14 other wells but with no groundwater level data). The wells did not provide an adequate spatial distribution for generating groundwater contours and analyzing area-wide changes in groundwater levels. Existing wells within these spatial gaps were identified using District records and drillers logs acquired from the California Department of Water Resources (DWR). The District asked numerous landowners that owned wells in these spatial gaps for permission to regularly measure groundwater levels in their wells; most well owners were fully cooperative. An expanded groundwater-level monitoring network was thus established that included 31 additional wells. In addition, groundwater level data was downloaded from the DWR website for some wells in the District's old database that had no water level data. Four of the wells in the original network were abandoned so the new network includes 28+14+31-4 = 69 wells. Refer to **Exhibits 4.1 and 4.2** for a comparison of the old and new well monitoring networks in the northern and southern portions of OCID, respectively. The target area for the expanded monitoring network is the 'most productive groundwater area' in the southern portion of OCID, although some monitoring will still be performed in the remainder of OCID. All of the wells in the expanded monitoring network were surveyed (see Section 4.2) and their well attributes were collected and added to the OCID groundwater database (see Section 4.4)

Development of accurate groundwater contours requires some data points outside of the area of interest. The Alta Irrigation District (AID) is located due west of OCID and represents one of these areas. AID has established a goal to survey their wells and create a groundwater database, however, this will only be completed when funding is available. OCID will maintain contact with AID staff on the status of their groundwater database, and, in the future, hope to establish an agreement to share groundwater level data.

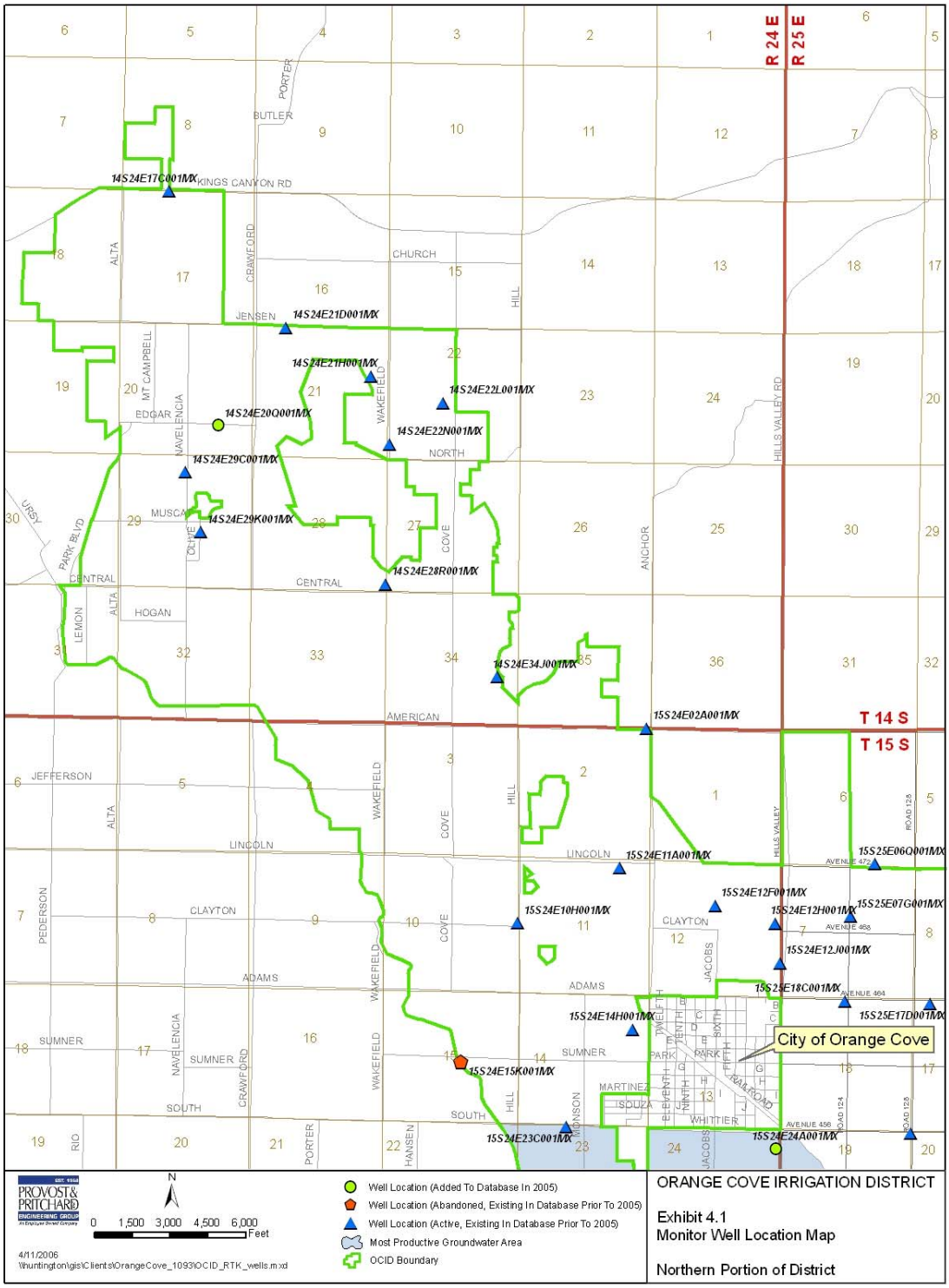


Exhibit 4.1 – Monitor Well Location Map: Northern Portion of District

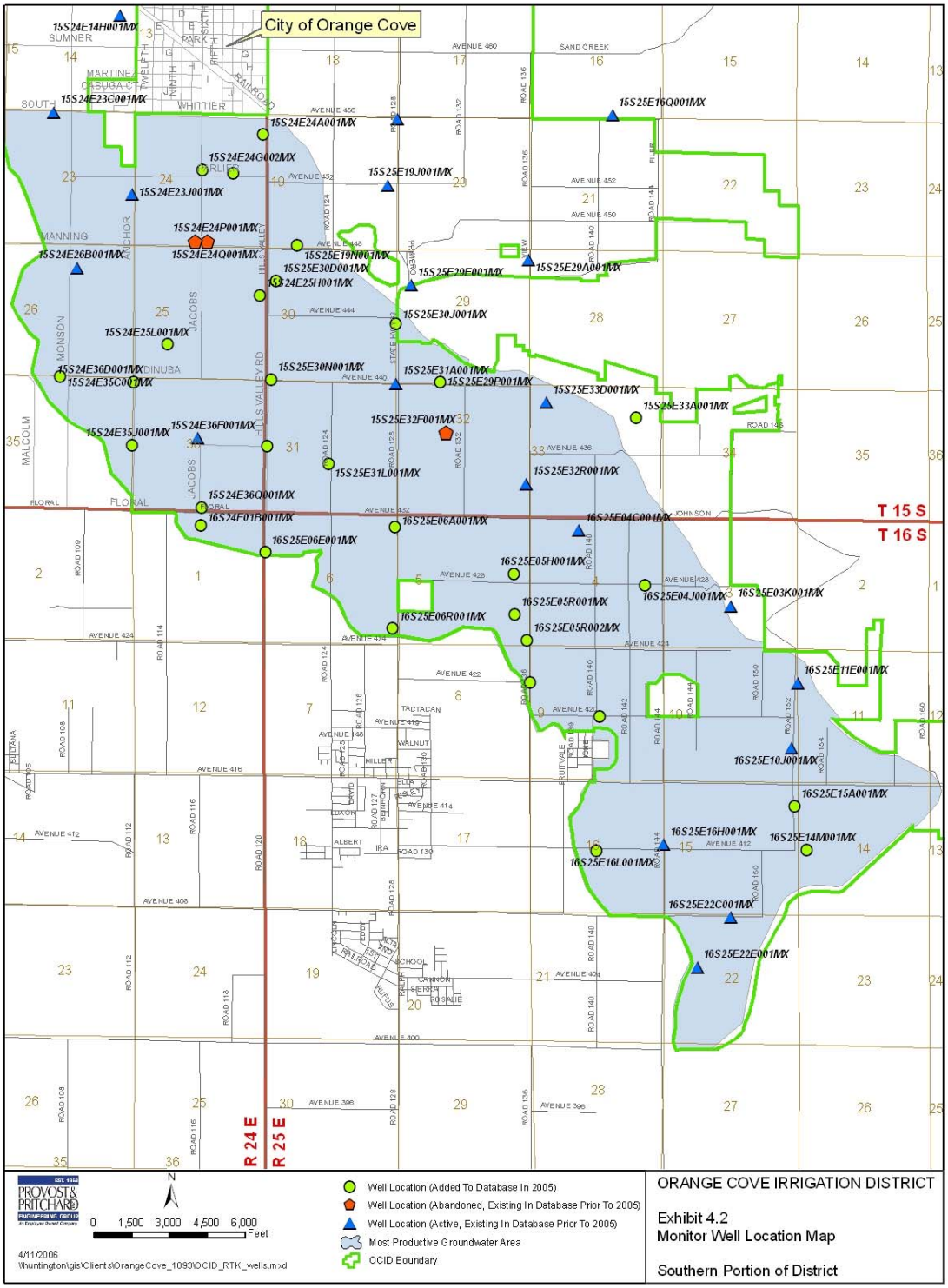


Exhibit 4.2 – Monitor Well Location Map: Southern Portion of District

4.2 - Survey Wells

A complete survey of all wells in the new monitoring network was performed to determine or verify their location and elevation, and collect well attribute information for inclusion in the District's new groundwater database. The work was overseen by a California licensed land surveyor.

Control Survey

A control survey was performed to establish benchmarks and establish horizontal and vertical control for surveying the locations and elevations of monitoring wells in OCID. Six new control points were established and the elevations of three existing benchmarks were verified. New control points were established because existing benchmarks were either not present in the area, or because existing benchmarks could not be accessed with global positioning system (GPS) base station equipment. The new benchmarks are aluminum disks set in concrete and stamped with the control point identification number. A sufficient number of control points were established to provide coverage over the entire District. **Appendix D** includes the locations and elevations of the control points, as well as maps and aerial photographs showing their locations.

GPS Survey/Well Canvass

After the control network was established, the location and elevation of all 69 wells in the new monitoring well network were surveyed. The wells were surveyed using a real-time kinematic GPS signal. Previously, the location of the wells was only known according to the 40-acre tract they were located in.

