

**APPENDIX A
RESOLUTIONS**

RESOLUTION OF ADOPTION

CLERK'S CERTIFICATE

I, Diana Stice, Deputy City Clerk of the City of Clovis, State of California, do hereby certify that the foregoing is a full, true and correct copy of Res. 11-133 duly approved and adopted by the City Council of the City of Clovis on the dates therein stated and as appears on file in my office.

IN WITNESS WHEREOF, I hereunto set my hand and affix the seal of the City of Clovis on December 13, 2011.



Diana Stice

Diana Stice, Deputy City Clerk

RESOLUTION NO. 11-133

A RESOLUTION ADOPTING THE CITY OF CLOVIS 2010 URBAN WATER MANAGEMENT PLAN

WHEREAS, the California Legislature enacted Assembly Bill 797 (Water Code Section 10610 et seq., known as the Urban Water Management Planning Act) during the 1983-84 Regular Session, and as amended subsequently, which requires all urban water suppliers providing municipal water directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre feet of water annually, to prepare and submit an Urban Water Management Plan (Plan), the primary objective of which is to plan for the conservation and efficient use of water; and

WHEREAS, the City of Clovis (City) is an urban supplier of water providing water to over 30,000 customers; and

WHEREAS, the Plan shall be periodically reviewed at least once every five years, and that the City shall make any amendments or changes to its plan which are indicated by the review; and

WHEREAS, the City has therefore, prepared and circulated for public review a draft Urban Water Management Plan, and properly noticed public hearing regarding said Plan was held by the City Council on December 5, 2011; and

WHEREAS, the City of Clovis did prepare and shall file said Plan with the California Department of Water Resources within 30 days of adoption;

NOW, THEREFORE, BE IT RESOLVED as follows:

1. The Clovis City Council does hereby adopt the 2010 Urban Water Management Plan (Plan) as presented to this Council December 5, 2011;

2. That copies of said Plan be forwarded to the State of California, Department of Water Resources, Fresno County and the California State Library for filing within 30 days of this date;

3. The Public Utilities Director is hereby authorized and directed to implement the demand management measures as set forth in the 2010 Urban Water Management Plan, which includes water shortage contingency analysis and recommendations to the City Council regarding necessary procedures, rules, and regulations to carry out effective and equitable water conservation and water recycling programs;

4. In a water shortage, the Public Utilities Director is hereby authorized to declare a Water Shortage Emergency according to the Stages of Action indicated in the Plan and implement necessary elements of the Plan;

5. The Public Utilities Director shall recommend to the City Council additional procedures, rules, and regulations to carry out effective and equitable allocation of water resources;

6. Beginning January 1, 2012, the Finance Director shall reduce the Tarpey meter retrofit discount by \$100 each January 1, until the full cost of the meter retrofit is achieved.

* * * * *

The foregoing resolution was introduced and adopted at a regular meeting of the City Council of the City of Clovis held on December 5, 2011, by the following vote, to wit:

AYES: Councilmembers Armstrong, Ashbeck, Magsig, Mayor Flores

NOES: None

ABSENT: Councilmember Whalen

ABSTAIN: None

Dated: December 5, 2011



Jose B. Flores
Mayor

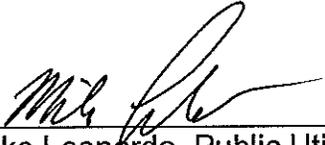
[Signature]
City Clerk

**APPENDIX B
PUBLIC NOTIFICATION**

**NOTICE OF PUBLIC HEARING
NOTIFICATION LETTERS
PROOF OF PUBLICATION**

NOTICE OF PUBLIC HEARING

NOTICE IS HEREBY GIVEN that a public hearing will be held to consider the adoption of the City of Clovis 2010 Urban Water Management Plan. A copy of the Plan is available to the public for inspection at the City of Clovis Operations and Maintenance Service Center at 155 N. Sunnyside Avenue, Clovis, CA and at the Clovis Senior Center located at 850 Fourth Street, Clovis, CA. A public hearing will be conducted by the Clovis City Council on the adoption of the Plan on December 5, 2011, in the City Council Chambers at 1033 Fifth Street, Clovis at 6:00 p.m. Public Comment is invited.

A handwritten signature in black ink, appearing to read "Mike Leonardo", written over a horizontal line.

Mike Leonardo, Public Utilities Director



City of Clovis Public Utilities Department

155 N. Sunnyside Avenue, Clovis, CA 93611 (559) 324-2600

May 23, 2011

Mr. Alan Weaver, Director
Fresno County Public Works and Planning
2220 Tulare Street, Sixth Floor
Fresno, CA 93721

Dear Mr. Weaver,

Subject: City of Clovis Urban Water Management Plan

In accordance with the California Water Code, section 10621. (b), the City of Clovis is notifying Fresno County that the City of Clovis will be reviewing its Urban Water Management Plan and considering amendments or changes to the plan. We would be pleased to receive any comments from the County regarding this update to the Plan. Once a draft is ready for review it will be sent to your attention. If you need to contact me regarding this I may be reached at 324-2607.

Sincerely,

Lisa Koehn
Assistant Public Utilities Director



City of Clovis

155 N. Sunnyside Avenue, Clovis, CA 93611 (559) 324-2600

November 14, 2011

Mr. Gary Serrato
Fresno Irrigation District
2907 S Maple Avenue
Fresno, California 93725

Dear Mr. Serrato,

Subject: City of Clovis Urban Water Management Plan – Notification Letter

The City of Clovis is in the process of reviewing and updating our Urban Water Management Plan (UWMP). As an urban water supplier, Clovis is required, pursuant to Section 10620(d)(2) of the UWMP Act, to coordinate with water management agencies, relevant public agencies, and other water suppliers on the preparation of the UWMP.

Please find enclosed a draft revision of the UWMP, for your review and comment. Comment submittals are requested no later than November 18, 2011 and should be sent to Lisa Koehn, Assistant Public Utilities Director at 155 N. Sunnyside Avenue, Clovis, CA 93611 or to lisak@ci.clovis.ca.us. Once received, the comments will be reviewed and incorporated as much as possible. The final version of the UWMP will be brought to City Council December 5, 2011 for adoption. We welcome your participation in the revision of the Clovis UWMP.

If you have any questions, I may be reached at (559) 324-2607.

Sincerely,

Lisa Koehn
Assistant Public Utilities Director



City of Clovis

155 N. Sunnyside Avenue, Clovis, CA 93611 (559) 324-2600

November 14, 2011

Mr. Laurence Kimura
Fresno Irrigation District
2907 S. Maple Avenue
Fresno, California 93725

Dear Mr. Kimura,

Subject: City of Clovis Urban Water Management Plan – Notification Letter

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Sincerely,

Lisa Koehn
Assistant Public Utilities Director



City of Clovis

155 N. Sunnyside Avenue, Clovis, CA 93611 (559) 324-2600

November 14, 2011

Mr. Brock Buche
City of Fresno
1910 E. University Avenue
Fresno, California 93703

Dear Mr. Buche,

Subject: City of Clovis Urban Water Management Plan – Notification Letter

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Sincerely,

Lisa Koehn
Assistant Public Utilities Director



City of Clovis

155 N. Sunnyside Avenue, Clovis, CA 93611 (559) 324-2600

November 14, 2011

Mr. Jerry Lakeman
Fresno Metro Flood Control Dist
5469 E Olive Avenue
Fresno, California 93727

Dear Mr. Lakeman,

Subject: City of Clovis Urban Water Management Plan – Notification Letter

The City of Clovis is in the process of reviewing and updating our Urban Water Management Plan (UWMP). As an urban water supplier, Clovis is required, pursuant to Section 10620(d)(2) of the UWMP Act, to coordinate with water management agencies, relevant public agencies, and other water suppliers on the preparation of the UWMP.

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Sincerely,

Lisa Koehn
Assistant Public Utilities Director



City of Clovis

155 N. Sunnyside Avenue, Clovis, CA 93611 (559) 324-2600

November 14, 2011

Mr. Alan Weaver
County of Fresno
2220 Tulare Avenue, 6th Floor
Fresno, California 93721

Dear Mr. Weaver,

Subject: City of Clovis Urban Water Management Plan – Notification Letter

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If you have any questions, I may be reached at (559) 324-2607.

Sincerely,

Lisa Koehn
Assistant Public Utilities Director

CITY OF CLOVIS

1033 5TH STREET

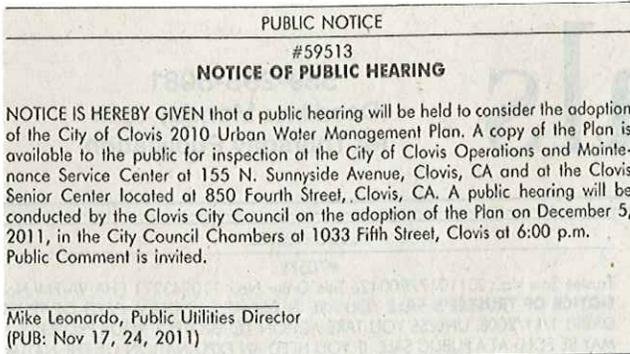
ATTN: ACCTS PAYABLE

CLOVIS CA 93612

PROOF OF PUBLICATION

COUNTY OF FRESNO
STATE OF CALIFORNIA

EXHIBIT A.



The undersigned states:

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years and not a party to or interested in the above entitled matter. I am the printer and principle clerk of the publisher of THE THE FRESNO BEE, CLOVIS ZONED EDITION, printed and published in the City of Fresno, County of Fresno, State of California weekly for which said newspaper has been adjudged a newspaper of general circulation by Superior Court of the County of Fresno, State of California, under the date of January 17, 1995, Action No. 56881; that the notice, a copy of which is hereto annexed, marked Exhibit A, has been published in each issue thereof and not in any supplement thereof on the following dates, to wit:

November 17, 24, 2011

I certify (or declare) under penalty of perjury that the foregoing is true and correct and that this declaration was executed at Fresno, California.

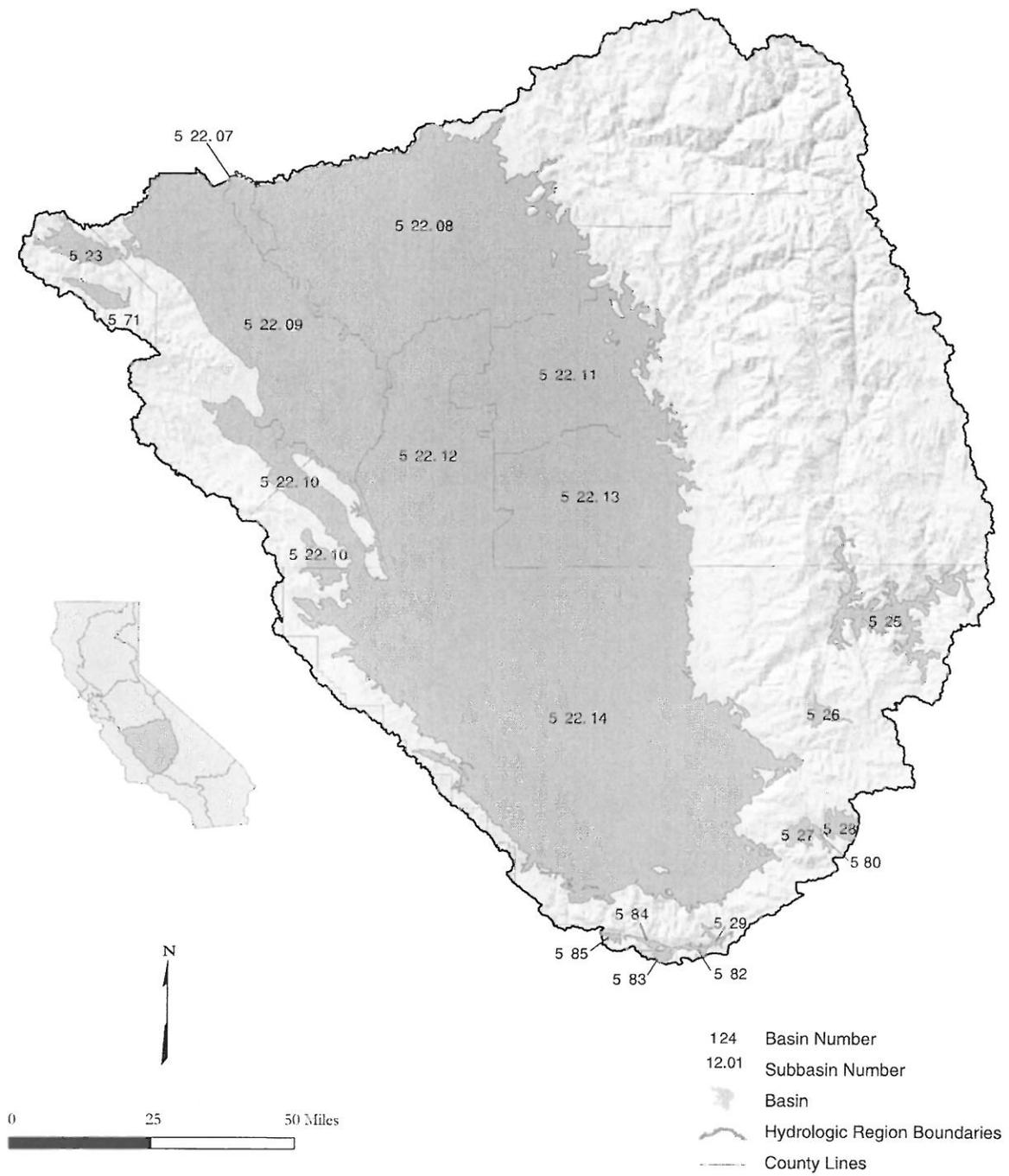
Dated _____ November 25, 2011

Antonia Dejean

APPENDIX C
GROUNDWATER BASIN INFORMATION

BULLETIN 118: TULARE LAKE HYDROLOGICAL BASIN

Tulare Lake Hydrologic Region



Basins and Subbasins of Tulare Lake Hydrologic Region

Basin/subbasin	Basin name
5-22	San Joaquin Valley
5-22.08	Kings
5-22.09	Westside
5-22.10	Pleasant Valley
5-22.11	Kaweah
5-22.12	Tulare Lake
5-22.13	Tule
5-22.14	Kern County
5-23	Panoche Valley
5-25	Kern River Valley
5-26	Walker Basin Creek Valley
5-27	Cummings Valley
5-28	Tehachapi Valley West
5-29	Castaic Lake Valley
5-71	Vallecitos Creek Valley
5-80	Brite Valley
5-82	Cuddy Canyon Valley
5-83	Cuddy Ranch Area
5-84	Cuddy Valley
5-85	Mil Potrero Area

Description of the Region

The Tulare Lake HR covers approximately 10.9 million acres (17,000 square miles) and includes all of Kings and Tulare counties and most of Fresno and Kern counties (Figure 37). The region corresponds to approximately the southern one-third of RWQCB 5. Significant geographic features include the southern half of the San Joaquin Valley, the Temblor Range to the west, the Tehachapi Mountains to the south, and the southern Sierra Nevada to the east. The region is home to more than 1.7 million people as of 1995 (DWR, 1998). Major population centers include Fresno, Bakersfield, and Visalia. The cities of Fresno and Visalia are entirely dependent on groundwater for their supply, with Fresno being the second largest city in the United States reliant solely on groundwater.

Groundwater Development

The region has 12 distinct groundwater basins and 7 subbasins of the San Joaquin Valley Groundwater Basin, which crosses north into the San Joaquin River HR. These basins underlie approximately 5.33 million acres (8,330 square miles) or 49 percent of the entire HR area.

Groundwater has historically been important to both urban and agricultural uses, accounting for 41 percent of the region's total annual supply and 35 percent of all groundwater use in the State. Groundwater use in the region represents about 10 percent of the State's overall supply for agricultural and urban uses (DWR 1998).

The aquifers are generally quite thick in the San Joaquin Valley subbasins with groundwater wells commonly exceeding 1,000 feet in depth. The maximum thickness of freshwater-bearing deposits (4,400 feet) occurs at the southern end of the San Joaquin Valley. Typical well yields in the San Joaquin Valley range from 300 gpm to 2,000 gpm with yields of 4,000 gpm possible. The smaller basins in the mountains surrounding the San Joaquin Valley have thinner aquifers and generally lower well yields averaging less than 500 gpm.

The cities of Fresno, Bakersfield, and Visalia have groundwater recharge programs to ensure that groundwater will continue to be a viable water supply in the future. Extensive groundwater recharge programs are also in place in the south valley where water districts have recharged several million acre-feet for future use and transfer through water banking programs.

The extensive use of groundwater in the San Joaquin Valley has historically caused subsidence of the land surface primarily along the west side and south end of the valley.

Groundwater Quality

In general, groundwater quality throughout the region is suitable for most urban and agricultural uses with only local impairments. The primary constituents of concern are high TDS, nitrate, arsenic, and organic compounds.