During the well survey, specific well attributes were also collected and the information was entered into the District's new GIS linked groundwater database. Attributes that were recorded for each well included:

- Well type
- Status
- Foundation
- Power supply
- Horsepower
- Discharge pipe diameter
- Discharge direction
- PG&E Tag No.
- Well casing diameter
- Ground surface elevation
- Reference point elevation

In addition, a digital photograph was taken of each well. The data available on each well is contained in the OCID groundwater database. A printout of the well attribute information can be found in **Appendix E**.

4.3 - Construct Monitor Wells

Six monitoring wells were installed in System Area 9 of OCID to assist with monitoring groundwater levels. System Area 9 comprises about 4,100 acres and is located within the southern portion of OCID (see Exhibit 4.1 in Appendix L). System Area 9 is also located within the 'Most Productive Groundwater Area in OCID.' The wells will be used primarily to measure groundwater level changes resulting from a future in-lieu groundwater banking project, and to help ensure that the groundwater levels do not encroach on the root zone and cause waterlogging problems. The wells will also become part of the district's regular monitoring network. A summary of the wells is provided in the table below:

Monitor Well No.	Depth (ft)	Well Completion Report No.[1]
1	39.3	0900527
2	54	0900528-0900529
3	84.5	0900530-0900531
4	74.5	0900532-0900534
5	74.5	0900535-0900536
6	53.3	0900537

[1] The State Well ID Numbers had not been assigned to these wells at the time this report was completed. They should be available later in 2006 and can be matched with the Well Completion Report Number.

Refer to **Appendix G** for a copy of the record drawings, specifications, subconsultant geology report, borehole logs, and DWR Well Completion Reports for the six wells. Public bidding was not necessary since the total construction cost was less than $25,000. An informal public bid was performed and bids were received from three California licensed and experienced well drillers on January 27, 2006. The contract was awarded to the lowest bidder, Twining Laboratories of Fresno, California. **Table 4.1** summarizes the unit prices provided by each bidder.

Regulatory requirements for the wells included relevant County permits and the CEQA process. The wells were determined to be Categorically Exempt from CEQA based on a Class 3 Exemption: New Construction of Limited Small New Facilities. OCID submitted a Notice of Exemption on March 13, 2006.

All of the wells were constructed in System Area 9, which has one of the most productive groundwater supplies in OCID and was also selected for a pilot program for the Drought Preparedness Program. Wells were sited to fill gaps in the existing monitoring well network, avoid underground utilities, and provide the most beneficial information for evaluating the pilot Drought Preparedness Program. All of the wells were constructed in county road right-of-ways.

Twining Laboratories of Fresno, California installed the wells. Refer to **Appendix H** for photographs of the drilling and well construction. The wells were drilled with an 8" hollow stem auger and samples were logged at 5-foot intervals. The wells depths

varied from about 40 to 85 feet deep. Final depths were determined by the field geologist at the time of drilling according to the depth to bedrock and groundwater level at each location. The location and elevation of each well was surveyed (see Appendix G).

Data Loggers manufactured by Instrumentation Northwest, Inc. were installed in each of the six wells to provide a temporal record of groundwater levels. Refer to **Appendix I** for manufacturer's information on specific data loggers that were installed. The data loggers are capable of measuring and storing groundwater level data. The data can be downloaded to a hand held device and then downloaded to a personal computer. Barometric correction devices were also purchased to correct water levels for changes in atmospheric pressure. A Supervisory Control and Data Acquisition (SCADA) system was not installed due to its high cost. Refer to Section 1.4 for more discussions on the scope of work for constructing monitoring wells.

A geologist from the District's engineering consultant observed the drilling operations at all of the well locations. Refer to Appendix G for a report discussing the field observations, subsurface conditions, and hydrogeologic implications for performing the proposed in-lieu groundwater-banking program.

Table 4.1 - SUMMARY OF CONTRACTOR BIDS

ORANGE COVE IRRIGATION DISTRICT
AB303 GROUNDWATER STUDY - OBSERVATION WELL CONSTRUCTION

EST. 1968 PROVOST & PRITCHARD ENGINEERING GROUP

Bid Opening Date 1/20/2006 Project Manager OEK
Prevailing Wages Required Yes Project Engineer OEK

Item No.	Item Description	Quantity	Unit	BSK Unit Price	BSK Item Total	Technicon Unit Price	Technicon Item Total	Twining Unit Price	Twining Item Total
1	Mobilization/Demobilization, Bonds, and Insurance, Permits	1	LS	$400.00	$400.00	$480.00	$480.00	$75.00	$75.00
2	Miscellaneous Facilities, Operations, and Worker Protection, USA	1	LS	$200.00	$200.00	$130.00	$130.00	$25.00	$25.00
3	Drill 8-inch Diameter Borehole	32	LF	$25.00	$800.00	$8.67	$277.44	$17.50	$560.00
4	Furnish and Install 2-inch (nominal) Diameter Perforated Casing (0.020")	15	LF	$3.50	$52.50	$6.20	$93.00	$2.20	$33.00
5	Furnish and Install 2-inch (nominal) Diameter Blank Casing	15	LF	$2.25	$33.75	$4.13	$61.95	$1.70	$25.50
6	Furnish and Install Filter Pack	20	LF	$3.50	$70.00	$15.87	$317.40	$3.80	$76.00
7	Furnish and Install Bentonite Seal	2	LF	$5.50	$11.00	$11.56	$23.12	$0.70	$1.40
8	Furnish and Install Annular Seal	10	LF	$15.00	$150.00	$14.65	$146.50	$1.40	$14.00
9	Construct Wellhead Facilities	1	EA	$350.00	$350.00	$250.00	$250.00	$160.00	$160.00
10	Well Development	1	LS	$425.00	$425.00	$200.00	$200.00	$155.00	$155.00
	Total for Each Observation Well				**$2,492.25**		**$1,979.41**		**$1,124.90**
	Total for 8 Observation Wells				**$19,938.00**		**$15,835.28**		**$8,999.20**

NOTES:
Quantities are not guaranteed. Final payment will be based on actual quantities.

4.4 - Develop Geographic Information System

The Orange Cove Irrigation District (OCID) had a groundwater database prior to implementation of this study. The database was significantly upgraded to make it easier to use, and includes new features, additional data, and a link to a Geographic Information System.

Old Database

OCID's old groundwater database was prepared in Microsoft Access. The database held data specific to 28 well locations throughout the district as well as a collection of precipitation, water delivery, and transpiration data. Most of the data in the old database was transferred to the new database.

Development of New Database

A new database (Groundwater Database) was also developed in Microsoft Access with the goal of being a comprehensive groundwater management tool for OCID. The new database includes all of the information collected during the real-time kinematic GPS survey of the wells in OCID and is linked to a Geographic Information System (GIS). The database includes a series of tables, queries, and forms to improve the process of data entry and reporting. Refer to **Appendix E** for an electronic copy of the database on CD, and sample hardcopies of the tables and reports from the database**.** Following are discussions on the major features in the new database:

- **Well location and identification.** Numerous parameters describing the wells were collected during the GPS survey (See section 4.2). These attributes are included in two separate tables in the database.
- **Current static water levels.** New groundwater level data can be entered into the database through an entry form.
- **Historical static water levels.** To establish a record of historic measurements for well locations, online data available from DWR (http://wdl.water.ca.gov/gw/) was downloaded and entered in the database. Currently there are 44 wells with data, creating 4,471 measurement records. Historic static water levels were also available from the District's old database.
- **Water quality testing results.** Water quality results can be entered through a specific entry form. Historic water quality results were entered from past studies within or near the District (refer to Section 5.1 for more information).
- **Driller's reports.** Driller's reports were collected for the sections encompassing the southern portion of the District. Since over 400 driller's reports were collected they are not held in the database but were placed in their own directory and organized by the public land survey system. The database includes a button for accessing driller's logs that have been linked to a well in the database. The driller's logs from the six new monitoring wells are linked to the database. Attempts were made to link older wells to driller's logs. However, most of the old driller's logs have no maps or very poor maps and no links could be made with certainty.

- **Digital images of well sites.** All wells in the database were photographed with a digital camera and the images are available in the database. Individual well reports can be viewed with GPS survey data or with a photo and site description data.
- **Well hydrographs.** Hydrographs can be created in the Groundwater Database for all wells that have well water measurements. The hydrographs can plot data for individual wells or average water levels for all the wells within the area of most productive groundwater. The hydrographs can include depth to water surface or groundwater elevation. The hydrographs can be printed or exported as .pdf images to be later linked to the GIS if desired.
- **Groundwater reports.** Quarterly, annual, five-year, and ten-year groundwater storage change reports can be created in the Groundwater Database. These can be printed or exported as .pdf images.
- **Contour mapping.** Contours of depth to groundwater or groundwater elevations can be created with custom tools installed in the District's GIS. These tools allow the user to select a year and season of well water measurements, then create contours of either equal depth or elevation. The contours can be saved by exporting them to the geodatabase for later recall.
- **Geographic Information System.** A single user license of ESRI ArcView 9.0 was installed on a computer at the OCID office. Newly created and publicly available GIS feature layers were packaged into a geodatabase for mapping within the District. These layers included the District boundary, water service areas, roads, public land survey system, USGS 1:24,000 topo rasters, major canals, District area of most productive groundwater, a digitized contour layer for depth to granite, and established survey controls.
- **Other features.** Several Adobe .pdf figures were set up to open within the Groundwater Database as reference documents. These documents include a map of the District with well locations and service areas, and a map of depth to granite contours within the District.

GIS was integrated with the Groundwater Database in the following ways:

1. When the user enters well depth readings the database runs several Visual Basic macro scripts that send updated data tables to the GIS Geodatabase. These tables include all of the measurement data as depth to well water or calculated elevation of well water, and a table summarizing quarterly water level data. In other words, each time the Groundwater Database is updated, the GIS Geodatabase is automatically updated.
2. In ArcView the GIS Geodatabase contains a master data set of surveyed well locations. These data will link to a measurements table by the unique identifier assigned to each well. Through a series of custom tools using Spatial Analyst extension, a query can be performed for measurement data for a specific time period. Well locations with associated measurement data can then be used to create groundwater contours of equal elevation or depth in GIS.