The areas of high TDS content are primarily along the west side of the San Joaquin Valley and in the trough of the valley. High TDS content of west-side water is due to recharge of stream flow originating from marine sediments in the Coast Range. High TDS content in the trough of the valley is the result of concentration of salts because of evaporation and poor drainage. In the central and west-side portions of the valley, where the Corcoran Clay confining layer exists, water quality is generally better beneath the clay than above it. Nitrates may occur naturally or as a result of disposal of human and animal waste products and fertilizer. Areas of high nitrate concentrations are known to exist near the town of Shafter and other isolated areas in the San Joaquin Valley. High levels of arsenic occur locally and appear to be associated with lakebed areas. Elevated arsenic levels have been reported in the Tulare Lake, Kern Lake and Buena Vista Lake bed areas. Organic contaminants can be broken into two categories, agricultural and industrial. Agricultural pesticides and herbicides have been detected throughout the valley, but primarily along the east side where soil permeability is higher and depth to groundwater is shallower. The most notable agricultural contaminant is DBCP, a now-banned soil fumigant and known carcinogen once used extensively on grapes. Industrial organic contaminants include TCE, DCE, and other solvents. They are found in groundwater near airports, industrial areas, and landfills.

Water Quality in Public Supply Wells

From 1994 through 2000, 1,476 public supply water wells were sampled in 14 of the 19 groundwater basins and subbasins in the Tulare Lake HR. Evaluation of analyzed samples shows that 1,049 of the wells, or 71 percent, met the state primary MCLs for drinking water. Four-hundred-twenty-seven wells, or 29 percent, exceeded one or more MCL. Figure 38 shows the percentages of each contaminant group that exceeded MCLs in the 427 wells.

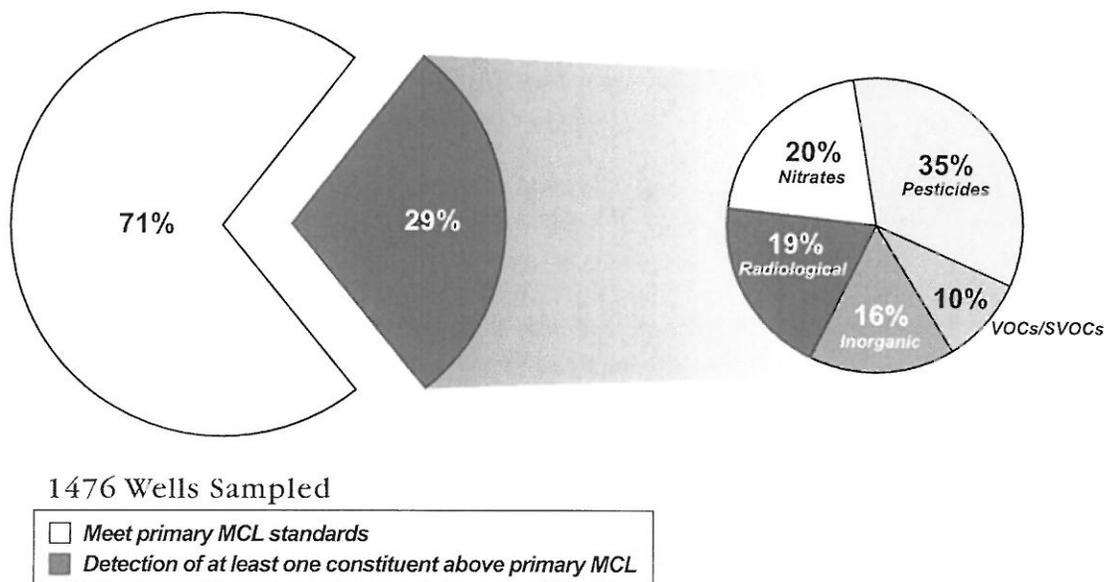


Figure 38 MCL exceedances by contaminant group in public supply wells in the Tulare Lake Hydrologic Region

Table 31 lists the three most frequently occurring contaminants in each of the six contaminant groups and shows the number of wells in the HR that exceeded the MCL for those contaminants.

Table 31 Most frequently occurring contaminants by contaminant group in the Tulare Lake Hydrologic Region

Contaminant group	Contaminant - # of wells	Contaminant - # of wells	Contaminant - # of wells
Inorganics - Primary	Fluoride – 32	Arsenic – 16	Aluminum – 13
Inorganics - Secondary	Iron – 155	Manganese – 82	TDS – 9
Radiological	Gross Alpha – 74	Uranium – 24	Radium 228 – 8
Nitrates	Nitrate(as NO ₃) – 83	Nitrate + Nitrite – 14	Nitrite(as N) – 3
Pesticides	DBCP – 130	EDB – 24	Di(2-Ethylhexyl)phthalate – 7
VOCs/SVOCs	TCE – 17	PCE – 16	Benzene – 6 MTBE – 6

DBCP = Dibromochloropropane
 EDB = Ethylenedibromide
 TCE = Trichloroethylene
 PCE = Tetrachloroethylene
 VOC = Volatile organic compound
 SVOC = Semivolatile organic compound

Changes from Bulletin 118-80

There are no newly defined basins since Bulletin 118-80. However, the subbasins of the San Joaquin Valley, which were delineated as part of the 118-80 update, are given their first numeric designation in this report (Table 32).

Table 32 Modifications since Bulletin 118-80 of groundwater basins and subbasins in Tulare Lake Hydrologic Region

Subbasin name	New number	Old number
Kings	5-22.08	5-22
Westside	5-22.09	5-22
Pleasant Valley	5-22.10	5-22
Kaweah	5-22.11	5-22
Tulare Lake	5-22.12	5-22
Tule	5-22.13	5-22
Kern County	5-22.14	5-22
Squaw Valley	deleted	5-24
Cedar Grove Area	deleted	5-72
Three Rivers Area	deleted	5-73
Springville Area	deleted	5-74
Templeton Mountain Area	deleted	5-75
Manache Meadow Area	deleted	5-76
Sacator Canyon Valley	deleted	5-77
Rockhouse Meadows Valley	deleted	5-78
Inns Valley	deleted	5-79
Bear Valley	deleted	5-81

Several basins have been deleted from the Bulletin 118-80 report. In Squaw Valley (5-24) all 118 wells are completed in hard rock. Cedar Grove Area (5-72) is a narrow river valley in Kings Canyon National Park with no wells. Three Rivers Area (5-73) has a thin alluvial terrace deposit but 128 of 130 wells are completed in hard rock. Springville Area (5-74) is this strip of alluvium adjacent to Tule River and all wells are completed in hard rock. Templeton Mountain Area (5-75), Manache Meadow Area (5-76), and Sacator Canyon Valley (5-77) are all at the crest of mountains with no wells. Rockhouse Meadows Valley (5-78) is in wilderness with no wells. Inns Valley (5-79) and Bear Valley (5-81) both have all wells completed in hard rock.

Table 33 Tulare Lake Hydrologic Region groundwater data

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Types of Monitoring			TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range
5-22	SAN JOAQUIN VALLEY									
5-22.08	KINGS	976,000	C	3,000	500-1,500	909	-	722	200-700	40-2,000
5-22.09	WESTSIDE	640,000	C	2,000	1,100	960	-	50	520	220-35,000
5-22.10	PLEASANT VALLEY	146,000	B	3,300	-	151	-	2	1,500	1,000-3,000
5-22.11	KAWEAH	446,000	B	2,500	1,000-2,000	568	-	270	189	35-580
5-22.12	TULARE LAKE	524,000	B	3,000	300-1,000	241	-	86	200-600	200-40,000
5-22.13	TULE	467,000	B	3,000	-	459	-	150	256	200-30,000
5-22.14	KERN COUNTY	1,950,000	A	4,000	1,200-1,500	2,258	249	476	400-450	150-5,000
5-23	PANOCH VALLEY	33,100	C	-	-	48	-	-	1,300	394-5530
5-25	KERN RIVER VALLEY	74,000	C	3,650	350	-	-	92	378	253-480
5-26	WALKER BASIN CREEK VALLEY	7,670	C	650	-	-	-	1	-	-
5-27	CUMMINGS VALLEY	10,000	A	150	56	51	-	15	344	-
5-28	TEHACHAPI VALLEY WEST	14,800	A	1,500	454	64	-	19	315	280-365
5-29	CASTAC LAKE VALLEY	3,600	C	400	375	-	-	3	583	570-605
5-71	VALLECITOS CREEK VALLEY	15,100	C	-	-	-	-	0	-	-
5-80	BRITE VALLEY	3,170	A	500	50	-	-	-	-	-
5-82	CUDDY CANYON VALLEY	3,300	C	500	400	-	-	3	693	695
5-83	CUDDY RANCH AREA	4,200	C	300	180	-	-	4	550	480-645
5-84	CUDDY VALLEY	3,500	A	160	135	3	-	3	407	325-645
5-85	MIL POTRERO AREA	2,300	C	3,200	240	7	-	7	460	372-657

gpm - gallons per minute
 mg/L - milligram per liter
 TDS - total dissolved solids

**APPENDIX D
ORDINANCES**

**WATER SHORTAGE CONTINGENCY
WATER EFFICIENT LANDSCAPE
CITY WATER ORDINANCE**

Draft Ordinance

ORDINANCE NO. __-__

AN ORDINANCE ADDING SECTION 6-5.113 TO THE CLOVIS MUNICIPAL CODE TO ESTABLISH A WATER SHORTAGE CONTINGENCY PLAN, AUTHORIZE THE DIRECTOR OF PUBLIC UTILITIES TO IMPLEMENT PLAN UNDER CERTAIN CONDITIONS, PROVIDE RATES AND CHARGES FOR SERVICE UNDER CERTAIN CONDITIONS AND TO DECLARE AN EMERGENCY

THE CITY COUNCIL OF THE CITY OF CLOVIS DOES ORDAIN AS FOLLOWS:

Section 1: The following section shall be added to the Clovis Municipal Code and shall read as follows:

“Section 6-5.113. Water shortage contingency plan.

“The following water shortage contingency plan shall be effective upon the declaration of the Public Utilities Director that a water shortage exists. The Public Utilities Director shall follow guidelines established in the 2010 Urban Water Management Plan as required by the State of California, when declaring a particular water shortage stage.

(a) Water Conservation Stages. No customer shall make, cause, use or permit the use of water supplied by the City, for any purpose in a manner contrary to any provisions of this section, or in an amount in excess of that use permitted by the water shortage stage in effect, pursuant to action taken by the Public Utilities Director in accordance with the provisions of this section.

(1) Stage1, minor water shortage. Customers of the City of Clovis Water Section of the Department of Public Utilities are requested to voluntarily limit the amount of water used to that amount absolutely necessary for health, business and irrigation.

(2) Stage 2, moderate water shortage. Upon declaration by the Public Utilities Director and notification of customers, by mail or publication, the following restrictions shall apply to all persons, customers and property served water by the City of Clovis:

(a) Outside water use shall be limited to three (3) days per week and not during peak demand hours; particular days and hours as designated by the Public Utilities Director. The following uses shall be excepted from the restrictions: Irrigation by drip system, commercial nurseries, commercial sod farmers, construction dust control, other construction water uses and commercial car washing. Additionally vehicle or equipment washing is exempted from these regulations if the health, safety, and welfare of the public is contingent upon frequent vehicle cleanings, such as garbage trucks and vehicles which transport food.

(b) All hoses used for outside water purposes shall have a self closing nozzle attached to the free end during use.

(c) Fountains, fish ponds, artificial streams and other water features shall utilize a water recirculation system.

(d) Restaurants shall not serve water to its customers unless requested to do so by the customer.

(e) The following uses of water are specifically defined as “water wasting” and are prohibited:

1. failure to repair a controllable leak;

2. washing sidewalks, driveways, parking areas, tennis courts, patios, or other paved areas, except as to maintain the health, safety and welfare of the public;

3. excessive water runoff to a gutter, ditch or storm drain.

(3) Stage 3, severe water shortage. Upon declaration of the Public Utilities Director and customer notification by mail or publication, the following restrictions shall apply to all persons, customers and property served water by the City of Clovis. All elements of Stage 2 shall remain in effect except that:

(a) Outdoor water use will be limited to two (2) days per week and not during peak demand hours, particular days and hours as designated by the Public Utilities Director.

(b) No customer shall use water for permitted uses in excess of the following amounts:

1. Single family residential customers shall not use more than 8,000 gallons in January, 8,000 gallons in February, 8,000 gallons in March, 9,000 gallons in April, 12,000 gallons in May, 15,000 gallons in June, 22,000 gallons in July, 20,000 gallons in August, 19,000 gallons in September, 19,000 gallons in October, 10,000 gallons in November and 8,000 gallons in December.

2. Multiple family residential customers shall not use per unit more than 6,667 gallons in January, 6,667 gallons in February, 6,667 gallons in March, 6,667 gallons in April, 8,000 gallons in May, 10,000 gallons in June, 15,000

gallons in July, 14,000 gallons in August, 13,000 gallons in September, 12,000 gallons in October, 7,000 gallons in November and 6,667 gallons in December.

3. All other metered customers shall not use more than eighty-five percent (85%) of the customer's average consumption over the same billing period for the previous two (2) years. Landscaping only accounts shall not use more than seventy percent (70%) of the customer's average consumption over the same billing period for the previous two (2) years.

4. Unmetered customers shall be allowed the same limits of consumption as single family residential customers. The individual customer's consumption shall be the average consumption for all unmetered customers, based upon water production figures for the unmetered area.

(c) Each customer's allotment of water shall be calculated by the Finance Department and each customer notified by mail.

(d) Any customer may appeal their customer classification on the basis of use or the calculated allotment on the basis of hardship or incorrect calculation.

(e) Appeals shall be in writing and directed to the Public Utilities Director. The appeal shall be reviewed by the Department of Public Utilities and a site visit scheduled if required. A condition of approval of any appeal shall be that all applicable plumbing fixtures or irrigation systems be replaced or modified for maximum water conservation if feasible. Decisions on the granting of the appeal will be made by the Public Utilities Director. If an applicant disagrees with the decision, the request may be appealed to the City Manager. The City Manager's decision is final.

(f) New connections are prohibited to the water system unless the developer or builder of the new connection offsets by a factor of two (2) the expected water consumption from the new connection by installing water conservation devices in existing developments within the water service area.

(d) Draining and refilling of swimming pools, artificial water features or ponds is prohibited.

(4) Stage 4, critical water shortage. Upon declaration of the Public Utilities Director and customer notification by mail or publication, the following restrictions shall apply to all persons, customers and property served water by the City of Clovis. All elements of Stage 3 shall remain in effect except that:

(a) Outdoor water use will be limited to one (1) day per week and not during peak demand hours, the particular day and hours as designated by the Public Utilities Director.

(b) No customer shall use water for permitted uses in excess of the following amounts:

1. Single family residential customers shall not use more than 8,000 gallons in January, 8,000 gallons in February, 8,000 gallons in March, 8,000 gallons in April, 10,000 gallons in May, 12,000 gallons in June, 18,000 gallons in July, 16,000 gallons in August, 15,000 gallons in September, 15,000 gallons in October, 8,000 gallons in November and 8,000 gallons in December.

2. Multiple family residential customers shall not use per unit more than 6,667 gallons in January, 6,667 gallons in February, 6,667 gallons in March, 6,667 gallons in April, 8,000 gallons in May, 10,000 gallons in June, 12,000

gallons in July, 11,000 gallons in August, 10,000 gallons in September, 10,000 gallons in October, 6,667 gallons in November and 6,667 gallons in December.

3. All other metered customers shall not use more than eighty percent (80%) of the customer's average consumption over the same billing period for the previous two (2) years. Landscaping only accounts shall not use more than fifty percent (50%) of the customer's average consumption over the same billing period for the previous two (2) years.

4. Unmetered customers shall be allowed the same limits of consumption as single family residential customers. The individual customer's consumption shall be the average consumption for all unmetered customers, based upon water production figures for the unmetered area.

(c) New water connections are prohibited.

(b) Rates and charges under Stage 3 shall be as follows:

(1) For single-family living units; multiple-family units; two (2) or more living units with separate toilet, kitchen or washroom facilities situated on the same lot; hotels; motels; and auto courts or mobile home parks wherein individual units or cabins are provided with kitchen facilities the minimum charge to each customer shall be eight and 40/100ths dollars (\$8.40) per month per unit. Such minimum charge shall be for five thousand (5,000) gallons of water or less per month per unit, and for amounts in excess of five thousand (5,000) gallons but no more than the per month allotment per unit, the customer shall pay at the rate of two and 30/100ths dollars (\$2.30) per one thousand (1,000) gallons of water used. For amounts of water used in excess of the allotment per month per unit, the customer shall pay, in addition, the rate of seven and

20/100ths dollars (\$7.20) per one thousand (1,000) gallons of water used over the allotment per month. For individually unmetered residential customers these rates shall apply with consumption determined based on average water production in the area served.

(2) For all other customers; landscape only, commercial uses, industrial uses, schools and churches, wherein water service is provided, the minimum charge shall be eight and 40/100ths dollars (\$8.40) per account per month for water services one inch (1") or smaller in size. For water services one and one-half inches (1-1/2") in size, the minimum charge shall be fourteen and 16/100ths dollars (\$14.16) per account per month. For water services two inches (2") in size, the minimum charge shall be twenty-one and 08/100ths dollars (\$21.08) per account per month. For water services three inches (3") in size, the minimum charge shall be thirty-nine and 53/100ths dollars (\$39.53) per account per month. For services four inches (4") in size, the minimum charge shall be sixty and 31/100ths dollars (\$60.31) per account per month. For services six inches (6") in size, the minimum charge shall be two hundred thirty-three and 33/100ths dollars (\$233.33) per account per month. For services eight inches (8") in size, the minimum charge shall be four hundred six and 35/100ths dollars (\$406.35) per account per month. For services ten inches (10") in size, the minimum charge shall be six hundred thirty-seven and 06/100ths dollars (\$637.06) per account per month. Such minimum charge shall be for five thousand (5,000) gallons of water or less per month per account, and for amounts in excess of five thousand (5,000) gallons per months, the customer shall pay, at the rate of two and 30/100ths dollars (\$2.30) per one thousand (1,000) gallons of water used for amounts up to seventy percent (70%) for

landscape only accounts and eighty-five percent (85%) for all other non-residential accounts of the customer's average usage for the same billing period for the previous two (2) years. For the amount of water in excess of the seventy (70%) or eighty-five (85%) of the customer's previous usage, the customer shall pay in addition, the rate of seven and 20/100ths dollars (\$7.20) per one thousand (1,000) gallons of water used.

"Account" as used in this subsection shall mean each meter connection whether serving one (1) business or multiple businesses under one (1) or multiple ownership.

(c) Rates and charges under Stage 4 shall be as follows:

(1) For single-family living units; multiple-family units; two (2) or more living units with separate toilet, kitchen or washroom facilities situated on the same lot; hotels; motels; and auto courts or mobile home parks wherein individual units or cabins are provided with kitchen facilities the minimum charge to each customer shall be eight and 40/100ths dollars (\$8.40) per month per unit. Such minimum charge shall be for five thousand (5,000) gallons of water or less per month per unit, and for amounts in excess of five thousand (5,000) gallons but no more than the per month allotment per unit, the customer shall pay at the rate of two and 60/100ths dollars (\$2.60) per one thousand (1,000) gallons of water used. For amounts of water used in excess of the allotment per month per unit, the customer shall pay, in addition, the rate of seven and 20/100ths dollars (\$7.20) per one thousand (1,000) gallons of water used over the allotment per month. For individually unmetered residential customers these rates shall apply with consumption determined based on average water production in the area served.

(2) For all other customers; landscape only, commercial uses, industrial uses, schools and churches, wherein water service is provided, the minimum charge shall be eight and 40/100ths dollars (\$8.40) per account per month for water services one inch (1") or smaller in size. For water services one and one-half inches (1-1/2") in size, the minimum charge shall be fourteen and 16/100ths dollars (\$14.16) per account per month. For water services two inches (2") in size, the minimum charge shall be twenty-one and 08/100ths dollars (\$21.08) per account per month. For water services three inches (3") in size, the minimum charge shall be thirty-nine and 53/100ths dollars (\$39.53) per account per month. For services four inches (4") in size, the minimum charge shall be sixty and 31/100ths dollars (\$60.31) per account per month. For services six inches (6") in size, the minimum charge shall be two hundred thirty-three and 33/100ths dollars (\$233.33) per account per month. For services eight inches (8") in size, the minimum charge shall be four hundred six and 35/100ths dollars (\$406.35) per account per month. For services ten inches (10") in size, the minimum charge shall be six hundred thirty-seven and 06/100ths dollars (\$637.06) per account per month. Such minimum charge shall be for five thousand (5,000) gallons of water or less per month per account, and for amounts in excess of five thousand (5,000) gallons per months, the customer shall pay, at the rate of two and 60/100ths dollars (\$2.60) per one thousand (1,000) gallons of water used for amounts up to fifty percent (50%) for landscape only accounts and eighty percent (80%) for all other non-residential accounts of the customer's average usage for the same billing period for the previous two (2) years. For the amount of water in excess of the fifty (50%) or eighty (80%) of the

customer's previous usage, the customer shall pay in addition, the rate of seven and 20/100ths dollars (\$7.20) per one thousand (1,000) gallons of water used.

"Account" as used in this subsection shall mean each meter connection whether serving one (1) business or multiple businesses under one (1) or multiple ownership.

(d) Rates and charges in Stage 1 and Stage 2 shall be per Section 6.5.103 and Section 6.5.104.

Section 2: That an emergency exists and in order to protect the health, safety, and general welfare of the public this ordinance shall be in full force and effect immediately.

Mayor

City Clerk

The foregoing ordinance was introduced and read at a regularly adjourned meeting of the City Council of the City of Clovis held on _____, and was adopted at a regular meeting of said Council held on _____, by the following vote to wit:

AYES:

NOES:

ABSENT:

DATED:

City Clerk

CLERK'S CERTIFICATE

I, Diana Stice, Deputy City Clerk of the City of Clovis, State of California, do hereby certify that the foregoing is a full, true and correct copy of Proposed Ordinance No. 10-04 duly approved and adopted by the City Council of the City of Clovis on the dates therein stated and as appears on file in my office.

IN WITNESS WHEREOF, I hereunto set my hand and affix the seal of the City of Clovis on April 6, 2010.





Diana Stice, Deputy City Clerk

ORDINANCE 10-04

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF CLOVIS AMENDING CHAPTER 6.5 OF TITLE 6 CLOVIS MUNICIPAL CODE RELATING TO WATER EFFICIENT LANDSCAPE REQUIREMENTS

The City Council of the City of Clovis does ordain as follows:

Section 1 Article 5. Water Efficient Landscape Requirements of Chapter 6.5 of Title 6 of the Clovis Municipal Code is hereby amended to read in its entirety as follows:

Article 5. Water Efficient Landscape Requirements

6-5.501 Applicability.

(a) The requirements herein shall apply to all of the following landscape projects:

(1) new construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check or design review;

(2) new construction and rehabilitated landscapes which are developer-installed in single-family and multi-family projects with a landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review;

(3) new construction landscapes which are homeowner-provided and/or homeowner-hired in single-family and multi-family residential projects with a total project landscape area equal to or greater than 5,000 square feet requiring a building or landscape permit, plan check or design review;

(4) existing landscapes constructed prior to the effective date of this chapter are limited to Sections 6-5.512 and 6-5.513.

(5) new and rehabilitated cemeteries are limited to Sections 6-5.503(b)(2), 6-5.506 and 6-5.507; and existing cemeteries are limited to Sections 6-5.512; and 6-5.513.

(b) This ordinance does not apply to:

(1) registered local, state or federal historic sites;

(2) ecological restoration projects that do not require a permanent irrigation system;

(3) mined-land reclamation projects that do not require a permanent irrigation system; or

(4) plant collections, as part of botanical gardens and arboretums open to the public.

6-5.502 Definitions.

The terms used in this article have the meaning set forth below:

(a) "applied water" means the portion of water supplied by the irrigation system to the landscape.

(b) "automatic irrigation controller" means an automatic timing device used to remotely control valves that operate an irrigation system. Automatic irrigation

controllers schedule irrigation events using either evapotranspiration (weather-based) or soil moisture data.

(c) "backflow prevention device" means a safety device used to prevent pollution or contamination of the water supply due to the reverse flow of water from the irrigation system.

(d) "Certificate of Completion" means the document required under Section 6-5.04.

(e) "certified irrigation designer" means a person certified to design irrigation systems by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation designer certification program and the Irrigation Association's Certified Irrigation Designer program.

(f) "certified landscape irrigation auditor" means a person certified to perform landscape irrigation audits by an accredited academic institution, a professional trade organization or other program such as the US Environmental Protection Agency's WaterSense irrigation auditor certification program and the Irrigation Association's Certified Landscape Irrigation Auditor program.

(g) "check valve" or "anti-drain valve" means a valve located under a sprinkler head, or other location in the irrigation system, to hold water in the system to prevent drainage from sprinkler heads when the sprinkler is off.

(h) "City" shall mean the City of Clovis Department of Planning and Development Services unless indicated otherwise.

(i) "common interest developments" means community apartment projects, condominium projects, planned developments, and stock cooperatives per Civil Code Section 1351.

(j) "conversion factor (0.62)" means the number that converts acre-inches per acre per year to gallons per square foot per year

(k) "drip irrigation" means any non-spray low volume irrigation system utilizing emission devices with a flow rate measured in gallons per hour. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(l) "ecological restoration project" means a project where the site is intentionally altered to establish a defined, indigenous, historic ecosystem.

(m) "effective precipitation" or "usable rainfall" (Eppt) means the portion of total precipitation which becomes available for plant growth.

(n) "emitter" means a drip irrigation emission device that delivers water slowly from the system to the soil.

(o) "established landscape" means the point at which plants in the landscape have developed significant root growth into the soil. Typically, most plants are established after one or two years of growth.

(p) "establishment period of the plants" means the first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth.

(q) "Estimated Total Water Use" (ETWU) means the total water used for the landscape as described in Section 6-5.503(b)(2)(ii)(ac).

(r) "ET adjustment factor" (ETAF) means a factor of 0.7, that, when applied to reference evapotranspiration, adjusts for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape. A combined plant mix with a site-wide average of 0.5 is the basis of the plant factor

portion of this calculation. For purposes of the ETAF, the average irrigation efficiency is 0.71. Therefore, the ET Adjustment Factor is $(0.7) = (0.5/0.71)$. ETAF for a Special Landscape Area shall not exceed 1.0. ETAF for existing non-rehabilitated landscapes is 0.8.

(s) "evapotranspiration rate" means the quantity of water evaporated from adjacent soil and other surfaces and transpired by plants during a specified time.

(t) "flow rate" means the rate at which water flows through pipes, valves and emission devices, measured in gallons per minute, gallons per hour, or cubic feet per second.

(u) "hardscapes" means any durable material (pervious and non-pervious).

(v) "homeowner-provided landscaping" means any landscaping either installed by a private individual for a single family residence or installed by a licensed contractor hired by a homeowner. A homeowner, for purposes of this ordinance, is a person who occupies the dwelling he or she owns. This excludes speculative homes, which are not owner-occupied dwellings.

(w) "hydrozone" means a portion of the landscaped area having plants with similar water needs. A hydrozone may be irrigated or non-irrigated.

(x) "infiltration rate" means the rate of water entry into the soil expressed as a depth of water per unit of time (e.g., inches per hour).

(y) "invasive plant species" means species of plants not historically found in California that spread outside cultivated areas and can damage environmental or economic resources.

(z) "irrigation audit" means an in-depth evaluation of the performance of an irrigation system conducted by a Certified Landscape Irrigation Auditor. An irrigation audit includes, but is not limited to: inspection, system tune-up, system test with distribution uniformity or emission uniformity, reporting overspray or runoff that causes overland flow, and preparation of an irrigation schedule.

(aa) "irrigation efficiency" (IE) means the measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. The minimum average irrigation efficiency for purposes of this ordinance is 0.71.

(bb) "irrigation survey" means an evaluation of an irrigation system that is less detailed than an irrigation audit. An irrigation survey includes, but is not limited to: inspection, system test, and written recommendations to improve performance of the irrigation system.

(cc) "irrigation water use analysis" means an analysis of water use data based on meter readings and billing data.

(dd) "landscape architect" means a person who holds a license to practice landscape architecture in the state of California Business and Professions Code, Section 5615.

(ee) "landscape area" means all the planting areas, turf areas, and water features in a landscape design plan subject to the Maximum Applied Water Allowance calculation. The landscape area does not include footprints of buildings or structures, sidewalks, driveways, parking lots, decks, patios, gravel or stone walks, other pervious or non-pervious hardscapes, and other non-irrigated areas designated for non-development (e.g., open spaces and existing native vegetation).

(ff) "landscape contractor" means a person licensed by the state of California to construct, maintain, repair, install, or subcontract the development of landscape systems.

(gg) "Landscape Documentation Package" means the documents required under Section 6-5.503.

(hh) "landscape project" means total area of landscape in a project as defined in "landscape area" for the purposes of this ordinance, meeting requirements under Section 6-5.501.

(ii) "lateral line" means the water delivery pipeline that supplies water to the emitters or sprinklers from the valve. This pipeline is typically downstream of the zone control valve and is not pressurized when irrigation is not occurring.

(jj) "low volume irrigation" means the application of irrigation water at low pressure through a system of tubing or lateral lines and low-volume emitters such as drip, drip lines, and bubblers. Low volume irrigation systems are specifically designed to apply small volumes of water slowly at or near the root zone of plants.

(kk) "main line" means the pressurized pipeline that delivers water from the water source to the valve or outlet.

(ll) "Maximum Applied Water Allowance" (MAWA) means the upper limit of annual applied water for the established landscaped area as specified in Section 6-5.503(b)(2)(ii)(ab). It is based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscape area. The Estimated Total Water Use shall not exceed the Maximum Applied Water Allowance. Special Landscape Areas, including recreation areas, areas permanently and solely dedicated to edible plants such as orchards and vegetable gardens, and areas irrigated with recycled water are subject to the MAWA with an ETAF not to exceed 1.0.

(mm) "microclimate" means the climate of a small, specific area that may contrast with the climate of the overall landscape area due to factors such as wind, sun exposure, plant density, or proximity to reflective surfaces.

(nn) "mined-land reclamation projects" means any surface mining operation with a reclamation plan approved in accordance with the Surface Mining and Reclamation Act of 1975.

(oo) "mulch" means any organic material such as leaves, bark, straw, compost, or inorganic mineral materials such as rocks, gravel, and decomposed granite left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

(pp) "new construction" means a new building with a landscape or other new landscape.

(qq) "operating pressure" means the pressure at which the parts of an irrigation system are designed by the manufacturer to operate.

(rr) "overhead sprinkler irrigation systems" means systems that deliver water through the air (e.g., spray heads and rotors).

(ss) "overspray" means the irrigation water which is delivered beyond the target area.

(tt) "permit" means an authorizing document issued by the City of Clovis for new construction or rehabilitated landscapes.

(uu) "pervious" means any surface or material that allows the passage of water through the material and into the underlying soil.

(vv) "plant factor" or "plant water use factor" is a factor, when multiplied by the reference evapotranspiration (ET_o), estimates the amount of water needed by plants. For purposes of this chapter, the plant factor range for low water use plants is 0 to 0.3, the plant factor range for moderate water use plants is 0.4 to 0.6, and the plant factor range for high water use plants is 0.7 to 1.0. Plant factors cited in this chapter are derived from the Department of Water Resources 2000 publication "Water Use Classification of Landscape Species".

(ww) "precipitation rate" means the rate of application of water measured in inches per hour.

(xx) "project applicant" means the individual or entity submitting a Landscape Documentation Package required under Section 6-5.503, to request a permit, plan check, or design review from the City. A project applicant may be the property owner or his or her designee.

(yy) "rain sensor" or "rain sensing shutoff device" means a component which automatically suspends an irrigation event when it rains.

(zz) "record drawing" or "as-builts" means a set of reproducible drawings which show significant changes in the work made during construction and which are usually based on drawings marked up in the field and other data furnished by the contractor.

(aaa) "recreational area" means areas dedicated to active play such as parks, sports fields, and golf courses where turf provides a playing surface.

(bbb) "recycled water", "reclaimed water", or "treated sewage effluent water" means treated or recycled waste water of a quality suitable for non-potable uses such as landscape irrigation and water features. This water is not intended for human consumption.

(ccc) "reference evapotranspiration" or "ET_o" means a standard measurement of environmental parameters which affect the water use of plants. ET_o is expressed in inches per day, month, or year as represented in Section 6-5.503(b)(2)(ii)(aa), and is an estimate of the evapotranspiration of a large field of four- to seven-inch tall, cool-season grass that is well watered. Reference evapotranspiration is used as the basis of determining the Maximum Applied Water Allowance so that regional differences in climate can be accommodated.

(ddd) "rehabilitated landscape" means any re-landscaping project that requires a permit, plan check, or design review, meets the requirements of Section 6-5.501, and the modified landscape area is equal to or greater than 2,500 square feet, is 50% or more of the total landscape area, and the modifications are completed within one year.

(eee) "runoff" means water which is not absorbed by the soil or landscape to which it is applied and flows from the landscape area. For example, runoff may result from water that is applied at too great a rate (application rate exceeds infiltration rate) or when there is a slope.

(fff) "soil moisture sensing device" or "soil moisture sensor" means a device that measures the amount of water in the soil. The device may also suspend or initiate an irrigation event.

(ggg) "soil texture" means the classification of soil based on its percentage of sand, silt, and clay.

(hhh) "Special Landscape Area" (SLA) means an area of the landscape dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface.

- (iii) "sprinkler head" means a device which delivers water through a nozzle.
- (jjj) "static water pressure" means the pipeline or municipal water supply pressure when water is not flowing.
- (kkk) "station" means an area served by one valve or by a set of valves that operate simultaneously.
- (lll) "swing joint" means an irrigation component that provides a flexible, leak-free connection between the emission device and lateral pipeline to allow movement in any direction and to prevent equipment damage.
- (mmm) "turf" means a ground cover surface of mowed grass. Annual bluegrass, Kentucky bluegrass, Perennial ryegrass, Red fescue, and Tall fescue are cool-season grasses. Bermudagrass, Kikuyugrass, Seashore Paspalum, St. Augustinegrass, Zoysiagrass, and Buffalo grass are warm-season grasses.
- (nnn) "valve" means a device used to control the flow of water in the irrigation system.
- (ooo) "water conserving plant species" means a plant species identified as having a low plant water use factor.
- (ppp) "water feature" means a design element where open water performs an aesthetic or recreational function only. Water features include ponds, lakes, waterfalls, fountains, artificial streams, spas, and swimming pools (where water is artificially supplied). The surface area of water features is included in the high water use hydrozone of the landscape area. Constructed wetlands used for on-site wastewater treatment or stormwater best management practices that are not irrigated and used solely for water treatment or stormwater retention are not water features and, therefore, are not subject to the water budget calculation. Groundwater recharge ponds which utilize untreated surface water or recycled water are not water features and, therefore, are not subject to the water budget calculation.
- (qqq) "watering window" means the time of day irrigation is allowed.
- (rrr) "WUCOLS" means the Water Use Classification of Landscape Species published by the University of California Cooperative Extension, the Department of Water Resources and the Bureau of Reclamation, 2000.