Training

The OCID Manager was given basic training on the function of the GIS software and use of the Groundwater Database. A User's Manual was also prepared to aid in the use of the database (**Appendix F**). The User's Manual includes numerous screen shots and step-by-step instructions for entering, viewing, and editing data, and creating reports. The User's Manual is available from a link on the Groundwater Database.

5 - GROUNDWATER QUALITY MONITORING

5.1 - Review Existing Water Quality Information

The Orange Cove Irrigation District does not perform groundwater quality testing, and, prior to this study, had no records on the local groundwater quality. The lack of groundwater quality monitoring was attributed to the generally acceptable quality of the groundwater (according to local growers) and the absence of District owned wells where testing could be performed. In addition, OCID was aware that other agencies have already been testing groundwater quality in the local area. Despite the generally acceptable quality of the groundwater, OCID found it prudent to collect all available data to confirm the state of groundwater quality, identify areas of concern, if any, and to archive the data for comparison to the results of any future testing.

Historical water quality that was researched and all available data was reviewed, and, when practical, placed in the new OCID groundwater database (data from one source was voluminous and thus was not entered into the OCID database). Refer to **Appendix J** for a map showing the locations with historical groundwater quality data and a table with all the collected data.

Following is a discussion on the sources of groundwater quality data that were investigated.

Historical Reports. Historical reports prepared by government agencies, such as DWR, USBR, etc. were reviewed for groundwater quality data. Some limited groundwater quality data was found in the two following reports:

1. USBR, *Supplemental Irrigation Suitability Land Classification Report, Central Valley Project, Friant Division, Hills Valley - Tri-Valley Area*, March 1982.
2. USGS, *Water-Quality Data, San Joaquin Valley, California, April 1987 to September 1988, USGS Open-File Report 91-74*, 1991.

The data includes groundwater quality test results from the 1980's for wells within and just outside of OCID.

United States Geologic Survey. Historical groundwater quality data was found for six wells within OCID on the website for the United State Geologic Survey. The data covered the years of 1963, 1987 and 1989. The data is not recent, however, due to the limited amount of other data found it was added to the OCID database.

East Orosi Community Services District. The East Orosi Community Services District was identified as a possible source of groundwater quality data near the southwest border of OCID. They were contacted as part of this study but did not return any phone calls.

City of Orange Cove Wastewater Treatment Plant. The City of Orange Cove operates a wastewater treatment facility (WWTF) approximately one mile southeast of the City of Orange Cove. Historically, effluent was delivered via pipelines to OCID for irrigation use. However, OCID suspended the program in 2002 due to concerns over the quality of the treated water. The City of Orange Cove now delivers the water to recharge ponds.

The City of Orange Cove monitors groundwater quality upgradient and downgradient of the WWTF. Elevated levels of TDS and nitrates have been found in wells near the WWTF. However, the groundwater is still considered suitable for agricultural uses. The groundwater quality data collected by the City of Orange Cove is voluminous and therefore was not entered into the OCID groundwater database. It is recommended that OCID staff regularly review groundwater monitoring reports prepared by the City of Orange Cove to determine if the WWTF is adversely impacting the groundwater quality.

Private Groundwater Quality Data. Many growers and corporate farms perform periodic groundwater quality testing. OCID did not ask them to submit their data since it was already pointed out at the Groundwater Advisory Committee (GAC) meetings that growers would be reluctant to share their data with the public. However, some of the GAC members noted that growers might be willing to share their data with OCID on a case-by-case basis. Sharing the data would be contingent on OCID not releasing it to the public and using it for a project that would benefit district growers. OCID will consider this action in the future if they have the need for more groundwater quality data.

Appendix J includes a table entitled “Comparison of Groundwater Quality to Recommended Guidelines for Agricultural Water Quality”. The table includes historical ranges for several groundwater constituents, and recommended concentrations of constituents for agriculture. The table also lists USBR guidelines for water quality in the Friant-Kern Canal, which is based on agronomic as well as operational criteria, so its use as a guideline should be considered carefully. Based on the limited data available, groundwater quality in OCID was been suitable for agriculture except for one sample in 1987 that exceeded the DWR recommendation for TDS for sensitive crops. The groundwater quality is generally well below recommended maximum levels for most constituents and would be suitable for sensitive crops. This has confirmed previous beliefs and the general observations of the local farmers that the groundwater is suitable for cropping. The groundwater quality was not evaluated with respect to its suitability for domestic water use.

No definitive links were made between the wells with water quality data and those recently surveyed and entered into the new groundwater database.

5.2 - Conduct Additional Water Quality Monitoring

This task was removed from the scope of work and replaced with Task 4.5 – Educational Program for Drought Preparedness Program. Refer to Section 1.4 for more details on the reasons for the change in the scope of work.

6 - DROUGHT PREPAREDNESS PROGRAM

The proposed Drought Preparedness Program (DPP) would provide incentives to some growers to increase surface water use in wet years to provide in-lieu groundwater recharge, and later increase groundwater pumping in dry years so their surface water supply can be delivered to growers with a less sustainable groundwater supply. The products of this task are primarily documented in the Drought Preparedness Program report, which is included in **Appendix K**. Following are discussions on the subtasks found in the scope of work.

6.1 - Meetings with Advisory Committee

Four meetings were held with the Groundwater Advisory Committee (GAC), primarily to discuss the proposed Drought Preparedness Program (DPP). Refer to Section 3.2 for more information on the membership of the GAC. The meetings were held in October 2004, September 2005, November 2005, and December 2005. Minutes were not recorded at the first GAC meeting in October 2004 since its purpose was only for project orientation and no substantial comments were provided by GAC members. Minutes were recorded at the three other meetings and can be found in **Appendix C**. The GAC members provided important input on the development of the DPP, particularly regarding grower incentives and grower education.

6.2 - Evaluation of Surface Water Supply, Demand and Groundwater Costs

The issues of surface water supply, demands, and groundwater costs are discussed in the Drought Preparedness Program Report (**Appendix K**), particularly in Sections 3 – Surface and Groundwater Use and Section 5 - Project Benefits and Impacts. In summary, a simulation was performed and estimated that OCID could bank 45,000 acre-feet over a 30-year period.

6.3 - Review of Existing Facilities

Initially, it was proposed that growers could pump groundwater into the OCID distribution system to serve areas with an inadequate water supply in dry years. However, this alternative presented several challenges and concerns. Firstly, many of the growers would need new conveyance and metering facilities to deliver water into the OCID distribution system. Also, water quality concerns from other growers may reduce the popularity of this alternative. Therefore, it was concluded that growers would contribute instead by pumping additional groundwater and using it all on their *own* land, and thus avoiding the aforementioned problems. As a result, no new facilities would be needed to deliver water to the OCID distribution system. In addition, no new District facilities would be needed for the program.

Nevertheless, limitations in grower pumping capacity can limit how much water grower's should exchange. For example, if a grower banks groundwater and agrees to relinquish all of their surface water rights in dry years, then the grower's groundwater pumping capacity must be able to meet their entire irrigation demand. It was not considered practical to evaluate the well systems of all the farmers. Instead, a worksheet was

prepared to give them a tool for evaluating their own system. The worksheet provided guidance in estimating a grower's groundwater pumping capacity, groundwater pumping energy costs, and the financial incentives needed for them to benefit from the program. The worksheet was explained at the educational outreach meetings (see Section 6.5) and can be found in **Appendix L**.

6.4 - Define the Drought Preparedness Plan

A complete description of the proposed DPP is provided in the Drought Preparedness Report in **Appendix K**. The report discusses all aspects of the proposed program including:

1. Alternatives for drought protection in OCID
2. Description of surface and groundwater uses in OCID
3. Requirements for grower participation in the DPP
4. Incentives for growers participating in the DPP (including adjustments to OCID water rates)
5. Triggers for implementing the DPP
6. Monitoring requirements
7. Public participation in developing the DPP
8. Proposed pilot program (including proposed area for pilot program)
9. Economic analysis of DPP
10. Discussion on other benefits of the DPP
11. Potential impacts and environmental concerns
12. Recommendations for future studies

The report does not include a review of needed facilities for the reasons described in Section 6.3.

In April 2006, OCID conducted several educational sessions to solicit input and gauge interest from the growers. The response from most growers was favorable and OCID will probably proceed with the DPP. A recommended implementation schedule follows (note that the tasks listed below are not part of the scope of work for this study):

- Submit CEQA Initial Study (August 2006)
- OCID Board of Directors vote on resolution to adopt DPP (Sept 2006)
- Prepare and sign formal agreements with growers (Oct 2006 – Dec 2006)
- Begin implementing DPP (Jan 2007)

It is anticipated that OCID will submit a CEQA Initial Study on the proposed drought preparedness plan (see Section 6). However, this was not part of the scope of this study, and it is not anticipated to be done until OCID has held further negotiations with the growers and the OCID Board of Directors have approved the final Drought Preparedness Program.

6.5 - Educational Program

An educational outreach program was conducted to inform local growers on the mechanics and benefits of the DPP, solicit their comments, and gain a better understanding of their interest in the program.

Educational materials were prepared to facilitate the outreach program and can be found in **Appendix L**. These include:

- Informational Brochure
- Powerpoint Presentation
- Pilot Program Example
- List of Frequently Asked Questions
- Participant Worksheet

Three meetings were held with landowners from April 4-6, 2006. The three meetings were held with large, medium, and small landowners, respectively. The minutes and sign in sheets from all three meetings are provided in **Appendix C**. Generally, response to the program was positive, although a few attendees showed little interest during the meetings. The growers offered some useful comments and ideas and the DPP was modified accordingly.

The growers were contacted by phone approximately two weeks after the meetings to gauge their overall understanding of the program and possible interest in participating. A few growers expressed interest and a few were not interested, while a large number of growers were still undecided. OCID may perform more public outreach in the near future to encourage participation and, hopefully, implement a pilot program before the 2007 irrigation season begins.

7 - PROJECT REPORTING

7.1 - Progress Reports

The following progress reports were submitted to DWR:

Progress Report No. 1: September 2004 to January 2005
Progress Report No. 2: February 2005 to April 2005
Progress Report No. 3: May 2005 to July 2005
Progress Report No. 4: August 2005 to October 2005
Progress Report No. 5: November 2005 to January 2006
Progress Report No. 6: February 2006 to April 2006
Progress Report No. 7: May 2006 to July 2006

The progress reports followed the format outlined in Exhibit E – Quarterly Report Format in the Grant Agreement between OCID and DWR. Each progress report was accompanied by a payment request. The progress reports were previously submitted to DWR and therefore are not included as part of this report.