6-5.503 Landscape Documentation Package Submittal Requirements

(a) Prior to issuance of a building permit, encroachment permit, or beginning of construction, the project applicant shall submit a Landscape Documentation Package to the City for review and approval. The Landscape Documentation Package shall contain the information required by (b) and shall be incorporated into the improvement plan and/or landscape plan set required for permit approvals.

(b) Elements of the Landscape Package. The Landscape Package shall include the following six (6) elements:

- (1) project information, which shall include the following;
 - (i) date;
 - (ii) project applicant;
 - (iii) project address;
 - (iv) total landscape area (square feet);
 - (v) project type (e.g. new, rehabilitated, public, private, cemetery, homeowner installed);
 - (vi) water supply type (e.g. potable recycled, private well, untreated surface water);

- (vii) checklist of all documents in Landscape Package;
- (viii) project contacts to include contact information for the project applicant and property owner; and
- (ix) applicant signature and date with statement, "I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package."
- (2) Water Efficient Landscape Worksheet;
 - (i) hydrozone information table for the landscape project, and
 - (ii) water budget calculations
- (aa) For the calculation of the Maximum Applied Water Allowance and Estimated Total Water Use, a project applicant shall use the following ETo values:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
1.0	1.5	3.2	4.8	6.4	7.7	8.5	7.3	5.3	3.4	1.4	0.7	51.4

Water budget calculations shall adhere to the following requirements:

1. The plant factor used shall be from WUCOLS. The plant factor ranges from 0 to 0.3 for low water use plants, from 0.4 to 0.6 for moderate water use plants, and from 0.7 to 1.0 for high water use plants.
2. All water features shall be included in the high water use hydrozone and temporarily irrigated areas shall be included in the low water use hydrozone.
3. All Special Landscape Areas shall be identified and their water use calculated as described below.
4. ETAF for Special Landscape Areas shall not exceed 1.0.

(ab) The Maximum Applied Water Allowance shall be calculated using the equation:

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)] where:
 MAWA = Maximum Applied Water Allowance (gallons per year)
 ETo = Reference Evapotranspiration (inches per year)
 0.62 = Conversion Factor (to gallons)
 0.7 = ET Adjustment Factor (ETAF)
 LA = Landscape Area including SLA (square feet)
 0.3 = Additional Water Allowance for SLA
 SLA = Special Landscape Area (square feet)

(ac) The Estimated Total Water Use shall be calculated using the equation below. The sum of the Estimated Total Water Use calculated for all hydrozones shall not exceed MAWA.

$$ETWU = (ETo)(0.62) \left(\frac{PF \times HA}{IE} + SLA \right)$$

Where:

ETWU = Estimated Total Water Use per year (gallons)

ET_o = Reference Evapotranspiration (inches)
PF = Plant Factor from WUCOLS (see Section 6-5.02)
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor
IE = Irrigation Efficiency (minimum 0.71)

(3) Soil Management Report. In order to reduce runoff and encourage healthy plant growth, a soil management report shall be completed by the project applicant or designee, as follows:

- (i) Submit soil samples to a laboratory for analysis and recommendations.
 - (aa) Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.
 - (ab) The soil analysis shall include:
 1. soil texture;
 2. infiltration rate determined by laboratory test or soil texture infiltration rate table;
 3. pH;
 4. total soluble salts;
 5. sodium;
 6. percent organic matter; and
 7. recommendations for appropriate soil amendment.
- (ii) The soil analysis shall be made available, in a timely manner, to the professionals preparing the landscape design plans and irrigation design plans to make any necessary adjustments.
- (iii) Upon completion of construction and prior to issuance of an occupancy permit or project acceptance, the project applicant or designee shall submit documentation verifying implementation of soil analysis report recommendations within the landscaped area to the City with the Certificate of Completion.

(4) Landscape Design Plan. Landscape plans, including plant selection shall be designed consistent with City Landscape Design Standards and guidelines. A landscape design plan meeting the following design criteria shall be submitted as part of the Landscape Documentation Package.

(i) Plant material. The Estimated Total Water Use for plants selected for the landscape area shall not exceed the Maximum Applied Water Allowance. The landscape plan shall identify landscape materials, trees, shrubs, groundcover, and turf. Plant symbols shall be clearly drawn and plants shall be labeled by botanical name, common name, container size, spacing and quantities for each group of plants specified. Planting areas dedicated permanently and solely to edible plants should be clearly delineated.

(ii) Plant selection. Plants shall be selected and planted appropriately based upon their adaptability to the climatic, geologic, and topographical conditions of the project site and consideration of the following factors: protection and preservation of native species and natural vegetation; selection of water conserving plant and turf species; selection of plants based on disease and pest resistance; selection based on climate zone tolerance; selection based on the horticultural attributes of plants such as mature plant size and invasive roots to minimize damage to property or infrastructure; selection of trees based on tree shading requirements; the solar orientation for plant placement to

maximize summer shade and winter solar gain; and selection from City recommended plant lists.

(iii) Hydrozone information. Delineate and label each hydrozone by number, letter, or other method; identify each hydrozone as low, moderate, high water, or mixed water use; identify recreational areas; identify areas irrigated with recycled water; identify type and surface area of water features; Surface area of a water feature shall be included in the high water use hydrozone area of the water budget calculation. Temporarily irrigated areas of the landscape shall be included in the low water use hydrozone for the water budget calculation. Each hydrozone shall have plant materials with similar water use, with the exception of hydrozones with plants of mixed water use, as specified in Section 6-5.503(b)(5)(ii)(ad).

(iv) Turf is not allowed on slopes greater than 25% where the toe of the slope is adjacent to an impermeable hardscape and where 25% means 1 foot of vertical elevation change for every 4 feet of horizontal length.

(v) The architectural guidelines of a common interest development, which include community apartment projects, condominiums, planned developments, and stock cooperatives, shall not prohibit or include conditions that have the effect of prohibiting the use of low-water use plants as a group.

(vi) Water features may be permitted, subject to design review, and the provisions of Section 6-5.514.

(vii) Mulch and Amendments. Identify type of mulch and application depth. A minimum two inch (2") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated. Stabilizing mulching products shall be used on slopes greater than 3:1. The mulching portion of the seed/mulch slurry in hydro-seeded applications shall meet the mulching requirement. Identify any soil amendments, type, and quantity on the plans. Soil amendments shall be incorporated according to recommendations of the soil report and what is appropriate for the plants selected.

(viii) Other design considerations. The landscape design plan shall also identify; hardscapes (pervious and non-pervious); property lines; utilities and utility easements; streets; buildings and structures; natural features to remain; location and installation details of any applicable stormwater best management practices that encourage on-site retention and infiltration of stormwater; and any applicable rain harvesting or catchment technologies (e.g., rain gardens, cisterns, etc.);

(ix) Verification. The landscape plan shall contain the following statement: "I have complied with the criteria of the Water Efficient Landscape Requirements Ordinance and applied them for the efficient use of water in the landscape design plan"; and shall bear the signature of a licensed landscape architect, licensed landscape contractor, or any other person authorized to design a landscape. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agriculture Code.)

(5) Irrigation Design Plan. For the efficient use of water, an irrigation system shall meet all the requirements listed in this section and the manufacturers' recommendations. The irrigation system and its related components shall be planned and designed to allow for proper installation, management, and maintenance.

(i) System requirements.

(aa) Dedicated landscape water meters are required for all non-residential landscape areas to facilitate water management.

(ab) Automatic irrigation controllers utilizing either evapotranspiration or soil moisture sensor data shall be required for irrigation scheduling in all irrigation systems.

(ac) The irrigation system shall be designed to ensure that the dynamic pressure at each emission device is within the manufacturer's recommended pressure range for optimal performance.

1. If the static pressure is above or below the required dynamic pressure of the irrigation system, pressure-regulating devices such as inline pressure regulators, booster pumps, or other devices shall be installed to meet the required dynamic pressure of the irrigation system.

2. Static water pressure, dynamic or operating pressure, and flow reading of the water supply shall be measured at the point of connection. These pressure and flow measurements shall be conducted at the design stage. If the measurements are not available at the design stage, the measurements shall be conducted at installation.

(ad) Sensors (rain, freeze, wind, etc.), either integral or auxiliary, that suspend or alter irrigation operation during unfavorable weather conditions shall be required on all irrigation systems, as appropriate for local climatic conditions. Irrigation should be avoided during windy or freezing weather or during rain.

(ae) Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be required, as close as possible to the point of connection of the water supply, to minimize water loss in case of an emergency (such as a main line break) or routine repair.

(af) Backflow prevention devices shall be provided as required by the City Water Division to protect the water supply from contamination by the irrigation system.

(ag) The irrigation system shall be designed to prevent runoff, low head drainage, overspray, or other similar conditions where irrigation water flows onto non-targeted areas, such as adjacent property, non-irrigated areas, hardscapes, roadways, or structures.

(ah) Relevant information from the soil management plan, such as soil type and infiltration rate, shall be utilized when designing irrigation systems.

(ai) The design of the irrigation system shall conform to the hydrozones of the landscape design plan.

(aj) The irrigation system must be designed and installed to meet the irrigation efficiency criteria as described in Section 6-5.503(b)(2) regarding the Maximum Applied Water Allowance.

(ak) The project applicant shall consult with the City Water Division about peak water operating demands (on the water supply system) or water restrictions that may impact the effectiveness of the irrigation system.

(al) Low volume irrigation shall be used in mulched planting areas to maximize water infiltration into the root zone.

(am) Sprinkler heads and other emission devices shall have matched precipitation rates, unless otherwise directed by the manufacturer's recommendations.

(an) Sprinkler spacing shall be designed to achieve the highest possible distribution uniformity using the manufacturer's recommendations.

(ao) Swing joints or other riser-protection components shall be provided on all risers subject to damage that are adjacent to high traffic areas.

(ap) Check valves or anti-drain valves are required for all irrigation systems.

(aq) Narrow or irregularly shaped areas, including turf, less than eight (8) feet in width in any direction, shall be irrigated with subsurface irrigation or low volume irrigation systems.

(ar) Overhead irrigation shall not be permitted within 24 inches of any non-permeable surface. Allowable irrigation within the setback from non-permeable surfaces may include drip, drip line, or other low volume non-spray technology. The setback area may be planted or unplanted. The surfacing of the setback may be mulch, gravel, or other porous material. These restrictions may be modified if:

1. the landscape area is adjacent to permeable surfacing and no runoff occurs; or
2. the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping; or
3. the irrigation designer specifies an alternative design or technology, as part of the Landscape Documentation Package and clearly demonstrates strict adherence to irrigation system design criteria in Section 6-5.503(b)(5)(i)(ag). Prevention of overspray and runoff must be confirmed during the irrigation audit.

(as) Slopes greater than 25% shall not be irrigated with an irrigation system with a precipitation rate exceeding 0.75 inches per hour. This restriction may be modified if the landscape designer specifies an alternative design or technology, as part of the Landscape Documentation Package, and clearly demonstrates no runoff or erosion will occur. Prevention of runoff and erosion must be confirmed during the irrigation audit.

(ii) Hydrozone irrigation design parameters.

(aa) Each valve shall irrigate a hydrozone with similar site, slope, sun exposure, soil conditions, and plant materials with similar water use.

(ab) Sprinkler heads and other emission devices shall be selected based on what is appropriate for the plant type within that hydrozone.

(ac) Where feasible, trees shall be placed on separate valves from shrubs, groundcovers, and turf.

(ad) Individual hydrozones that mix plants of moderate and low water use, or moderate and high water use, may be allowed if:

1. the plant factor calculation is based on the proportions of the respective plant water uses and their plant factor; or
2. the plant factor of the higher water using plant is used for calculations.

(ae) Individual hydrozones that mix high and low water use plants shall not be permitted.

(af) The areas irrigated by each valve shall be designated, and each valve shall be assigned a number corresponding to the hydrozones identified on the landscape plan. The valve numbers shall be listed in the Hydrozone Information Table on the plans..

(iii) The irrigation design plan, at a minimum, shall identify:

- (aa) location and size of separate water meters for landscape;
- (ab) location, type and size of all components of the irrigation system, including controllers, main and lateral lines, valves, sprinkler heads, moisture sensing devices, rain switches, quick couplers, pressure regulators, and backflow prevention devices;
- (ac) static water pressure at the point of connection to the public water supply;
- (ad) flow rate (gallons per minute), application rate (inches per hour), and design operating pressure (pressure per square inch) for each station;
- (ae) recycled water irrigation systems as specified in Section 6-5.509;

(iv) Verification. The irrigation plan shall contain the following statement: "I have complied with the criteria of the Water Efficient Landscape Requirements Ordinance

and applied them accordingly for the efficient use of water in the irrigation design plan”; and shall bear the signature of a licensed landscape architect, certified irrigation designer, licensed landscape contractor, or any other person authorized to design an irrigation system. (See Sections 5500.1, 5615, 5641, 5641.1, 5641.2, 5641.3, 5641.4, 5641.5, 5641.6, 6701, 7027.5 of the Business and Professions Code, Section 832.27 of Title 16 of the California Code of Regulations, and Section 6721 of the Food and Agricultural Code.)

(6) Grading Design Plan. For the efficient use of water, grading of a project site shall be designed to minimize soil erosion, runoff, and water waste. A grading plan shall be submitted as part of the Landscape Documentation Package. A comprehensive grading plan prepared by a civil engineer for other permits satisfies this requirement.

(i) The project applicant shall submit a landscape grading plan that indicates finished configurations and elevations of the landscape area including: height of graded slopes; drainage patterns; pad elevations; finish grade; proposed underground and in-ground drainage improvements; and stormwater retention improvements, if applicable.

(ii) The grading design plan shall contain the following statement: “I have complied with the criteria of the Water Efficient Landscape Requirements Ordinance and applied them accordingly for the efficient use of water in the grading design plan” and shall bear the signature of a licensed professional as authorized by law.

(c) Approval required. Upon approval of the Landscape Documentation Package by the City, the project applicant shall:

(1) receive a permit or approval of the plan check or design review and record the date of the permit in the Certificate of Completion;

(2) submit a copy of the approved Landscape Documentation Package along with the record drawings, and any other information to the property owner or his/her designee; and

(3) submit a copy of the Water Efficient Landscape Worksheet to the City Water Division.

6-5.504 Landscape certificate of completion.

(a) Prior to issuance of a certificate of occupancy or final project acceptance, project applicant shall submit a signed Certificate of Completion to the City for review. The Certificate of Completion shall include the following elements:

(1) project information sheet that contains: date; project name; project applicant name, telephone, and mailing address; project address and location; and property owner name, telephone, and mailing address;

(2) certification by either the signer of the landscape design plan, the signer of the irrigation design plan, or the licensed landscape contractor that the landscape project has been installed per the approved Landscape Documentation Package. Where there have been significant changes made in the field during construction, “as-built” or record drawings shall be included with the certification;

(3) irrigation scheduling parameters used to set the controller (see Section 6-5.505);

(4) landscape and irrigation maintenance schedule (see Section 6-5.506);

(5) irrigation audit report (see Section 6-5.507); and

(6) soil analysis report, if not initially submitted with the Landscape Documentation Package, and documentation verifying implementation of soil report recommendations.

(b) The project applicant shall: ensure that copies of the approved Certificate of Completion are submitted to the City Water Division and property owner or his or her designee.

(c) The City shall receive and either approve or deny the Certificate of Completion. If the Certificate of Completion is denied, the City shall provide information to the project applicant regarding reapplication, appeal, or other assistance.

6-5.505 Irrigation scheduling.

(a) For the efficient use of water, all irrigation schedules shall be developed, managed, and evaluated to utilize the minimum amount of water required to maintain plant health. Irrigation schedules shall meet the following criteria:

(1) Irrigation scheduling shall be regulated by automatic irrigation controllers.

(2) Overhead irrigation shall be scheduled between 8:00 p.m. and 10:00 a.m. unless weather conditions prevent it. Operation of the irrigation system outside the normal watering window is allowed for auditing, system maintenance and during plant establishment period.

(3) The irrigation schedule shall factor in irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.

(4) Parameters used to set the automatic controller shall be developed and submitted for each of the following:

- (i) the plant establishment period;
- (ii) the established landscape; and
- (iii) temporarily irrigated areas.

(5) Each irrigation schedule shall consider for each station all of the following that apply:

- (i) irrigation interval (days between irrigation);
- (ii) irrigation run times (hours or minutes per irrigation event to avoid runoff);
- (iii) number of cycle starts required for each irrigation event to avoid runoff;
- (iv) amount of applied water scheduled to be applied on a monthly basis;
- (v) application rate setting;
- (vi) root depth setting;
- (vii) plant type setting;
- (viii) soil type;
- (ix) slope factor setting;
- (x) shade factor setting; and
- (xi) irrigation uniformity or efficiency setting.

6-5.506 Landscape and irrigation maintenance.

(a) Landscapes shall be maintained to ensure water use efficiency. A regular maintenance schedule shall be submitted with the Certificate of Completion.

(b) A regular maintenance schedule shall include, but not be limited to, routine inspection; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing any obstruction to emission devices.

(c) Repair of all irrigation equipment shall be done with the originally installed components or their equivalents.

6-5.507 Irrigation Audit, Irrigation Survey, and Irrigation Water Use Analysis.

(a) All landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

(b) For new construction and rehabilitated landscape projects installed after January 1, 2010, as described in Section 6-5.501:

(1) the project applicant shall submit an irrigation audit report with the Certificate of Completion to the City that shall include, but is not limited to: inspection, system tune-up, system test with distribution uniformity, reporting overspray or run off that causes overland flow, and preparation of an irrigation schedule;

(2) the City Public Utilities Department shall administer programs that may include, but not be limited to, irrigation water use analysis, irrigation audits, and irrigation surveys for compliance with the Maximum Applied Water Allowance.

6-5.508 Irrigation Efficiency.

For the purpose of determining Maximum Applied Water Allowance, average irrigation efficiency is assumed to be 0.71. Irrigation systems shall be designed, maintained, and managed to meet or exceed an average landscape irrigation efficiency of 0.71.

6-5.509 Recycled Water.

(a) The installation of recycled water irrigation systems shall allow for the current and future use of recycled water, unless a written exemption has been granted as described in Section 6-5.509(b).

(b) Irrigation systems and decorative water features shall use recycled water unless a written exemption has been granted by the City Water Division stating that recycled water meeting all public health codes and standards is not available and will not be available for the foreseeable future.

(c) All recycled water irrigation systems shall be designed and operated in accordance with all applicable City and State laws.

(d) Landscapes using recycled water are considered Special Landscape Areas. The ET Adjustment Factor for Special Landscape Areas shall not exceed 1.0.

6-5.510 Stormwater Management.

Project applicants shall implement stormwater best management practices as required in chapter 6.7, Urban Storm Water Quality Management and Discharge Control.

6-5.511 Public Education.

(a) The City shall make available information regarding the design, installation, management, and maintenance of water efficient landscaping in single family residential homes.

(b) Model homes. All model homes that are landscaped shall use signs and written information to demonstrate the principles of water efficient landscapes described in this chapter.

(1) Signs shall be used to identify the model as an example of a water efficient landscape featuring elements such as hydrozones, irrigation equipment, and others that contribute to the overall water efficient theme.

(2) Information shall be provided about designing, installing, managing, and maintaining water efficient landscapes.

6-5.512 Provisions for Existing Landscapes

a) This section, shall apply to all existing landscapes that were installed before January 1, 2010 and are over one acre in size.

(1) For all landscapes in 6-5.512(a) that have a water meter, the City Public Utilities Department shall administer programs that may include, but not be limited to, irrigation water use analyses, irrigation surveys, and irrigation audits to evaluate water use and provide recommendations as necessary to reduce landscape water use to a level that does not exceed the Maximum Applied Water Allowance for existing landscapes. The Maximum Applied Water Allowance for existing landscapes shall be calculated as: $MAWA = (0.8) (ET_o)(LA)(0.62)$.

(2) For all landscapes in 6-5.512 (a), that do not have a meter, the City Public Utilities Department shall administer programs that may include, but not be limited to, irrigation surveys and irrigation audits to evaluate water use and provide recommendations as necessary in order to prevent water waste.

(b) All required landscape irrigation audits shall be conducted by a certified landscape irrigation auditor.

6-5.513 Water Waste Prevention.

Water wasting is prohibited and for purposes of this chapter shall be defined as runoff leaving a landscape due to low head drainage, overspray, or other similar conditions where water flows onto adjacent property, non-irrigated areas, walks, roadways, parking lots, or structures. Runoff and overspray is not considered water waste if the landscape area is adjacent to permeable surfacing and no runoff occurs from the property, or the adjacent non-permeable surfaces are designed and constructed to drain entirely to landscaping. Penalties for water wasting shall be per Section 6-5.110.

6-5.514 Water features.

(a) Regulated water features for purposes of this section contain 500 gallons of water or more and in the case of swimming pools are more than eighteen inches (18") in depth.

(b) Recirculating water. All water features shall use recirculating water or the water shall be reused for landscape irrigation. If untreated surface water or recycled water is used and is used for artificial recharge of the groundwater aquifer, recirculating water is not required.

(c) Permits required. No water feature shall be constructed or installed within the City by any person without first securing a permit therefore from the Building Division of the Planning and Development Services Department in accordance with Title 8, Building Regulations.

(d) Management Plan. All persons applying for a permit to construct or install a water feature shall prior to permit issuance provide a management plan prepared by a registered engineer or other professional determined to be competent by the City for the

water feature. The management plan shall indicate how the water feature will be maintained and shall be reviewed and approved by the City Water Division prior to permit issuance.

(e) Seepage. All water features, unless filled with reclaimed or untreated surface water, shall not lose more than one inch (1") per year in water depth due to seepage. The applicant shall by calculations based on the type of material used for the water feature lining, determine the expected water loss due to seepage prior to permit approval.

Section 2 This Ordinance shall go into effect and be in full force from and after thirty (30) days after its final passage and adoption.

APPROVED: March 1, 2010



Mayor



City Clerk

* * * * *

The foregoing Ordinance was introduced and read at a regular meeting of the City Council held on March 1, 2010, and was adopted at a regular meeting of said Council held on March 15, 2010 by the following vote, to wit:

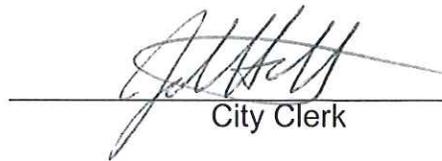
AYES: Councilmembers Ashbeck, Flores, Magsig, Whalen, Mayor Armstrong

NOES: None

ABSENT: None

ABSTAIN: None

DATED: March 15, 2010.



City Clerk



6.5.103 Water rates inside the City (effective July 1, 2010).

Each customer connected to the City's water system shall pay, as a condition of water service, the following rates for one month of service:

(a) For single-family living units; multiple-family units; two (2) or more living units with separate toilet, kitchen or washroom facilities situated on the same lot; hotels; motels; and auto courts or mobile home parks wherein individual units or cabins are provided with kitchen facilities, the minimum charge to each customer shall be six and 96/100ths dollars (\$6.96) per month per unit. Such minimum charge shall be for five thousand (5,000) gallons of water or less per month per unit, and for amounts in excess of five thousand (5,000) gallons but no more than seventeen thousand five hundred (17,500) gallons per month per unit, the customer shall pay at the rate of one and 41/100ths dollars (\$1.41) per one thousand (1,000) gallons of water used. For amounts of water used in excess of seventeen thousand five hundred (17,500) gallons but no more than thirty-five thousand (35,000) gallons per month per unit, the customer shall pay, in addition, the rate of one and 77/100ths dollars (\$1.77) per one thousand (1,000) gallons of water used over seventeen thousand five hundred (17,500) gallons per month. For amounts of water used in excess of thirty-five thousand (35,000) gallons per month per unit, the customer shall pay, in addition, the rate of two and 13/100ths dollars (\$2.13) per one thousand (1,000) gallons of water used over thirty-five thousand (35,000) gallons per month.

(1) For residential customers with landscape meters, the charge for water consumption of such landscape meters shall be at the minimum of the commercial rate provided in subsection (b) of this section plus one and 22/100ths dollars (\$1.22) per one thousand (1,000) gallons used in excess of the usage included with the minimum charge as provided in subsection (b) of this section.

(b) For all other customers, commercial uses, industrial uses, schools and churches, wherein water service is provided, the minimum charge shall be six and 96/100ths dollars (\$6.96) per account per month for water services one inch (1") or smaller in size. For water services one and one-half inches (1 1/2") in size, the minimum charge shall be eleven and 73/100ths dollars (\$11.73) per account per month. For water services two inches (2") in size, the minimum charge shall be seventeen and 46/100ths dollars (\$17.46) per account per month. For water services three inches (3") in size, the minimum charge shall be thirty-two and 74/100ths dollars (\$32.74) per account per month. For services four inches (4") in size, the minimum charge shall be forty-nine and 94/100ths dollars (\$49.94) per account per month. For services six inches (6") in size, the minimum charge shall be one hundred ninety-three and 23/100ths dollars (\$193.23) per account per month. For services eight inches (8") in size, the minimum charge shall be three hundred thirty-six and 52/100ths dollars (\$336.52) per account per month. For services ten inches (10") in size, the minimum charge shall be five hundred twenty-seven and 59/100ths dollars (\$527.59) per account per month. Such minimum charge shall be for five thousand (5,000) gallons of water or less per month per account, and for amounts in excess of five thousand (5,000) gallons per month, the customer shall pay at the rate of one and 22/100ths dollars (\$1.22) per one thousand (1,000) gallons of water used. "Account" as used in this subsection shall mean each meter connection whether serving one business or multiple businesses under one or multiple ownership.

(c) For any standby service, including fire sprinkler systems, the availability charge to each customer shall be forty-nine and 94/100ths dollars (\$49.94) per month per account.

(d) As a condition of and prior to the issuance of any building permit for the construction of a building where water service is to be utilized, but where no water meter has been installed, the person to whom such permit is issued shall pay an on-site construction water charge for each service of seventy-five and 84/100ths dollars (\$75.84) per building per two (2) months, for a period of time not to exceed six (6) months, provided the permittee installs, at his cost, an approved spacer. At the conclusion of said six (6) months, water service will only be provided after the installation of a water meter in accordance with the regulations and rates set forth in this article. The spacer shall become the property of the City.

(e) Any person receiving a permit to take water from a fire hydrant shall pay a minimum fee of thirty-two and 74/100ths dollars (\$32.74) per month, or portion thereof, under such permit, plus the amount of water used in excess of five thousand (5,000) gallons per month at the rate of one and 22/100ths dollars (\$1.22) per one thousand (1,000) gallons of water used. (§ 7, Ord. 09-21, eff. December 2, 2009)

**APPENDIX E
WATER BANKING SUMMARY**

BOSWELL (JAMESON) BANKING FACILITY SUMMARY LETTER



WATER & WASTEWATER
MUNICIPAL INFRASTRUCTURE
LAND DEVELOPMENT
AGRICULTURE SERVICES
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www.ppeng.com

June 21, 2011

Ryan Burnett, AICP
City of Clovis
Engineering Department
1033 Fifth Street
Clovis, CA 93612

Subject: **Jameson Groundwater Banking Project
Supporting Information for Environmental Documents**

Dear Mr. Burnett:

Provost & Pritchard Consulting Group ("P&P") is pleased to respond to your request for information regarding the Jameson Groundwater Banking (the "Project") Project. It is our understanding that the information provided will be used to assist the City of Clovis ("City" or "Clovis") in preparation of environmental documents for the Project. We have addressed the following items pursuant to your request:

- Overview of City Water Master Plan and planned growth
- Overview of Jameson Groundwater Bank (proposed exchange and operations)
- Summary of actions included in the Jameson Groundwater Banking Agreement
- Water source for Jameson Facility and impacts to current users (if any current users)
- Source of water transferred to the City of Clovis and impacts to current users (if any current users)
- Water stored in the Jameson Groundwater Bank and impacts to local groundwater levels and wells in the vicinity of the Jameson Facility
- City water transfer to areas outside FID's boundaries and impacts to local groundwater levels
- Overview of banking operations during critical dry years

The items above are addressed in the following sections. Refer to the enclosures for figures and supporting documentation referenced in this letter.

1) References

The following documents were referenced in the preparation of this letter:

1. Provost & Pritchard, The City of Clovis Water Master Plan Update (Phase I). April 1995.
2. Provost & Pritchard, Water Master Plan Update (Phase II) Facilities Plan. July 1999.
3. City of Clovis, The City of Clovis General Plan. April 26, 1993.
4. City of Clovis, 2005 Urban Water Management Plan. December 2005.

5. Fresno Irrigation District and City of Clovis, Water Banking and Reliability Agreement. Provided by City of Clovis in electronic form. File name: "Clovis-Jameson Agreement 5-25-11."
6. Provost & Pritchard, Jameson Pond Expansion Project Initial Study and Mitigated Negative Declaration. January 2010.
7. Provost & Pritchard, Operations Report for Waldron Banking Facilities 2010 Water Year. March, 2011.

2) City Water Master Plan and Planned Growth Overview

The Phase I and II of the City of Clovis Water Master Plan Update (Provost & Pritchard, 1995 & 1999) estimated water demands and water supply requirements to meet anticipated growth. Estimates of future water demands were based on the planning area and land use designations identified in the City's General Plan (Clovis, 1993). Build-out of the General Plan was anticipated to occur in the year 2030 based on the estimated growth rate and average target densities associated with land uses identified in the planning area.

The ultimate water demand for the City was estimated to be 52,500 acre-feet per year at build-out in the year 2030 at a corresponding population of about 200,000 people. The Water Master Plan Update (Provost & Pritchard, 1999) recommended a conjunctive use plan whereby the City would utilize groundwater, groundwater recharge, and surface water to meet water supply needs. Water supply activities identified in the conjunctive use program including surface water supply and treatment, groundwater recharge and groundwater banking activities in an effort to offset groundwater overdraft.

The Water Master Plan (Provost & Pritchard, 1999) identified the need for a 30 million gallon per day (MGD) surface water treatment plant (SWTP) to meet the ultimate build-out demands. The environmental documents and Phase 1 of the SWTP design accounted for an ultimate capacity of 45 MGD. The City has constructed Phase 1 of the SWTP to include a capacity of 15 MGD. The proposed additional surface water supply associated with the Project will include 4,500 acre-feet or 4 MGD (annualized). The additional water supply will be utilized in critical years and to meet increases in demand to accommodate planned growth. The City will construct the next phase of the SWTP to increase capacity as required to meet planned growth in the future.

3) Jameson Groundwater Bank Overview

The purpose of the Jameson Groundwater Banking Facility (the "Jameson Facility") is to capture surplus water from Fresno Irrigation District's (the "District") Kings River Entitlement and store the water for later use during periods of demand in the same season or during dry years (Provost & Pritchard, 2010).

The District's existing facility consists of a 35-acre basin located at the northwest corner of North and Jameson Avenues (See **Figure A**). The Project consists of a new 65-acre basin to expand the total basin area to approximately 100 acres. The Project also includes 3 recovery wells located adjacent to the basins.

The City is partnering with the District to secure additional water supply from the groundwater bank to meet water demand increases associated with planned growth pursuant to the Water Master Plan Updates (see previous section). The District will construct, own and operate the Jameson Facility and the City will reimburse the District for construction costs. The City will

purchase available water from the groundwater bank on an annual basis to supplement other City water supplies.

Normal operation of the Jameson Facility will include the following:

- Surplus water will be conveyed from Mill Ditch to Lower Dry Creek or the Houghton Canal. Surplus water will be diverted to the Jameson Facility directly from Lower Dry Creek or from the Houghton Canal via the Thompson Extension (See **Figure B**).
- Surplus water will be diverted into the basins and percolated into the groundwater table. The percolated water will be "banked" in the groundwater table for later use. The recovery wells will be used to extract percolated water from the groundwater table at the time of use.

In order to facilitate delivery to the City, the District will exchange water extracted at the Jameson Facility with other water supplies as described below:

- Under normal operations the District will deliver surface water to the City's SWTP, located at the southwest corner of Bullard and Leonard Avenues, via the Enterprise Canal (See **Figure B**).
- The City's SWTP is hydraulically located upstream of the Jameson Facility. Therefore the District will deliver water from its surface water supply to the City by way of an internal exchange for water extracted from the Jameson Facility.
- The District will pump water from the recovery wells at the Jameson Facility into its distribution system to make deliveries to water users hydraulically located downstream of the Jameson Facility as a part of the exchange.

The City's service area is not located entirely within the boundary of the District's service area. Furthermore, the surface water delivered to the City will be subject to certain place of use restrictions. The City will abide by all place of use restrictions which will limit where the water supply can be used. The City will be required to redirect unrestricted water from its other water supplies to serve these restricted areas.

4) Jameson Groundwater Banking Agreement

The City and the District have finalized an agreement that will stipulate the terms of the Jameson Groundwater Banking Facility. On June 14, 2011, the City provided P&P with a copy of the final agreement entitled *Water Banking and Reliability Agreement* ("Agreement"). The agreement was provided in electronic form and the file name is "Clovis-Jameson Agreement 5-25-11." The terms of this agreement are summarized below:

- a) The District will construct, own and operate the Jameson Facility for the purpose of groundwater banking to provide a surface water supply to the City. The Jameson Facility consists of approximately 100 acres of percolation basins and 3 recovery wells.
- b) The City will reimburse the District for the total cost to construct the Jameson Facility, which is estimated at \$5.5 million.