7.2 - Project Report

This project report was prepared in compliance with the following:

- Scope of Work (see Appendix A)
- *Final Report Information Guidelines* provided by DWR
- *Exhibit F - Data Submittal Requirements* found in the contract between OCID and DWR

8 - REFERENCES

1. California Department of Water Resources, *Bulletin No. 74-81 – Water Well Standards: State of California*, 1981.

2. California Department of Water Resources, *California's Ground Water, Bulletin 118*, September 1975.

3. California Department of Water Resources, *California's Ground Water, Bulletin 118 (Update 2003),* 2003.

4. California Department of Water Resources, *Ground Water Basins in California, Bulletin 118-80*, January 1980.

5. California Regional Water Quality Control Board - Central Valley Region, *Order No. R5-2004-0008, Waste Discharge Requirements for City of Orange Cove Wastewater Treatment Facility, Fresno County*, 2004.

6. California State Senate, *Senate Bill No. 1938, Chapter 603, Groundwater Management: State Funding*, 2002.

7. County of Fresno, *Fresno County Groundwater Management Plan*, March 11, 1997.

8. Friant Unit Contractors, *Water Needs Analysis*, March 7, 1988.

9. Orange Cove Irrigation District, Hills Valley Irrigation District and Tri-Valley Water District, *Orange Cove Groundwater Management Plan*, October 27, 1997.

10. Orange Cove Irrigation District, *Water Conservation Plan*, January 1998.

11. Provost and Pritchard Engineering Group, Inc., *AB303 Application for the Groundwater Monitoring and Drought Preparedness Program for Orange Cove Irrigation District*, January 2004.

12. Thomson West, *California Water Code, 2003 Desktop Edition, Chapter 3 – Groundwater Management Plans*, 2003.

13. United States Bureau of Reclamation, *Supplemental Irrigation Suitability Land Classification Report, Central Valley Project Friant Division, Hills Valley – Tri-Valley Area*, March 1982.

14. United States Department of the Interior Bureau of Reclamation Region II, *Geologic Study of the Orange Cove Irrigation District*, August 1947.

15. United States Department of the Interior Bureau of Reclamation Region II, *Water Supply Study of the Orange Cove Irrigation District, Fresno and Tulare Counties, California*, September 1947.

16. United States Department of the Interior Bureau of Reclamation Region II, *Land Use Study of the Orange Cove Irrigation District, Fresno and Tulare Counties, California*, August 1947.

17. United States Geological Survey, *Water Quality Data, San Joaquin Valley, California, April 1987 to September 1988, Open File Report 91-74*, 1991.

ADVANCED PUMPING EFFICIENCY PROGRAM

COME FIND OUT ABOUT PUMP EFFICIENCY AND INCENTIVES TO REPLACE OR RETROFIT INEFFICIENT PUMPS AT THIS FREE SEMINAR!

LEARN HOW TO EVALUATE ENERGY EFFICIENCY FOR AGRICULTURAL PUMPS

Sponsored by: PG&E Pacific Gas and Electric Company®

Put More Power Through the Pump!

WHEN: Wednesday, December 15, 2010

WHERE: Center for Irrigation Technology
Fresno State *(SE Corner of Barstow & Chestnut Avenues, Next to Fresno State Farm Market)*
Fresno, California

TIME: 9:00 am - Noon
Agricultural Pumping Efficiency Program

- Eligibility
- 3 Big Ideas to Save Energy When Moving Water
- Pump Efficiency Demonstration including Variable Speed Drives

RSVP: Space is Limited Please RSVP to (800) 845-6038 or Online at www.pumpefficiency.org

FEATURING:

- APEP/PG&E subsidized pump tests (25 + HP pumps), APEP/PG&E incentives for pump retrofit/replace (all sizes)
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- Eligible pumps: agricultural pumps, municipal pumps (no primary or secondary sewage treatment pumps), turf pumps (golf courses, parks, schools)

California consumers are not obligated to purchase any full fee service or other service not funded by this program. This program is funded by California utility ratepayers under the auspices of the California Public Utilities Commission. The Agricultural Pumping Efficiency Program has been extended through 2011 as a PG&E Customer Energy Efficiency offering, funded through the Public Purpose Programs Change under the auspices of the California Public Utilities Commission. Please call APEP at 1.800.845.6038 or log on to www.pumpefficiency.org for current information regarding eligibility, educational seminars, pump tests and incentives for pump retrofits. Eligibility now extends to agricultural, large turf and municipal (including tertiary-treated water) water pumping customers with PG&E electric or natural gas accounts. Residential, commercial, industrial process, primary sewage and secondary sewage pumps are ineligible.

FRIANT WATER AUTHORITY

FRIANT WATERLINE

October 2010

Irrigation Tech-Line

Farm Water Efficiency

Evaluating Irrigation Systems Pays Off For Growers

Friant Water Authority / J. Randall McFarland

North West Kern Resources Conservation District General Manager Brian Hockett checks pressure in a manifold line as he evaluates micro-irrigation system uniformity.

Eastern San Joaquin Valley agriculture has spent the past two decades eagerly embracing techniques and tools for farm irrigation efficiency but that is only part of the challenge.

Keeping systems operating at peak effectiveness is an ongoing task that is not only a sound objective. It's a necessity.

FRIANT SERVICE

To help keep micro-irrigation systems and components in tip-top condition by detecting problems, Friant Division growers and others who farm in parts of the south valley have available a low-cost public service.

Brian W. Hockett, North West Kern Resource Conservation District Manager, for 23 years has been taking a mobile laboratory into valley fields to analyze efficiency of all types of irrigation systems, including flood and border strip, furrow and different types of sprinklers. He also undertakes water audits.

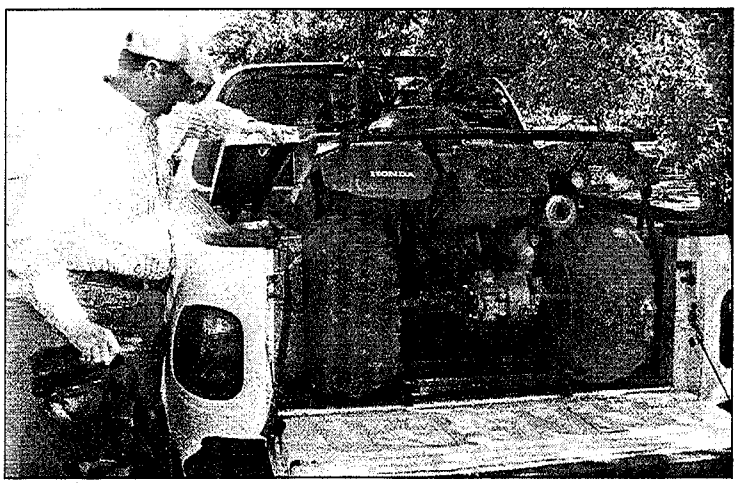
"Predominately, I'm looking at drip and micro-sprinklers," Hockett said. "More things go wrong in this type of system and there are more opportunities for correction." Most of those systems serve the valley's constantly expanding acreages of permanent crops.

His objective and that of the mobile lab operation "is to help growers be as efficient as possible."

Resource Conservation Districts and their programs are services of the U.S. Department of Agriculture.

To Schedule A Mobile Lab Visit On Your Farm

Making arrangements for an in-the-field analysis of farm irrigation system efficiency is easy. Call Brian Hockett, North West Kern Resource Conservation District Manager, at (661) 336-0967, extension 138. His e-mail address is *brian.hockett@ca.nacdnet.net.*



The "mobile lab" upon which Brian Hockett and the growers he serves with irrigation system evaluation includes an off-road vehicle and a variety of measuring and related equipment housed in a district pickup truck.

Friant Water Authority

EVALUATIONS

For a $100 fee charged by the district, Hockett examines and tests all parts of a grower's system, and prepares a thorough report for the farmer or farm manager – neatly bound – containing maps and data on water pressures along with problem areas and recommendations.

Under an agreement with the U.S. Bureau of Reclamation, North West Kern and Hockett provide evaluation services throughout the Central Valley Project's Friant Division.

The mobile lab made 118 on-farm

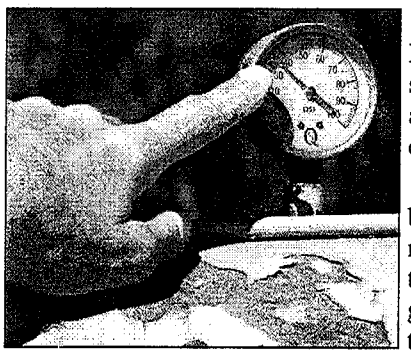
Please see **Mobile Lab**, back page

How Each System Is Evaluated

When Brian Hockett arrives in the field with his North West Kern Resource Conservation District mobile laboratory equipment to evaluate the farm's micro-irrigation system efficiency, he follows a fairly standard procedure that leads to one goal. "We're just out there doing what we can to help growers be more efficient," said Hockett.

AT THE START

He begins at the farm's on-site water source by examining the pumping plant's filter system and, if one is in use, the reservoir that is used to store water. Reservoirs also provide an opportunity for various impurities to settle to the bottom, acting as another guard against fouling the distribution system.



Friant Water Authority

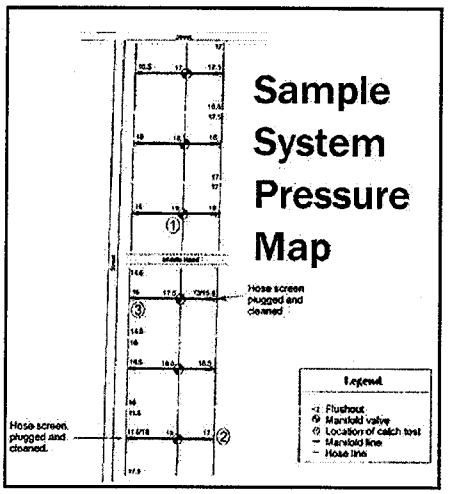
Filter system pressures are a crucial part of a micro-system evaluation.