- c) The District will operate the Jameson Facility and exchange water internally to provide a surface water supply to the City. Normal groundwater banking and water exchange operations will be as described in the previous section.
- d) The District will provide a surface water supply to the City of up to 4,500 acre-feet per year, which is the anticipated maximum annual yield of the Jameson Facility. The annual yield is the volume of water percolated into the groundwater table less 10% to account for losses.
- e) The surface water will be delivered to the City at (1) the Clovis SWTP; (2) the Fresno SWTP pursuant to the Intertie Agreement; (3) any recharge or flood control basin that can receive the City's portion of water from the District's Kings River Entitlement; or (4) any other mutually agreed upon location within the District's boundaries.
- f) The surface water physically delivered to the City will be subject to place of use restrictions; however, the City may redirect existing unrestricted water supplies to said restricted areas.
- g) The City will submit a request for water deliveries at the beginning of each contract year. The City can request an amount less than or equal to 4,500 acre-feet based on projected water needs. If the City requests less than 4,500 acre-feet of water in a given year; the balance of the annual yield amount cannot be carried over to the next contract year.
- h) The District will make every reasonable effort to get "supplemental water" if the amount of water requested by the City is not available. The City will pay the cost of acquiring supplemental water plus a 25% administrative fee.
- i) The District will pay all operating expenses associated with the Jameson Facility. The City will pay the District for water requested for delivery at the beginning of each contract year at the "per acre-foot" rate established in the Agreement.
- j) An advisory committee will monitor the effects of the Jameson Facility operations on groundwater conditions and properties in the area. The committee membership will include representative for the area landowners, the District and the City.

5) Water Source for Jameson Facility and Impacts to Current Users

The District's surplus water will be delivered to the Jameson Facility and stored in the groundwater bank. Surplus water includes water received by the District from its Kings River Entitlement, its Central Valley Project (CVP) allotment, and local water. A surplus of Kings River and CVP water may occur in wet years when the District's share of water available is higher than water user demands for irrigation. Local water consists of storm water runoff collected and diverted into the District's irrigation distribution system for flood control. A surplus of local water occurs during the rainy season when there are no demands for irrigation water.

There are no current users of the water that will be used for groundwater banking since the surplus water is the amount of water available in excess of demands from the current water users. Surplus water is not used otherwise and would be diverted to the San Joaquin River and ultimately discharged to the ocean. Therefore no current water users will be impacted by proposed groundwater banking associated with the Jameson Facility.

6) Water Source for Exchange to City and Impacts to Current Users

The District will use its Kings River Entitlement and CVP allotment as the source of surface water to be physically delivered to the City SWTP. The District will conduct an internal water exchange between the surface water delivered to the City and the water extracted from the groundwater bank at the Jameson Facility. Water pumped from the groundwater bank will be physically delivered to water users hydraulically located downstream of the Jameson Facility in lieu of the District's Kings River Entitlement and CVP allotment water.

The current users of the surface water that will be delivered to the City will have their water supply replaced with water yielded from the Jameson Facility. For water accounting purposes, the City will indirectly receive its water from the surplus water stored in the groundwater bank even though water delivered to the City will physically be from a separate source. Therefore no current water users will be impacted by the proposed deliveries to the City.

7) Jameson Facility Water Banking and Impacts to Local Groundwater Levels and Wells in the Vicinity of the Jameson Water Bank

The planned operation of the Jameson Facility will consist of recharging approximately 5,000 acre-feet during a normal year. The District plans to recover an annual yield of 4,500 acre-feet pursuant to the Agreement. The annual yield will be 10% less than the amount recharged to account for losses and mitigate any potential impacts to local groundwater levels as is practiced at the District's other banking sites.

The District will implement a Groundwater Monitoring Program (GMP), to provide annual monitoring and reporting, and provide oversight from an advisory committee; similar to the program implemented for the Waldron Pond Recharge Facility. The GMP will allow the District to track recharge, recovery well pumping, and groundwater levels to aid in the Jameson Facility operation and ensure that the Project does not have a significant impact on groundwater conditions. The advisory committee will include a representative from the District, the City and area landowners.

The GMP will mitigate any affects of the groundwater levels. Reference is made to the enclosed "Operations Report for Waldron Banking Facilities 2010 Water Year" (Provost & Pritchard, 2011). The depth of the groundwater rose approximately 5 to 10 feet in the vicinity of the Waldron Facility as a result of recharge and recovery operations during the 2010 water year (Provost & Pritchard, 2011). Therefore, no significant impact is anticipated to local groundwater levels and wells in the vicinity of the Jameson Facility as a result of the Project.

8) City Internal Water Transfer to Areas Outside the District's Boundary (and impacts to local groundwater levels)

Surface water delivered to the City will be subject to any place of use restrictions associated with the water. The City will abide by all place of use restrictions which will limit where the water supply can be used (see Section 3 above). The additional surface water supply from the Jameson Groundwater Banking Project will allow other non-restricted water supplies, such as groundwater, to be used in restricted areas. The City will not increase groundwater pumping as a result of this internal water transfer. Therefore no significant impacts are anticipated to local groundwater levels as a result of the Project.

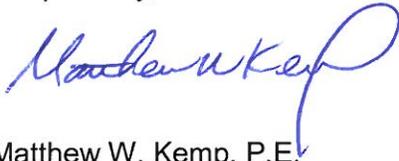
9) Groundwater Banking Operations During Critical Dry Years

Reference is made to the enclosed "Operations Report for Waldron Banking Facilities 2010 Water Year" (Provost & Pritchard, 2011). Table 2-1 (see page 4 of the enclosure) provides a summary of the District's recharge and recovery operations between 2005 and 2010. Even during drought years, such as 2007, the District was able to recharge 2,995 acre-feet, providing availability of groundwater for recovery.

Therefore even during "critical" drought years it is anticipated that some water supply will be available for recharge and recovery during the following year to make water available to the City. However, the annual yield available following "critical" years may be less than 4,500 acre-feet as provided in the Agreement. No impacts are anticipated to local groundwater levels since the allowable annual yield will be less than the amount recharged; less 10% to account for losses.

Thank you for providing P&P with this opportunity to assist Clovis in preparation of the environmental documents for the Jameson Groundwater Banking Project. If you have any questions regarding this evaluation or would like to discuss the results, please do not hesitate to give me a call.

Respectfully,



Matthew W. Kemp, P.E.
RCE 66088

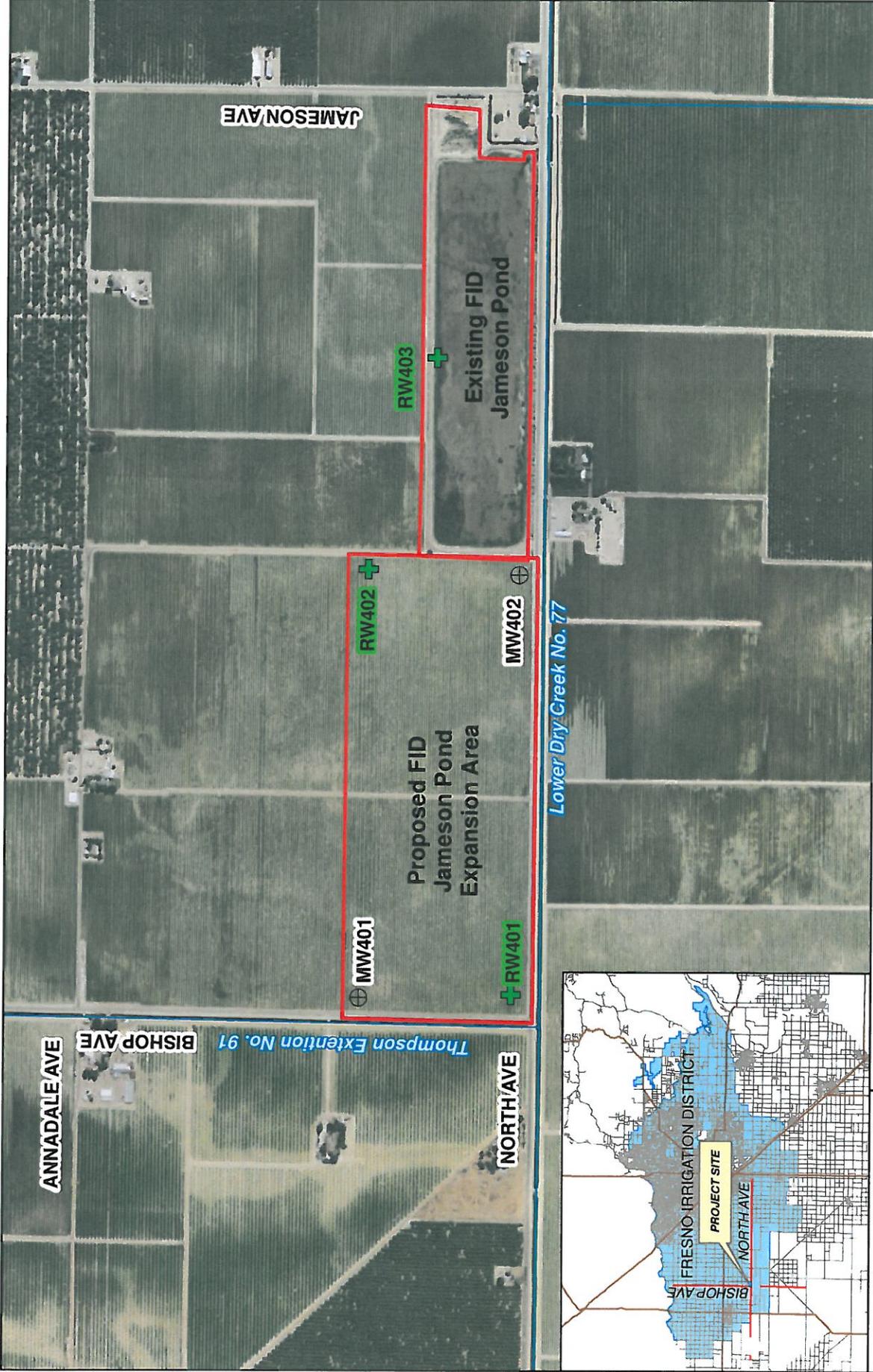


Date
Signed 6/21/11

Enclosures:

1. Figure A
2. Figure B
3. Operations Report for Waldron Banking Facilities 2010 Water Year

cc: Steve White, City of Clovis - via e-mail
Mike Leonardo, City of Clovis - via e-mail
Brian Ehlers, Provost & Pritchard - via e-mail
File: 101711C1-T1



Legend

Project Wells

- ⊕ Monitoring
- ⊕ Recovery

FIGURE A

Project Location Map

Jameson Groundwater Banking Facility

0 400 800 Feet

PROVOST & PRITCHARD
EST. 1918
CONSULTING GROUP
An Employee Owned Company

286 W. Cronwell Ave.
Fresno, CA 93711-6162
(559) 449-2700

Legend

Project Wells

- ⊕ Monitoring
- ⊕ Recovery

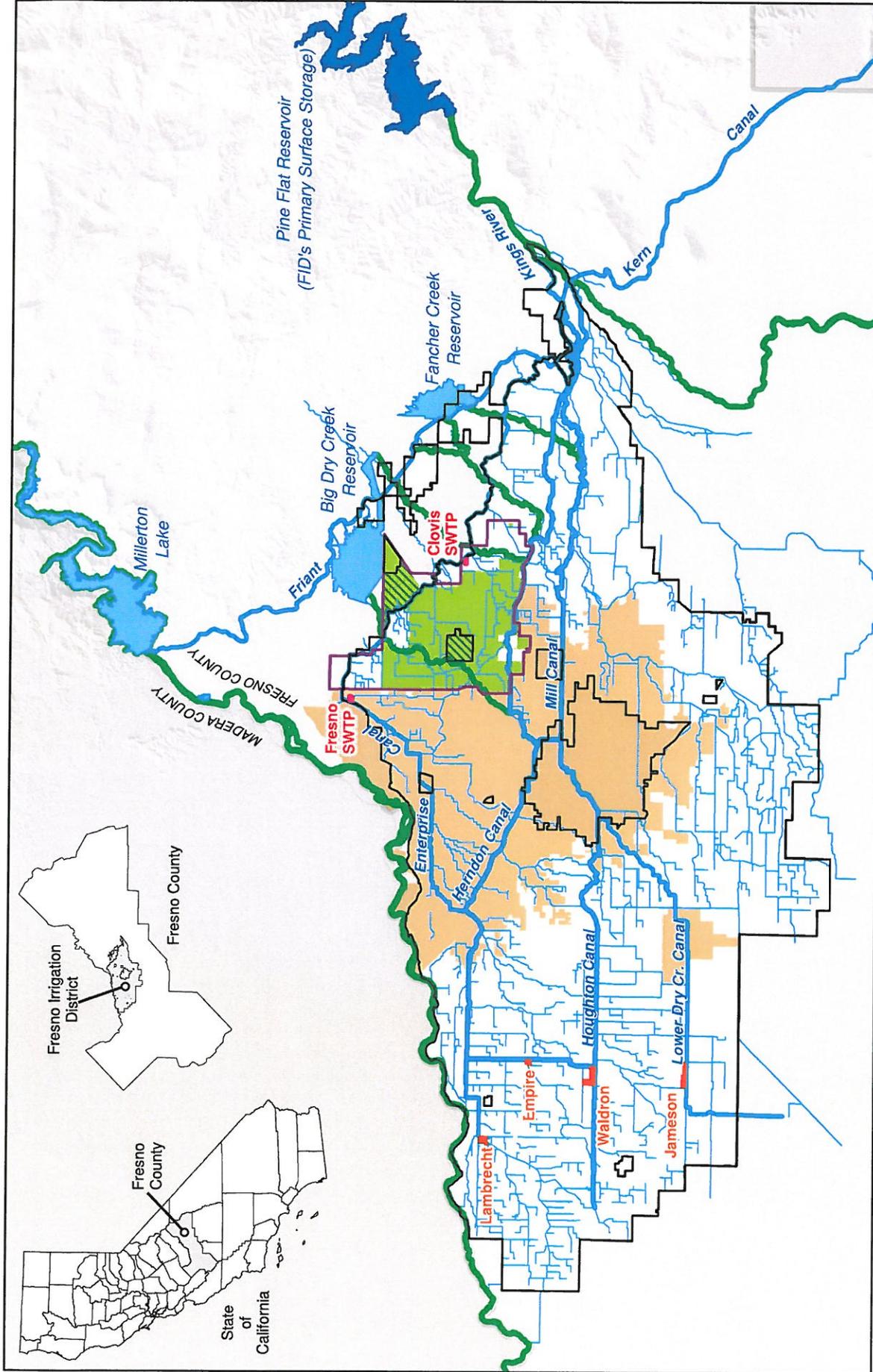


FIGURE B
Fresno Area Regional Map
 Jameson Groundwater Banking Facility



0 1 2 3 4 5 Miles

PROVOST & PRITCHARD
 CONSULTING GROUP
 EST. 1988
 286 W. Cromwell Ave.
 Fresno, CA 93711-6162
 (559) 449-2700
 An Employee Owned Company

4/27/2011 \\pinellatidwg_dgn\Clients\Fresno ID - 1038\10380929-Jameson Pond Expansion Project\GISMap\Project_location1-1_11x17.mxd

Gary Serrato, FID General Manager
Lisa Koehn, Assistant Director of Public Utilities, City of Clovis
Paul Lanfranco, Project Area Landowner
Nick Nazaroff, Project Area Landowner
Gary Reitz, Project Area Landowner
Jim Wulf, Project Area Landowner

The Committee provides guidance to the District in response to local concerns based on review of the data and Project operation. They are expected to ensure that the Project does not create conditions that are worse than would have prevailed without the Project, and give due recognition to the benefits that may result from the Project. Meetings are set as needed to keep the Committee informed of the operations of the Project. Unfortunately, Mr. Reitz passed away recently. FID is in the process of finding a landowner near the project to replace Mr. Reitz.

1.4 Description of Groundwater Monitoring Program

A Groundwater Monitoring Program (GMP) for the Project sites was developed in March of 2009. The GMP allows the District to track recharge, recovery well pumping, groundwater levels and groundwater quality, and provide a monitoring tool to aid in operating the Project. An effective GMP will help alleviate concerns regarding potential Project impacts on adjacent landowners. The objectives of this program are to provide the District and the Committee with a documented framework for the program that allows the District and Committee to:

- A. Determine long term recharge rate for the facility.
- B. Evaluate effect of groundwater recharge on shallow groundwater levels beneath and adjacent to the facility.
- C. Determine drawdowns during recovery well pumping in zones tapped by nearby water supply wells.
- D. Evaluate development of operation and maintenance procedures to maintain or enhance recharge rates.
- E. Evaluate need for measures to increase recharge rates, should long-term rates be found inadequate.
- F. Evaluate the need for measures to reduce groundwater mounding should it be found to adversely affect properties or public facilities adjacent to the facility.
- G. Determine measures to limit drawdowns in water supply wells in area if needed.
- H. Evaluate ability to monitor Project operations and to allow controls so that the Project accomplishes the goals of developing additional water supplies while not negatively impacting neighboring landowners.
- I. Evaluate effect of groundwater recharge on local groundwater quality.

2 OPERATIONS SUMMARY FOR 2010 WATER YEAR

2.1 Recharge Operations

The runoff for the 2010 water year was approximately 118% of average on the Kings River and 111% of average for the San Joaquin River¹. This resulted in an 8 month irrigation season which ran from March 1, 2010 through October 31, 2010. The District was able to make gross deliveries to all three sites totaling 23,022 AF. During the 2010 water year, 12,976 AF were delivered at Waldron, 1,995 AF were delivered at Empire and 8,051 acre feet were delivered at Lambrecht. Deducting 10% for losses from the gross deliveries, the credited recharge between all three sites totaled 20,718 AF. Of the amount credited for recharge, 11,678 AF were recharged at Waldron, 1,795 AF were recharged at Empire and 7,246 acre feet were recharged at Lambrecht. **Tables A-1, A-2, and A-3 in Appendix A** summarizes the monthly deliveries for Waldron, Empire and Lambrecht respectively.