Around the filters, Hockett checks the pressure gauges before and after the filtration process.

"This is where I start because if the filters are not performing properly, the grower is not going to get enough pressure to the field," he said.

Looking over sand media filters at an almond orchard east of Wasco in Kern County, Hockett determines the pressure of water that has passed through filtration is about two pounds lower than the head-end reading. He also watches the filters as they flush to spot any problems. Hockett determines that these filters are clean and functioning as intended.

Hockett maps the system and then begins testing, looking over each manifold and taking pressure readings at distances that increase from the filters. He takes into consideration whether the system is compensating or non-compensating for pressure fluctuations.



North West Kern Resource Conservation District

Uniformity of pressure is vital to achieve desired flow rates. "I'm checking to see that all of these manifolds are at a good pressure," Hockett said. If pressure drops below 8 pounds or less per square inch in a pressure compensating system, emitters are going to put out less water and the tree or vine will suffer.

He also tests pressure at many locations in hose lines and measures the amount of water actually being emitted throughout the field. Water is caught at locations with a high, a medium, and a low pressure to correlate changes in the flow rate with the changes in pressure. In the office, the data is plotted on a spread sheet that a computerized program will later help analyze "what we really have." A formula is applied to help determine if water distribution uniformity has been achieved.

If there are problems, a follow-up evaluation is scheduled to determine if all the necessary corrections have been made.

Mobile Lab: Irrigation Tested

Continued from front page

visits last year, with 2-5 per week made during the summer, all on a grower-request basis. Each field and system evaluation requires about 2½ - 5 hours in the field, with another two hours in the office.

"These tests ideally should be made on each system about once every five years," said Hockett.

VITAL NEED

Growers installing micro-irrigation systems or operating existing systems quickly become aware that on-going inspection and maintenance are vital to ensure water is delivered as intended to plantings.

"As micro systems like this become more prevalent and more people are keyed into it, they know what it takes," Hockett said.

Larger farm operations – many of which have their own irrigation department staffs – are generally better equipped to evaluate system efficiency along with routine inspections and maintenance than are smaller operators.

"Small farmers are doing everything," Hockett says.

No matter the size and scope of the farm, he notes that "irrigation is just one aspect of the overall farming operation but if you don't get the right amount of water on, it could have a big impact on the whole operation, because you won't be maximizing your yields."

Friant Water Authority / J. Randall McFarland

After using a catch device, Brian Hockett measures the water to help determine flow rates.

Orange Cove Irrigation District

2011 - WATER ORDER SHEET

Fax: 626-4463

	Name	System	Outlet	Date	Time	Flow	On/Off	Duration	Remarks	DATE ENTERED	TIME ENTERED

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
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FAX: 951-652-3078
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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