2.2 Recovery Operations

From July 2010 through October 2010, the District was able to recover 9,400 AF of the water stored at the three sites. During the 2010 water year, 4,294 AF were recovered at Waldron, 1,116 AF were recovered at Empire and 3,990 AF were recovered at Lambrecht.

2.3 Operations Impact on Stored Water

As a result of both the recovery and recharge activities over the past water year, the amount of water stored at Waldron, Empire, and Lambrecht have increased. For Waldron, the water year began with 6,483 AF in storage and ended with 13,867 AF for an increase of 7,383 AF. For Empire, the water year began with 928 AF and ended with 1,607 AF for an increase of 679 AF. Lastly for Lambrecht, the water year began with 10,369 AF in storage and ended with 13,625 AF for an increase of 3,256 AF. Between all three sites, the storage increased by 11,318 AF. **Table 2-1** summarizes the entire Project's operations since inception of operations in 2005.

¹ Source: California Department of Water Resources, California Data Exchange Center website. <http://cdec.water.ca.gov/cgi-progs/reports/FLOWOUT.201009>

SECTION TWO

TABLE 2-1
Summary of Project Recharge & Recovery Operations

Waldron						
Year	Beginning of Year Storage (AF)	Gross Deliveries (AF)	Losses (10%) (AF)	Recharge (AF)	Recovery (AF)	End of Year Storage (AF)
2005	0	1,857	186	1,671	0	1,671
2006	1,671	1,355	136	1,219	0	2,890
2007	2,890	676	68	608	0	3,498
2008	3,498	7,390	739	6,651	1,651	8,498
2009	8,498	2,989	298	2,691	4,706	6,483
2010	6,483	12,976	1,298	11,678	4,294	13,867
Totals		27,243	2,725	24,518	10,651	

Empire						
Year	Beginning of Year Storage (AF)	Gross Deliveries (AF)	Losses (10%) (AF)	Recharge (AF)	Recovery (AF)	End of Year Storage (AF)
2005*	0	0	0	0	0	0
2006	0	225	23	202	0	202
2007	202	659	66	593	0	795
2008	795	721	72	649	399	1,045
2009	1,045	1,217	122	1,095	1,212	928
2010	928	1,995	200	1,795	1,116	1,607
Totals		4,817	483	4,334	2,727	

Lambrecht						
Year	Beginning of Year Storage (AF)	Gross Deliveries (AF)	Losses (10%) (AF)	Recharge (AF)	Recovery (AF)	End of Year Storage (AF)
2005	0	1,690	169	1,521	0	1,521
2006	1,521	0	0	0	0	1,521
2007	1,521	1,993	199	1,794	0	3,315
2008	3,315	6,213	622	5,591	393	8,513
2009	8,513	6,783	678	6,105	4,249	10,369
2010	10,369	8,051	805	7,246	3,990	13,625
Totals		24,730	2,473	22,257	8,632	

Project Total						
Year	Beginning of Year Storage (AF)	Gross Deliveries (AF)	Losses (10%) (AF)	Recharge (AF)	Recovery (AF)	End of Year Storage (AF)
2005	0	3,547	355	3,192	0	3,192
2006	3,192	1,580	159	1,421	0	4,613
2007	4,613	3,328	333	2,995	0	7,608
2008	7,608	14,324	1,433	12,891	2,443	18,056
2009	18,056	10,989	1,098	9,891	10,167	17,780
2010	17,780	23,022	2,303	20,719	9,400	29,099
Totals		56,790	5,681	51,109	22,010	

NOTE: * The Empire site was not able to receive water until the 2006 water year.

3 MONITORING RESULTS

3.1 Water Level Measurements

The District continues to measure water levels in selected wells on a monthly basis in the vicinity of each of the three sites. **Plate 1** shows the locations of all of the wells measured for the Project. **Plates 2, 3, and 4** shows the locations of the wells measured at the Empire, Lambrecht, and Waldron sites respectively. **Table B-1** in **Appendix B** summarizes the completion depth and perforated intervals for the on-site wells. Overall, water levels have been relatively stable at the sites over the long term. In most recent years water levels have risen, partly due to intentional recharge.

In general, the depth to groundwater at the Waldron site is generally between 50 and 80 feet. The depth to groundwater at the Empire site is approximately 55 to 65 feet. The depth to groundwater at the Lambrecht site is generally between 35 and 45 feet. Much of the data presented represents intermediate depths tapped by irrigation wells in the area. The depth to groundwater beneath the Waldron, Empire, and Lambrecht sites rose by approximately 5 to 10 feet over the course of the 2010 water year (October 2009 to September 2010). Groundwater elevation maps for spring and fall 2010 for all three sites are included as **Plates 5 through 10**. **Tables B-2 and B-3** in **Appendix B** summarize the monthly depth to groundwater measurements for the off-site wells that were measured during the 2010 water year. Water level hydrographs for the measured wells are also included in **Appendix B**.

Water level hydrographs of onsite monitor wells for the 2010 water year are provided in **Appendix B** for each site. Groundwater levels fell at all three sites during pumping operations from July to October, but fluctuated very little during the rest of the water year.

3.1.1 Waldron Banking Facility

A drawdown from the pumping operations of RW101, RW102, or RW103 was indicated in well 03L1, which is adjacent to the banking facility and between wells RW101 and RW103. The hydrograph shapes for 03L1 and MW102 are similar, and the difference in water levels was less for 03L1 than MW102. During the operations of the wells (from July 2010 through October 2010) MW102 experienced water level decline of approximately 27 feet while 03L1 experienced a water level decline of approximately 14 feet. In addition, drawdown was indicated in wells 34K1, 3B1, 4J1, and 9H1; approximately 7 feet, 6 feet, 20 feet, and 12 feet respectively. The hydrographs for these wells also showed full recovery of water levels in the affected wells after FID ceased recovery pumping and a raised groundwater level for the 2010 water year of between 5 and 10 feet. It should be noted that the District was delivering surface water during its pumping operations, so landowners were likely not utilizing their wells.

SECTION THREE

3.1.2 Empire Banking Facility

A drawdown of approximately 53 feet was indicated in MW201 due to the RW201 pumping operations. MW 201 is located approximately 100 feet away from RW201, resulting in the large observed drawdown. No off-site wells showed signs of drawdown due to the pumping operations. The two on-site monitoring wells and wells 23N1 and 27B1 indicate a raised groundwater levels of 5 to 10 feet for the 2010 water year.

3.1.3 Lambrecht Banking Facility

Stable groundwater levels are indicated in the offsite measured wells. A drawdown of approximately 12 to 15 feet was indicated in MW 301 and MW 303 due to the RW 301, RW 302, and RW 303 pumping operations. The groundwater levels in MW 301 and MW 303 showed full recovery once pumping operations ceased. Raised groundwater levels of between 5 to 10 feet are indicated in the three measured on-site monitor wells for the 2010 water year.

3.2 Water Quality Monitoring

Water quality testing was performed on surface water in the spring and groundwater in the fall (at the Waldron site) during the 2010 water year at all three sites. **Tables 3-1 and 3-2** summarize results of water quality testing performed in March 2010 and July 2010 respectively. Sampling was generally consistent with the March 2009 Groundwater Monitoring Plan, except the monitoring wells were not sampled when the recovery pumping ceased. The water quality laboratory reports are on record with FID and are available for review upon request.

3.2.1 Basin Surface Water Sampling

Surface water samples were collected from each recharge facility in March 2010. At all sites, the constituents measured fell within the maximum constituent level (MCL) for drinking water, with one exception at Waldron. The measured pH was 9, slightly higher than the MCL for drinking water. A summary of the test results is provided in **Table 3-1**. A comparison to the test results from the sampled surface water taken in March 2009 shows no significant changes.

SECTION THREE

TABLE 3-1
Summary of Water Quality Sampling - March 2010

Analyte	Units	MCL	Waldron Surface Water	Empire Surface Water	Lambrecht Surface Water
Chloride	mg/L	250	5	4.7	6
Nitrate as NO3	mg/L	10	ND	ND	ND
pH	pH Units	6.5-8.5	9	8.7	8.4
Sulfate as SO4	mg/L	250	3.3	3.5	4
Arsenic	µg/L	10	ND	ND	ND
Iron	mg/L	0.3	0.78	0.35	0.33
Magnesium	mg/L	N/A	5.9	5.5	6.3
Sodium	mg/L	N/A	6.3	6.2	7
Dibromochloropropane (DBCP)	µg/L	0.2	ND	ND	ND
Ethylendibromide (EDB)	µg/L	0.05	ND	ND	ND
Gross Alpha	pCi/L	15	ND	3.1	ND

NOTE:

MCL: Maximum Contaminant Level (Environmental Protection Agency Drinking Water Standards and R.S. Ayers, 1985)

ND: None Detected

3.2.2 Groundwater Sampling

Groundwater was sampled at all three sites in July and October. A summary of the test results is provided in **Table 3-2**, **Table 3-3**, and **Table 3-4**. A comparison to the test results taken in July 2009 shows some general improvement in water quality. However, the values measured this year at the Waldron Site well MW103 for Nitrate and Gross Alpha are still higher than the MCL for drinking water.

SECTION THREE

TABLE 3-2
Waldron
Summary of Water Quality Sampling

July 2010

Analyte	Units	MCL	RW 101	RW 102	RW 103	MW 102	MW 103	MW 104
Chloride	mg/L	250	11	12	24	4.7	17	2.2
Nitrate as NO3	mg/L	45	12	5.7	19	6.3	76	1.1
pH	pH Units	6.5-8.5	8.0	7.7	7.8	8.4	7.5	7.8
Sulfate as SO4	mg/L	250	5.3	7.4	11	2.8	47	2.9
Arsenic	µg/L	10	ND	5.1	ND	2.1	5.1	11
Iron	mg/L	0.3	ND	ND	ND	0.19	ND	ND
Magnesium	mg/L	N/A	7.4	8.5	14	3.1	23	1.8
Sodium	mg/L	N/A	20	19	21	22	56	20
Dibromochloropropane (DBCP)	µg/L	0.2	ND	ND	0.01	ND	ND	ND
Ethylenedibromide (EDB)	µg/L	0.05	ND	ND	ND	ND	ND	ND
Gross Alpha	pCi/L	15	ND	6.63	15.2	1.99	17.2	ND

October 2010

Analyte	Units	MCL	RW 101	RW 102	RW 103
Chloride	mg/L	250	11	23	21
Nitrate as NO3	mg/L	45	12	11	17
pH	pH Units	6.5-8.5	8.2	8.2	8.3
Sulfate as SO4	mg/L	250	5.4	11	9.8
Arsenic	µg/L	10	3.2	5	2.1
Iron	mg/L	0.3	ND	ND	ND
Magnesium	mg/L	N/A	6.4	12	11
Sodium	mg/L	N/A	22	21	21
Dibromochloropropane (DBCP)	µg/L	0.2	ND	ND	ND
Ethylenedibromide (EDB)	µg/L	0.05	ND	ND	ND
Gross Alpha	pCi/L	15	3.31	7.95	15.2

NOTE:

MCL: Maximum Contaminant Level (Environmental Protection Agency Drinking Water Standards and R.S. Ayers, 1985)
ND: None Detected

SECTION THREE

TABLE 3-3
Empire
Summary of Water Quality Sampling

July 2010

Analyte	Units	MCL	RW 201	MW 201	MW 202
Chloride	mg/L	250	6.2	6.5	2.4
Nitrate as NO3	mg/L	45	10	9.2	2.3
pH	pH Units	6.5-8.5	8.0	8.1	7.6
Sulfate as SO4	mg/L	250	5.1	3.7	3.4
Arsenic	µg/L	10	ND	ND	ND
Iron	mg/L	0.3	ND	0.09	0.06
Magnesium	mg/L	N/A	4.4	4.1	8
Sodium	mg/L	N/A	25	23	4.5
Dibromochloropropane (DBCP)	µg/L	0.2	ND	ND	ND
Ethylenedibromide (EDB)	µg/L	0.05	ND	ND	ND
Gross Alpha	pCi/L	15	ND	ND	ND

October 2010

Analyte	Units	MCL	RW 201
Chloride	mg/L	250	6.6
Nitrate as NO3	mg/L	45	10
pH	pH Units	6.5-8.5	8.3
Sulfate as SO4	mg/L	250	4.9
Arsenic	µg/L	10	2.1
Iron	mg/L	0.3	ND
Magnesium	mg/L	N/A	4.3
Sodium	mg/L	N/A	24
Dibromochloropropane (DBCP)	µg/L	0.2	ND
Ethylenedibromide (EDB)	µg/L	0.05	ND
Gross Alpha	pCi/L	15	1.99

NOTE:

MCL: Maximum Contaminant Level (Environmental Protection Agency Drinking Water Standards and R.S. Ayers, 1985)

ND: None Detected

SECTION THREE

TABLE 3-4
Lambrecht
Summary of Water Quality Sampling

July 2010								
Analyte	Units	MCL	RW 301	RW 302	RW 303	MW 301	MW 303	MW 304
Chloride	mg/L	250	2.2	10	2.3	3.8	2.6	2.3
Nitrate as NO3	mg/L	45	2	5.6	1.9	2.4	1.3	ND
pH	pH Units	6.5-8.5	7.9	7.9	7.8	7.7	7.8	8.0
Sulfate as SO4	mg/L	250	2.9	3.8	3	3.5	2.6	2.3
Arsenic	µg/L	10	4.2	5.4	5	4.8	4.3	ND
Iron	mg/L	0.3	ND	ND	ND	1.4	ND	ND
Magnesium	mg/L	N/A	2.2	2.3	3.2	3.3	2.6	2.9
Sodium	mg/L	N/A	11	30	7	4.4	5.4	2.8
Dibromochloropropane (DBCP)	µg/L	0.2	ND	ND	ND	ND	ND	ND
Ethylenedibromide (EDB)	µg/L	0.05	ND	ND	ND	ND	ND	ND
Gross Alpha	pCi/L	15	ND	ND	ND	ND	ND	ND

October 2010					
Analyte	Units	MCL	RW 301	RW 302	RW 303
Chloride	mg/L	250	3.2	18	3.4
Nitrate as NO3	mg/L	45	3.1	6.4	2.5
pH	pH Units	6.5-8.5	8.1	8.1	8.0
Sulfate as SO4	mg/L	250	3.2	3.8	3
Arsenic	µg/L	10	6.4	5.4	7.4
Iron	mg/L	0.3	ND	ND	ND
Magnesium	mg/L	N/A	2.3	2.7	2.8
Sodium	mg/L	N/A	14	36	12
Dibromochloropropane (DBCP)	µg/L	0.2	ND	ND	ND
Ethylenedibromide (EDB)	µg/L	0.05	ND	ND	ND
Gross Alpha	pCi/L	15	1.99	ND	ND

NOTE:

MCL: Maximum Contaminant Level (Environmental Protection Agency Drinking Water Standards and R.S. Ayers, 1985)

ND: None Detected

4 RECOMMENDATIONS

Based on the data collected and provided by FID, the following recommendations are offered for consideration.

1. Continue to closely monitor the operations of the Waldron Banking Facilities recovery wells impact on offsite wells 03L1, 04J1 and 10A1.
2. Survey the reference point elevations for the following wells:

Waldron Site	Empire Site	Lambrecht Site
03G1	22P2	13H1
MW101	27B1	18A1
MW102	MW201	18M1
MW103	MW202	MW301
MW104		MW302
		MW303
		MW304

This will allow these wells to be included in the calculations for the groundwater elevations. The reference point survey should be done on the same datum as used for the original well survey.

3. Install pressure transducers and data loggers for the on-site monitoring wells at all three sites (ten total) so daily water level data can be kept. FID should continue to sound these wells monthly after the sensors are installed. The sensors should be recalibrated annually, or if manual readings indicate the sensor is not reading correctly.
4. Test water quality samples for Total Dissolved Solids, and Manganese. Manganese can contribute to a slime build up in pipelines and valves causing operational problems.
5. Continue to sample all wells and basins at the intervals stated in the March 2009 Groundwater Monitoring Plan.