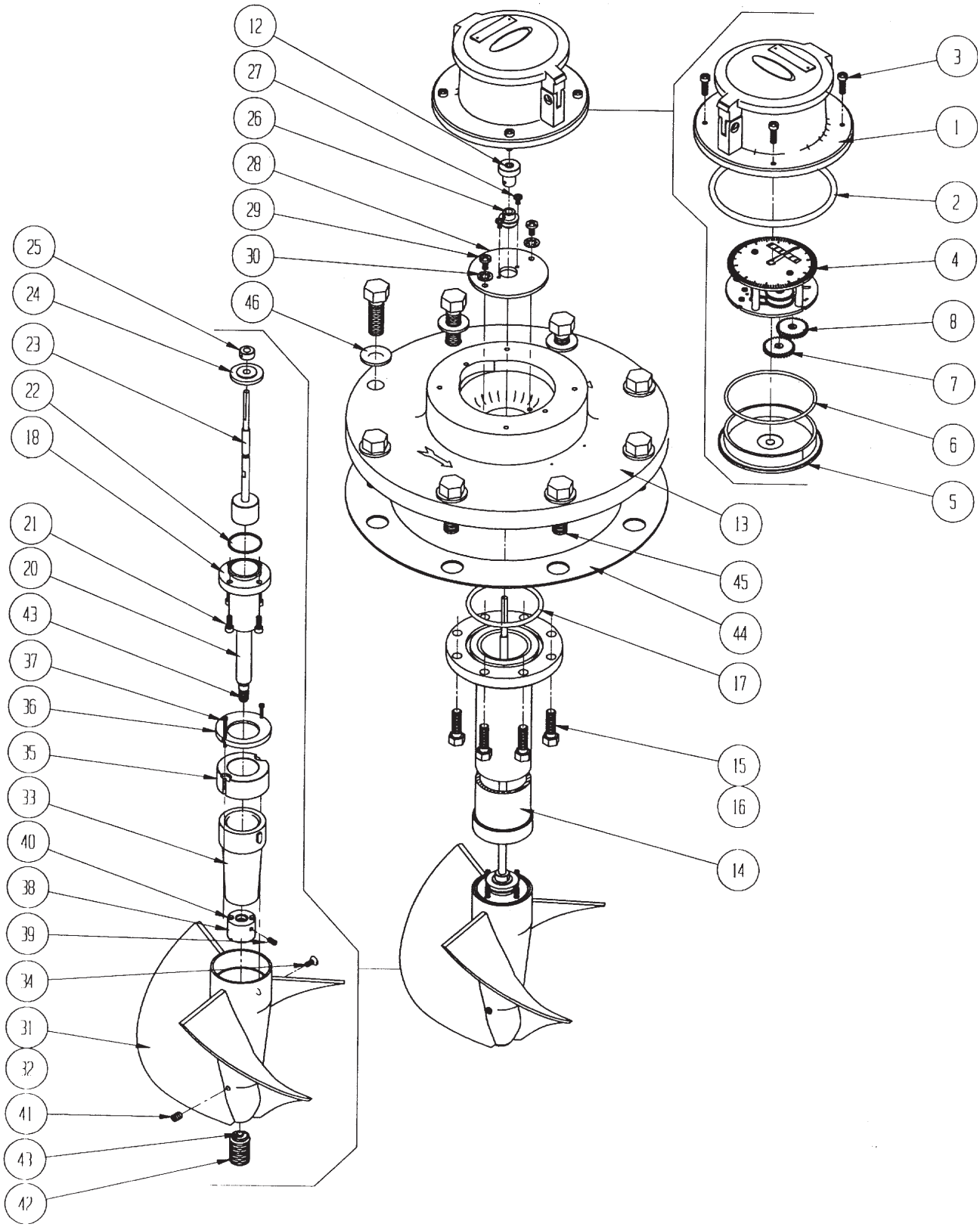
4"-20" VERTICAL UPFLOW METERS

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

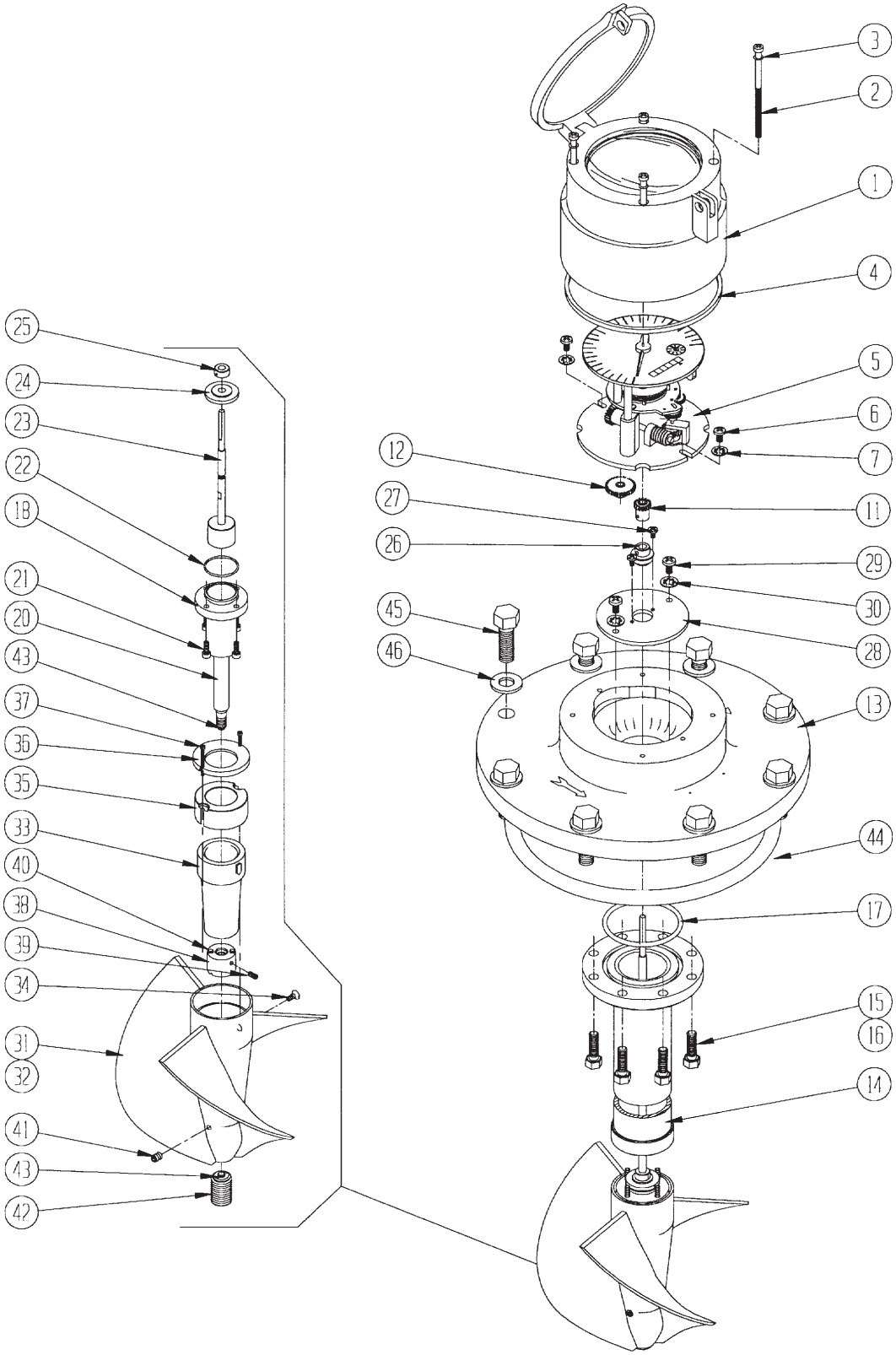
4”-20” VERTICAL UPFLOW METERS

MODELS VF28, VF30

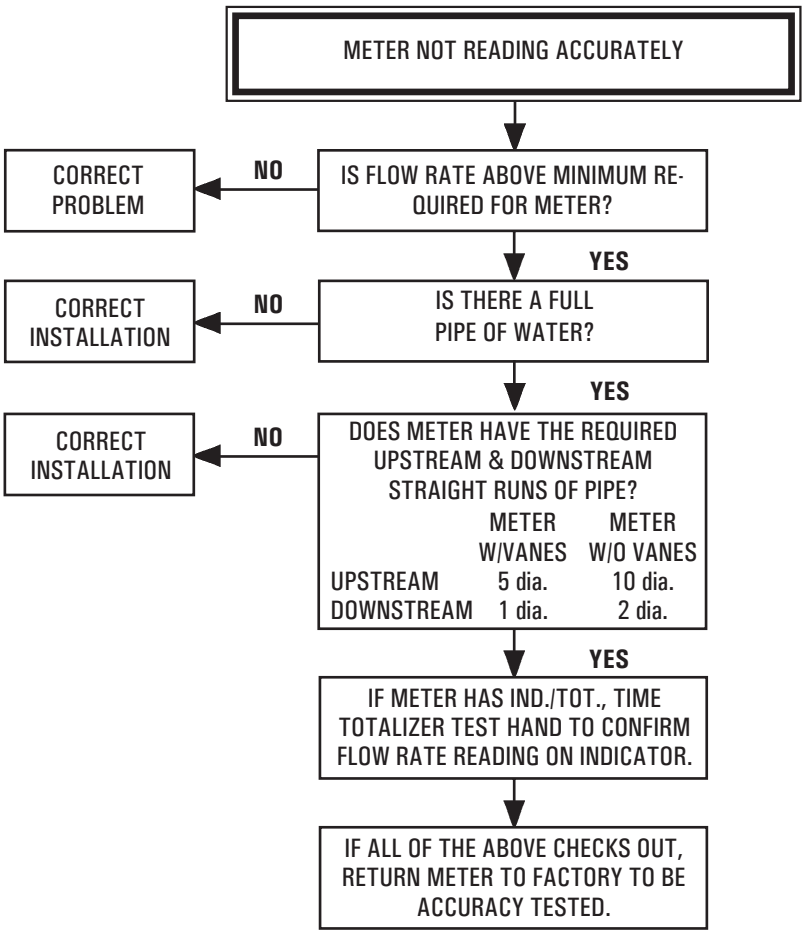
*MODEL CN06-2 INDICATOR-TOTALIZER ASSEMBLY

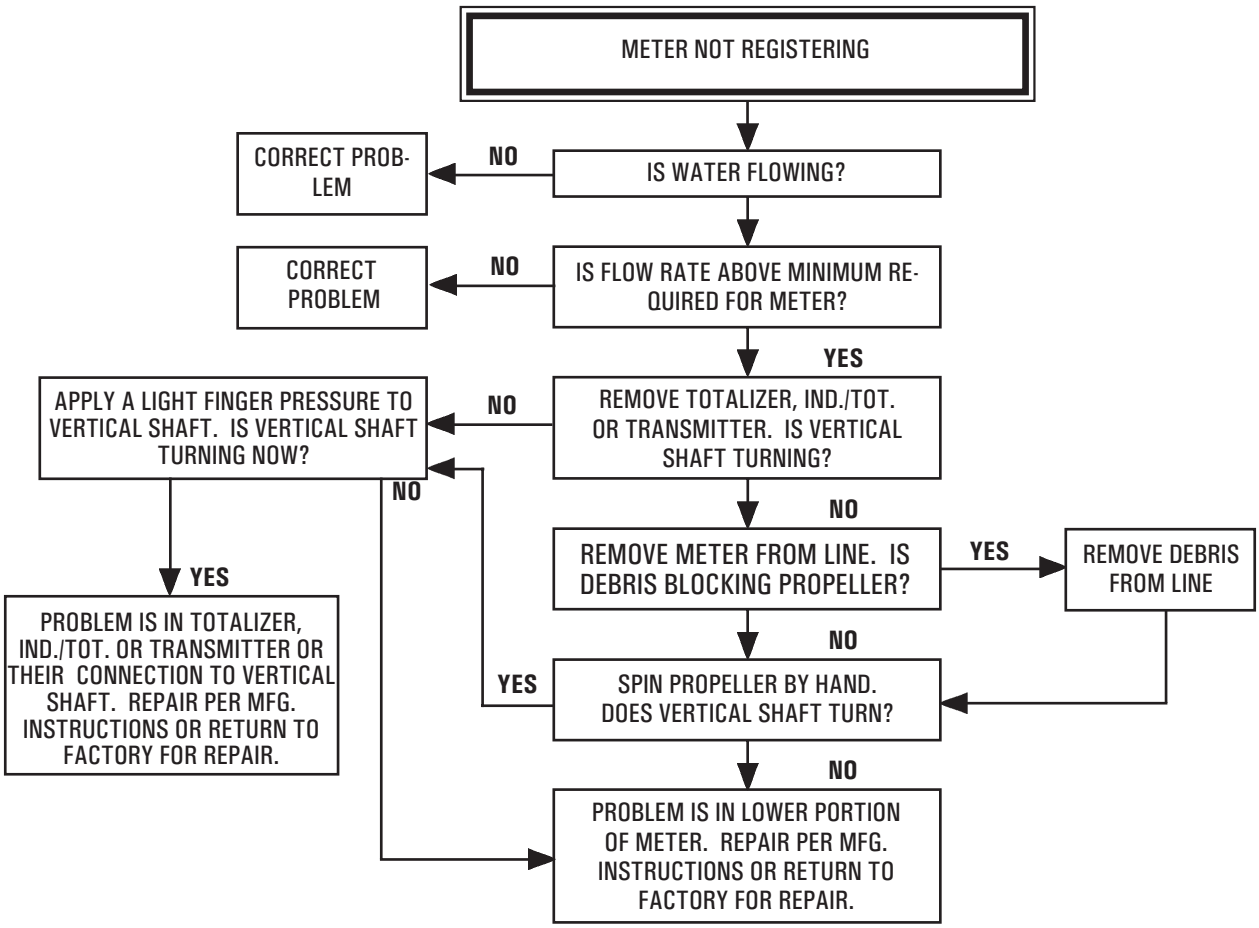
*CERAMIC BEARING CARTRIDGE PROPELLER

*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.

FRIANT-KERN CANAL WATER ANALYSES

Station: Friant Kern Canal Mile Point 34.92 Section: 18 Township: 14 South Range: 24 East M.D.B.M.

Location: End of Concrete Lining

Sample Date	Temp. ˚F	Time (Military)	B mg/L	Ca mg/L	Mg mg/L	Na mg/L	K mg/L	NO_3 mg/L	CO_3 mg/L	HCO_3 mg/L	C1 mg/L	SO_4 mg/L	TDS mg/L	pH	%Na	SAR	EC (mS/cm)
04/03/57		10:45											38				
04/23/57		10:00		4.2	0.9	3.0	2.0			12.0	5.7	9.0	48	6.10	28	0.35	
03/24/58	52	15:50		4.4	0.7	3.2				13.0	5.0	10.0	62	6.50	33	0.37	
03/20/59	50	9:25		3.8	1.1	2.8				13.0	5.7	8.6	52	5.50	30	0.33	
03/25/60	59	14:45		4.4	1.2	3.5		0.6		15.0	3.6	4.3	40	6.80	32	0.38	
05/08/63	50	9:15		4.8		2.8	1.2			16.0	2.8	1.4	48	7.40	31	0.35	
03/18/64	51	13:30		3.8	0.6	2.1	0.8	0.6		19.0	4.3	1.0	52	7.00	26	0.26	
03/10/65	48	14:25		4.2	0.6	3.9	0.8	0.6		16.0	5.0	8.6	54	7.30	38	0.47	
04/15/66	54	9:25		4.4	0.5	2.3	0.4	0.6		9.2	3.6	1.9	32	6.00	27	0.28	
03/15/67	47	10:45		4.0	1.0	3.5	1.2			18.0	6.4	1.4	42	6.80	33	0.41	
04/10/68				3.8	0.9	4.6	0.8			24.0	1.4	2.8	40	7.40	41	0.55	
05/27/69	56	9:15		3.4	1.0	1.4	0.8			14.0	1.4	2.9	28	6.50	18	0.17	
03/10/70	50	9:10		5.0	0.5	4.8	1.2			26.0	5.0	2.4	44	7.40	39	0.55	
03/12/71	48			4.0	1.0	4.5	0.6			20.0	1.0	3.0	23	7.00	40	0.52	
03/22/72	49			4.0	1.0	3.0				12.0	2.0	8.0	30	6.80	32	0.35	
03/09/73	47	10:15		4.1	0.4	3.6	0.9			17.0	2.8	2.1	37	6.50	38	0.45	
03/18/74	51	13:25		2.8	0.7	2.8	0.4			6.7	3.5	4.0	21	7.00	37	0.39	
03/17/75	51	13:40		3.2	1.2	4.6	0.0	0.0	0.0	22.0	0.1	4.8	36	7.90	44	0.56	
03/29/76	51	10:20		3.2	0.5	4.6	0.5			11.0	5.7	4.0	30	7.20	48	0.63	
07/15/77	69	10:30		5.2	1.5	6.9	0.9	0.0	0.0	20.7	6.7	8.2	50	6.90	42	0.69	
05/15/78	62	13:20		3.2	1.5	6.0	0.0	0.0	0.0	19.5	8.5	3.4	42	7.10	48	0.69	
03/19/79	46	15:30		4.0	0.9	3.2	0.80	0.5	0.0	16.5	4.2	2.4	33	6.70	32	0.38	
03/18/80		13:30		3.2	0.5	4.7	1.30	1.6	0.0	12.3	3.9	0.8	28	7.10	47	0.64	
04/20/81		10:00		4.0	1.0	4.4	1.00	1.0	0.0	15.2	6.7	0.7	34	7.30	38	0.51	
03/13/82	47	11:00		3.6	1.1	3.8	1.20	0.4	0.0	17.7	4.8	0.2	33	7.10	35	0.45	
04/11/83	50	9:00		4.0	1.2	3.7	1.20	1.1	0.0	15.9	5.7	2.4	35	7.30	33	0.42	
03/05/84	50	15:00		3.8	1.1	2.9	0.80	0.9	0.0	14.6	8.5	3.6	45	7.00	30	0.34	
03/07/85	48	9:40		5.2	0.2	3.9	0.70	1.1	0.0	22.9	3.5	0.2	38	6.90	37	0.46	
03/12/86	51	10:35		5.0	1.0	5.0	1.90	1.9	0.0	23.0	4.0	4.0	52	7.30	36	0.53	
02/24/87	50	12:00		5.0	1.0	4.0	0.00	0.1	0.0	20.0	4.0	0.4	47	7.70	34	0.43	
03/15/88	51	10:30		5.0	1.0	7.0	1.00	0.5	0.0	18.0	5.0	11.0	65	7.20	46	0.75	
03/16/89	52	14:00		3.4	0.6	3.0	0.00	0.0	0.0	5.0	4.0	6.0	40	7.30	37	0.39	
03/15/90	64	12:30		4.0	0.7	2.3	0.60	0.4	0.1	16.8	7.7	1.6	34	7.00	27	0.28	
06/17/91	60	10:00		3.5	0.4	5.4	1.00	0.4	0.0	6.5	7.9	5.2	46	7.00	50	0.73	
04/14/92	53	10:50		14.4	1.1	2.0	2.00	0.6	0.0	19.2	11.9	6.4	57	6.00	9	0.14	
04/02/93	50	14:00		6.6	0.7	3.1	0.00	0.9	0.0	26.2	14.9	2.4	74	6.60	26	0.31	
06/24/97	56	13:40	0.15	2.0	0.4	2.3	0.37	0.3	0.0	3.0	0.7	0.5	33	6.70	41	0.39	
09/25/98		11:40	0.11	1.8	0.4	1.8	0.00	0.3	0.0	3.0	0.5	0.4	10	7.40	40	0.32	
05/05/99		9:05	0.15	3.9	0.8	4.2	0.85	0.3	0.0	0.2	1.9	0.7	44	6.60	40	0.51	
08/10/00	62		0.01	1.8	0.3	1.3	0.08	0.0	0.0	12.8	0.0	0.3	18	7.14	32	0.23	
07/17/01			0.07	1.6	0.1	2.3	0.41	0.1	0.0	14.0	1.4	0.3	26	7.22	49	0.46	
09/25/02		8:30	0.1	2.0	1.2	2.3	2.80	0.1	0.0	12.2	3.5	4.8	33	7.50	27	0.32	
10/22/03			0.1	2.0	1.2	2.3	3.90	0.1	0.0	12.2	3.5	4.8	28	7.20	25	0.40	0.033
08/26/04			0.1	2.0	1.2	4.6		0.1	0.0	12.2	3.5	4.8	19	7.70	50	0.60	0.030
07/28/05			0.01	2.0	1.2	0.9	0.50	0.3	0.0	6.1	3.5	14.4	12	7.20	16	0.10	0.02
09/20/06			0.01	2.0	1.2	0.9	0.70	0.1	0.0	6.1	3.5	14.4	13	7.40	15	0.20	0.02
07/31/07			0.01	2.4	0.4	2.0	0.60	0.1	0.0	13.0	1.6	0.3	18	7.20	34	0.33	0.03
08/22/08			0.01	2.3	0.4	2.0	N/A	0.1	0.0	11.0	1.7	0.8	17	6.50	#VALUE!	0.30	0.02
07/16/09			0.02	2.2	0.4	3.0	0.70	0.7	0.0	6.0	2.5	0.6	13	5.40	45	0.40	0.03
No. of Tests:	33		5	40	39	40	36	27	23	40	40	40	41	40	40	40	
Average:	53		0.10	4.14	0.80	3.60	0.77	0.55	0.00	15.17	4.54	3.53	40.02	6.94	35.62	0.43	
Milli-Equivalents:			3.6	20.0	12.2	23.0	39.1	62.0	30.0	61.0	35.5	48.0					

FRIANT WATER AUTHORITY

May 2011

Volume 23, No. 207

FRIANT Waterline

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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FRIANT
Waterline

May 2011
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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.

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Ivanhoe Irrigation District
Kaweah Delta Water Conservation District
Kern-Tulare Water District
Lindmore Irrigation District
Lindsay-Strathmore Irrigation District
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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

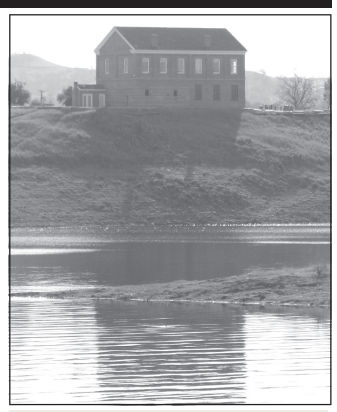
Friant Park Escapes Budget Ax

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.

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.

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.

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.

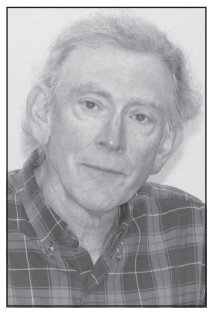
An administration official announced in May that the Bay Delta Conservation Plan (BDCP) will analyze alternative proposals including a relatively small diversion concept proposed originally by some in the environmental community.

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	58.31	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*
**—Temporary capacity pending Crane Valley Dam seismic retrofit*			
Upstream Total	**427,077**	**429,491**	***611,400***
OVERALL	**703,634**	**622,612**	***1,131,900***

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**
**—Capacity for emergency flood control, 82,314 acre-feet.*		
Kern River / *Isabella*	332,326	*360,000**
**—Capacity for emergency flood control, 570,000 acre-feet.*		
San Luis Reservoir / *CVP*	899,398	*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.

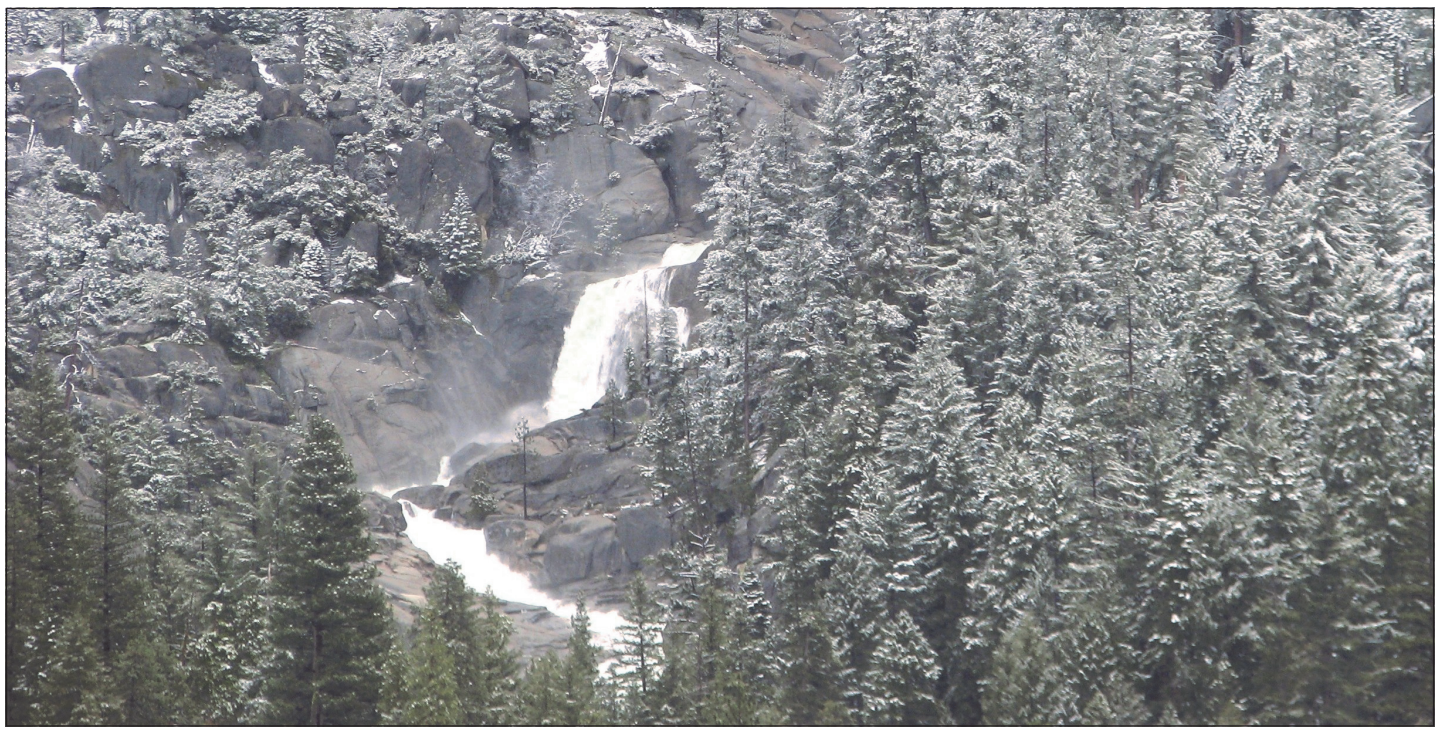
WON'T 'PRE-COMMIT'

"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."

Year of Data	2009	*Water year data

Table 1

Surface Water Supply

2009 Month	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)
Method				
January	0	0	0	0
February	282	0	0	0
March	202	0	0	0
April	1689	3	0	0
May	10008	4	0	0
June	3887	5	0	0
July	3837	7	0	0
August	4741	6	0	0
September	4281	7	0	0
October	4427	1	0	0
November	8301	0	0	0
December	581	1	0	0
TOTAL	42,236	34	0	0

Table 2

Ground Water Supply

2009 Month	District Groundwater (acre-feet)	Private Groundwater *(acre-feet)
Method		
January	0	0
February	0	70
March	0	435
April	0	3,645
May	0	6,755
June	0	8,380
July	0	11,505
August	0	10,220
September	0	9,230
October	0	3,090
November	0	2,000
December	0	1,250
TOTAL	0	56,580

*normally estimated

Table 3

Total Water Supply

2009 Month	Surface Water Total (acre-feet)	District Groundwater (acre-feet)	Recycled M&I (acre-feet)	Total District Water Supply (acre-feet)
Method				
January	0	0	0	0
February	282	0	0	282
March	202	0	0	202
April	1,692	0	0	1,692
May	10,012	0	0	10,012
June	3,892	0	0	3,892
July	5,344	0	0	5,344
August	4,747	0	0	4,747
September	4,288	0	0	4,288
October	4,428	0	0	4,428
November	8,301	0	0	8,301
December	582	0	0	582
TOTAL	43,770	0	0	43,770

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

Table 4

Distribution System

2009 Canal, Pipeline, Lateral, Reservoir	Length (feet)	Width (feet)	Surface Area (square feet)	Precipitation (acre-feet)
Pipe Line	612,480	0	0	0
Reservoir 3A	315	295	92,925	3
Reservoir 8	475	265	125,875	4
Reservoir 11A	265	135	35,775	1
Reservoir 13	325	325	105,625	3
			0	0
			0	0
			0	0
			0	0
			0	0
			0	0
TOTAL			360,200	10

Table 5

Crop Water Needs

2009 Crop Name	Area (crop acres)	Crop ET (AF/Ac)	Leaching Requirement (AF/Ac)	Cultural Practices (AF/Ac)
Oranges / Tang.	20,382	3.40	0.34	0.10
Grapes, table	1,046	2.50	0.25	0.00
Olives	876	3.43	0.34	0.00
Lemons / Limes	669	3.40	0.34	0.00
Plums	515	3.47	0.35	0.00
Prunes	515	3.47	0.35	0.00
Irrigated pasture	511	4.10	0.41	0.00
Almonds	342	3.55	0.35	0.00
Misc Crops	402	2.31	0.23	0.00
Pomegranates	239	3.90	0.39	0.00
Other hay	197	4.04	0.40	0.00
Apples	131	3.47	0.35	0.00
Peaches	127	3.43	0.34	0.00
Alfalfa hay	118	4.04	0.40	0.00
Oats	110	1.71	0.17	0.00
Apricots	101	3.43	0.34	0.00
Other (mixed veg)	100	2.33	0.23	0.00
Cherries	90	3.40	0.34	0.00
Persimmons	63	2.90	0.29	0.00
Grapes, raisin	54	2.50	0.25	0.00
Kiwis	45	3.36	0.34	0.00
Cotton: Lint (Upland)	0	2.86	0.29	0.00
Pecans	40	3.55	0.35	0.00
Fallow	884			
Crop Acres	27,557			

Total Irrig. Acres 26,666 (If this number is larger than your known tot

Table 6

2009 District Water Inventory

Water Supply	Table 3	
Riparian ET	(Distribution and Drain)	minus
Groundwater recharge	(intentional - ponds, injection)	minus
Seepage	Table 4	minus
Evaporation - Precipitation	Table 4	minus
Spillage	Table 4	minus
Transfers/exchanges/trades/wheeling	(into or out of the district)	plus/minus

Non-Agri deliveries	(delivered to non-ag customers)	minus
Water Available for sale to agricultural customers		
Compare the above line with the next line to help find data gaps		
2009 Actual Agricultural Water Sales	From District Sales Records	
Private Groundwater	Table 2	plus
Crop Water Needs	Table 5	minus
Drainwater outflow	(tail and tile not recycled)	minus
Percolation from Agricultural Land	(calculated)	

Table 7

Influence on Groundwater and Saline

2009

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

Table 8

Annual Water Quantities Delivered Under Ea

Year	Federal Ag Water (acre-feet)	Federal non-Ag Water. (acre-feet)	State Water (acre-feet)	Local Water (acre-feet)
2000	36,276	0	0	0
2001	38,385	0	0	0
2002	36,761	0	0	0
2003	37,893	0	0	0
2004	39,200	0	0	0
2005	44,583	0	0	0
2006	36,407	0	0	0
2007	26,672	0	0	0
2008	37,701	0	0	0
2009	42,236	34	0	0
Total	376,114	34	0	0
Average	37,611	3	0	0

Transferred In (acre-feet)	Upslope Drain Water (acre-feet)	Total (acre-feet)
0	0	0
0	0	282
0	0	202
0	0	1,692
0	0	10,012
0	0	3,892
1,500	0	5,344
0	0	4,747
0	0	4,288
0	0	4,428
0	0	8,301
0	0	582
1,500	0	43,770

Method Definitions:

M1	Measured summati
M2	Measured summati
M3	Measured summati
C1	Calculated (more tl
C2	Calculated using in
C3	Calculated using es
E1	Estimated using me
E2	Estimated using his
E3	Estimated using ob
O1	Other (attach a note

culture.

Evaporation (acre-feet)	Spillage (acre-feet)	Seepage (acre-feet)	Total (acre-feet)
0	0	0	0
9	0	0	(7)
13	0	0	(9)
4	0	0	(3)
11	0	0	(8)
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
37	0	0	(26)

	2009 inches precip
Jan	2.90
Feb	3.30
Mar	0.90
Apr	2.80
May	0.20
Jun	0.00
Jul	0.00
Aug	0.00
Sept	0.00
Oct	2.00
Nov	0.10
Dec	3.00
TOTAL	15.20

Effective Precipitation (AF/Ac)	Appl. Crop Water Use (acre-feet)
0.50	68,076
0.50	2,358
0.50	2,870
0.50	2,169
0.50	1,711
0.50	1,710
0.50	2,048
0.50	1,165
0.50	822
0.50	905
0.50	777
0.50	434
0.50	417
0.50	465
0.50	151
0.50	332
0.50	206
0.50	292
0.50	170
0.50	122
0.50	142
0.50	0
0.50	136
	87,479

:al, it may be due to double cropping)

43,770
0
0
0
26
0
(17,489)

26,255
29,240
56,580
87,479
0
(1,659)

Sink

luence on	0
	0
	27,557
	0
	0
	0
	0
	0
	0
	0

ch Right or Contract

Transferred In (acre-feet)	**Upslope Drain Water** (acre-feet)	**Total** (acre-feet)
0	0	36,276
0	0	38,385
0	0	36,761
0	0	37,893
0	0	39,200
0	0	44,583
0	0	36,407
0	0	26,672
0	0	37,701
1,500	0	43,770
1,500	0	377,648
150	0	37,765

on from calibrated measuring devices, accurate to within +/- 6 percent.
on from calibrated measuring devices.
on from measuring devices.
nan summation) using information from calibrated devices (such as the difference between measurements upstream a
nformation from measuring devices.
stimates from pump run-times and pump efficiency.
easured information from similar conditions.
storical information.
servation.
e with descriptions of other methods used).

Precipitation Worksheet					2009 Evaporation W
ft precip	acres	AF/Year		inches evap	ft evap
0.24	0.00	0.00	**Jan**	0.85	0.07
0.28	2.13	2.70	**Feb**	1.76	0.15
0.08	2.89	3.66	**Mar**	3.3	0.28
0.23	0.82	1.04	**Apr**	4.84	0.40
0.02	2.42	3.07	**May**	6.83	0.57
0.00	0.00	0.00	**Jun**	7.8	0.65
0.00	0.00	0.00	**Jul**	8.67	0.72
0.00	0.00	0.00	**Aug**	7.69	0.64
0.00	0.00	0.00	**Sept**	5.67	0.47
0.17	0.00	0.00	**Oct**	3.54	0.30
0.01	0.00	0.00	**Nov**	1.65	0.14
0.25			**Dec**	0.73	0.06
1.27			**TOTAL**	**53.33**	**4.44**

ınd down stream of diversion).

Worksheet		Seepage		
acres	AF/YEAR	acres	AFY	AF/ac seepage
0.00	0.00	0.00	0.00	0.00
2.13	9.48	2.13	0.00	0.00
2.89	12.84	2.89	0.00	0.00
0.82	3.65	0.82	0.00	0.00
2.42	10.78	2.42	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
		8.27	0.00	0.00
		16.54	0.00	

BEFORE THE BOARD OF DIRECTORS
OF THE
ORANGE COVE IRRIGATION DISTRICT

COUNTIES OF FRESNO AND TULARE, STATE OF CALIFORNIA

Adoption of the District's Revised Water Conservation Plan in Compliance with The Central Valley Project Improvement Act.	)))))	**Resolution 2011-5**

WHEREAS, the Orange Cove Irrigation District is a political subdivision of the State of California, duly organized, existing and acting pursuant to the laws thereof; and,

WHEREAS, the Orange Cove Irrigation District has a contract with the U.S. Bureau of Reclamation for 39,200 acre feet of Class I water from the Friant Division of the Central Valley Project; and,

WHEREAS, the Reclamation Reform Act of 1982 required Federal Reclamation Water Contractors to prepare water conservation plans in accordance with the Law; and,

WHEREAS, the Orange Cove Irrigation District prepared and received approval for its water conservation plan which later became the District's business plan; and,

WHEREAS, the Orange Cove Irrigation District made a major commitment to full implementation of its plan by committing to a $18,945,000 publicly financed project to rebuild, in total, its distribution system; and,

WHEREAS, the Central Valley Project Improvement Act became law in October, 1992 and imposed new water conservation plan requirements and mandated extensive time and cost commitment on the contractor;

NOW, THEREFORE, BE IT RESOLVED that the Orange Cove Irrigation District adopts its revised water conservation plan as being in full compliance with the Central Valley Project Improvement Act; and,

BE IT FURTHER RESOLVED, that Orange Cove Irrigation District has and continues to hold as its highest priority the optimum use of the water resource which it serves to high-value cropland in a water short area; and

BE IT FURTHER RESOLVED, that the activities adopted by Orange Cove Irrigation District through implementation of its water conservation plan exceed the conservation requirements of the Central Valley Project Improvement Act; and

PASSED AND ADOPTED this **8th day of June, 2011**, by the Board of Directors of Orange Cove Irrigation District, the following directors voting thereon:

AYES: Director(s)	**Bailey, Collin III, Brown, Katayama, Miller**
NOES: Director(s) -	None
ABSENT: Director(s) -	None
ABSTAIN: Director(s) -	None

Harvey A. Bailey, OCID Board Chairman

Fergus Morrissey, OCID Board Secretary