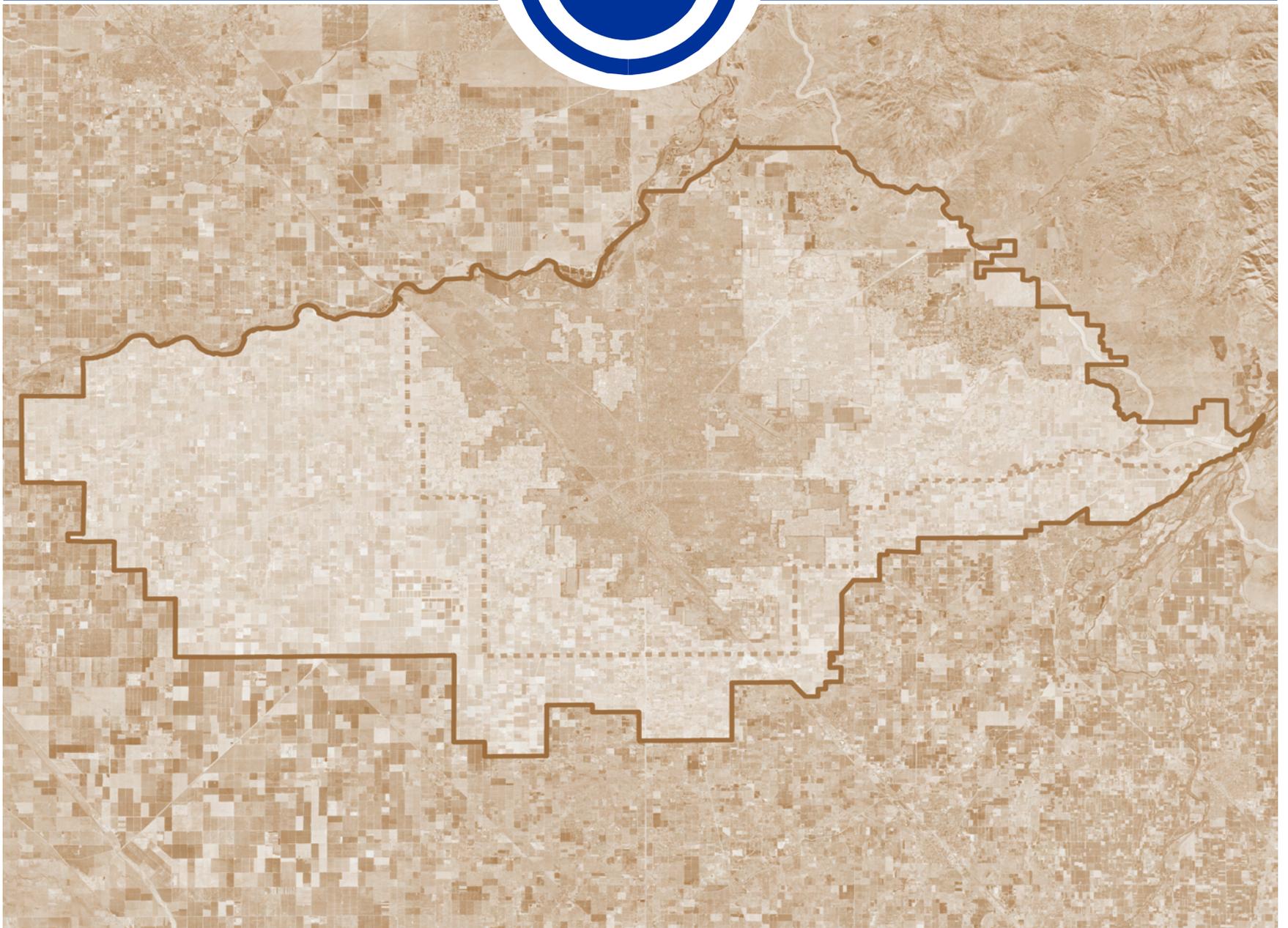
**APPENDIX F
GROUNDWATER PLAN**

**FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN
WORKING DRAFT – DECEMBER 2005**

**WORKING
DRAFT**
December 2005



Fresno Area Regional
**Groundwater
Management
Plan**



- *Fresno Irrigation District* ● *City of Clovis* ● *Fresno Metropolitan Flood Control District* ●
- *County of Fresno* ● *City of Fresno* ● *City of Kerman* ● *Bakman Water Company* ●
- *Garfield Water District* ● *Malaga County Water District* ● *Pinedale County Water District* ●

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

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- B - Memorandum of Understanding
- C - Glossary

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

LIST OF ABBREVIATIONS

AB	Assembly Bill
AF	Acre-feet
CSA	Community Service Area
CVP	Central Valley Project
DBCP	Dibromo-Chloropropane
DHS	Department of Health Services
DWR	Department of Water Resources
EDB	Ethylene Dibromide
EHS	Environmental Health System
EPA	Environmental Protection Agency
FCEHD	Fresno County Environmental Health Department
FID	Fresno Irrigation District
FMFCD	Fresno Metropolitan Flood Control District
GAC	Granulated Activated Carbon
GMP	Groundwater Management Plan
HSA	Hydrologic Study Area
ISI	Integrated Storage Investigations
MCWD	Malaga County Water District
MG	Million Gallons
MGD	Million Gallons Per Day
MOU	Memorandum of Understanding
MTBE	Methyl Tertiary-Butyl Ether
NPDES	National Pollution Discharge Elimination System
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SWTP	Surface Water Treatment Plant
TAC	Technical Advisory Committee
TCE	Trichloroethylene
TCP	Trichloropropane
VOC	Volatile Organic Chemicals or Volatile Organic Compounds
WWD	Waterworks District
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

1 - INTRODUCTION

This Groundwater Management Plan (GMP or Plan) is a collaborative effort among eight public agencies and one private water company in the Fresno-Clovis metropolitan and surrounding area. The Plan documents a regional approach toward groundwater management, while still addressing individual goals and issues for each of the participants. The Plan satisfies the new requirements for Groundwater Management Plans created by the September 2002 California State Senate Bill No. 1938, which amended Sections 10753 and 10795 of the California Water Code. The Plan also addresses recommended components for a Groundwater Management Plan described in Appendix C of Department of Water Resources Bulletin 118 (2003 Update).

1.1 - Background Information on Regional Group

Background

The desire to develop and adopt a regional groundwater management plan for this region came from an effort to involve local stakeholders in development of a groundwater management plan for the Fresno Irrigation District (FID). In 2004, FID intended to update its groundwater management plan to meet SB 1938 requirements and DWR recommendations. In an effort to solicit comment from stakeholders, FID held a public hearing on July 7, 2004, to notify the public of FID's intent to modify its plan. The notice invited landowners and interested parties to make comment at the meeting and participate on a technical advisory committee. No public comments were received at the hearing. FID adopted a Resolution of Intent to Modify its Groundwater Management Plan on July 7, 2004.

A Technical Advisory Committee (TAC) was formed to provide input during preparation of the Plan. The TAC was comprised of local agency representatives and landowners. The first meeting of the TAC was held on November 18, 2004. A review of the new Water Code requirements was provided, as well as the initial expectations of the TAC. At this initial meeting, some of the agency representatives noted that they planned to prepare their own groundwater management plan and some expressed interest in developing a regional plan. It was decided to conduct another meeting with representatives of agencies that have overlapping boundaries with FID to determine the interest of other local stakeholders to participate in a cooperative or regional plan. This meeting was held on January 27, 2005. The meeting addressed the need for an updated plan, the new requirements in the Water Code, the benefits of a regional plan, and discussions on how to proceed with a regional groundwater management plan. From this meeting, it was determined that there was enough interest in developing a regional plan. The attendees at the meeting identified four major reasons for developing a regional plan:

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

- Cooperative groundwater management efforts
- Cost savings with preparing a regional plan and annual groundwater reports
- Inclusion of smaller agencies
- Regional funding opportunities

Cooperative Effort

Interested parties continued to meet to develop a Memorandum of Understanding (MOU) for preparation of the regional plan. The MOU was drafted and reviewed by each of the agencies, and monthly meetings with the agency representatives and landowners were held. The MOU was presented before each agency's governing body for discussion and public comment. The MOU was then adopted by each of the agencies. A copy of the signed MOU is included in Appendix B.

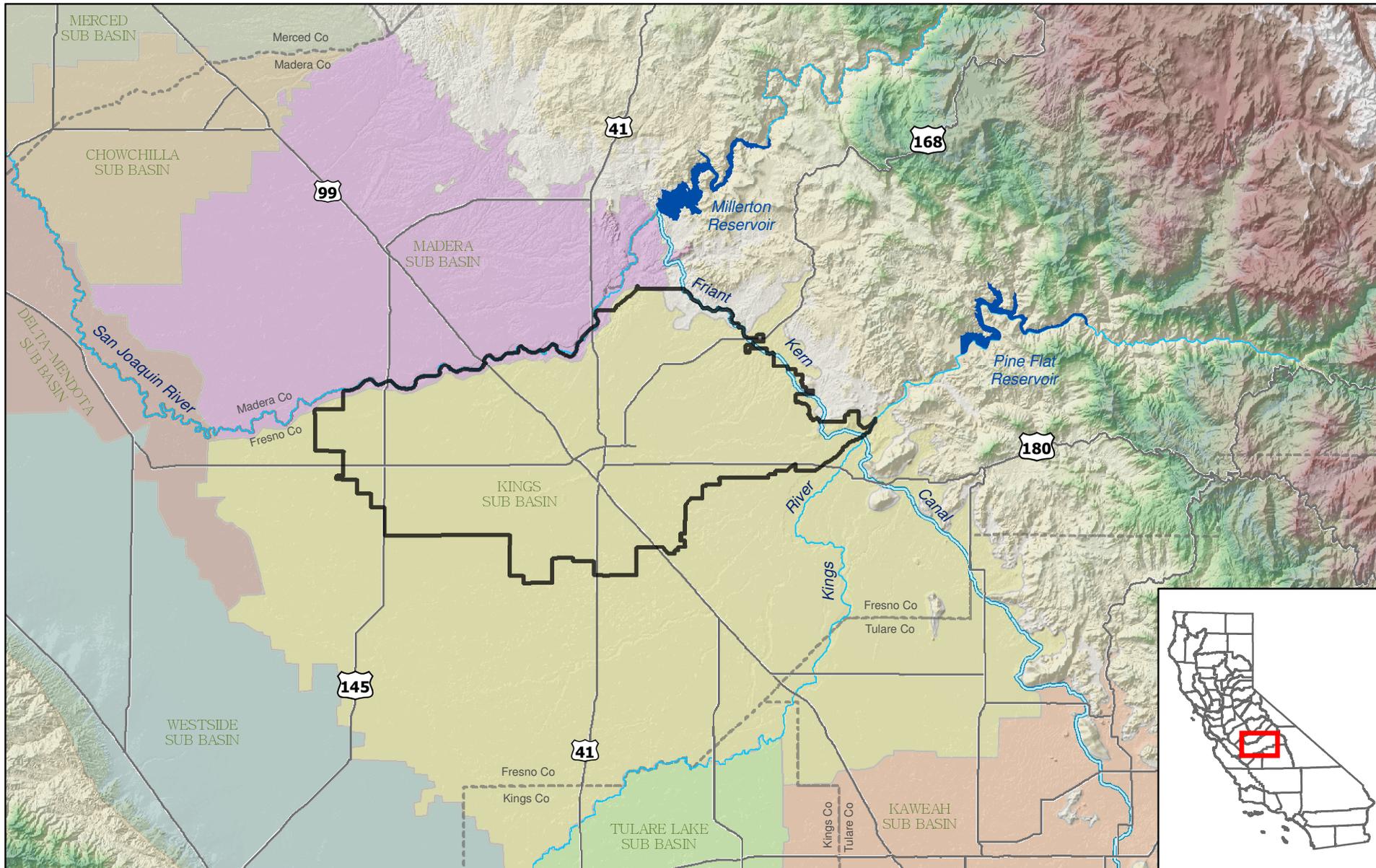
1.2 - Plan Area

The Plan Area lies within the Kings Groundwater Sub-basin, which lies within the San Joaquin Basin Hydrologic Study Area (HSA). The Kings Sub-basin is also identified as sub-basin 5-22.08 of the Tulare Lake Hydrologic Basin in the Department of Water Resources Draft Bulletin 118 updated in 2003, as shown in Figure 1-1. The Plan boundary generally follows the boundary of the Fresno Irrigation District, however it is extended in the northeast along Friant Road to Willow Avenue, then east to the Friant-Kern Canal, then south along the Friant-Kern Canal to FID's boundary near the Kings River. The participants to this Plan include:

- Fresno Irrigation District
- County of Fresno
- City of Fresno
- City of Clovis
- City of Kerman
- Malaga County Water District
- Pinedale County Water District
- Fresno Metropolitan Flood Control District
- Bakman Water Company

The participants are described in Section 2 and the Plan boundary and participant boundaries are shown in Figure 1-2. The Plan Area was determined based on the shared aquifer, and includes participants that are within close proximity within the aquifer and are actively managing water resources.

Consistent with provisions of the County's groundwater management plan, it is intended that this Plan supercede the County's existing Groundwater Management Plan only within the Plan Area. The County's existing Plan will still be in effect for the remainder of the County area.



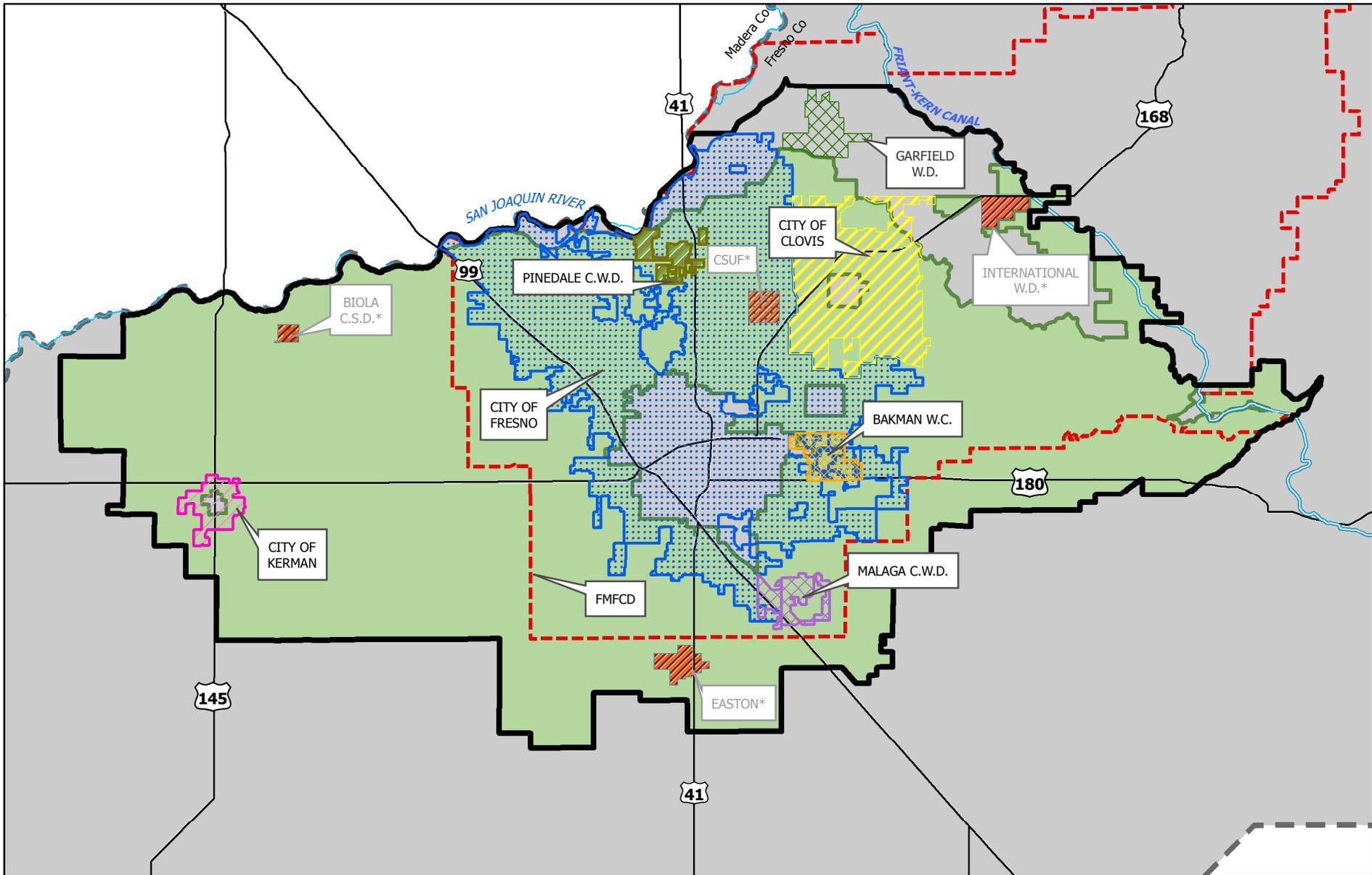
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 Fresno, CA 93711-6162
 (559) 449-2700

Groundwater Sub Basins

- | | | | |
|--|---------------|--|-------------|
| | Kaweah | | Westside |
| | Kings | | Chowchilla |
| | Madera | | Merced |
| | Delta-Mendota | | Tulare Lake |

GMP BOUNDARY

Figure 1-1
Groundwater Basin Map
 Fresno-Area Regional
 Groundwater Management Plan



0 1 2 3 4 Miles



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LEGEND

- COUNTY OF FRESNO
 - CITY OF FRESNO
 - CITY OF KERMAN
 - PINEDALE W.D.
 - CITY OF CLOVIS
 - GARFIELD W.D.
 - FRESNO I.D.
 - FMFCD Boundary
 - BAKMAN W.D.
 - MALAGA C.W.D.
 - *Agencies within plan boundary, not participating
 - GMP BOUNDARY
 - FRIANT-KERN CANAL
- The Plan area lies entirely within the County of Fresno, and the County is a participant to the Plan.
 The Plan area lies within the Kings River Conservation District.

Figure 1-2
Participating Agencies
 Fresno-Area Regional
 Groundwater Management Plan

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

1.3 - Purpose for this Groundwater Management Plan

The purpose of this Plan is to implement effective groundwater management that works toward maintaining a high quality and dependable water resource for the water users and landowners within the Plan Area, while minimizing negative impacts to other affected parties. The Plan documents the existing groundwater management efforts in the Plan Area that have been successful. The Plan also develops a coordinated and comprehensive approach to the future evaluation and management of groundwater resources within the Plan Area, in concert with other groundwater management activities within the groundwater basin. The Plan integrates past and present effective groundwater management activities with proposed activities to meet the following objectives:

1. Increase awareness of groundwater management efforts being performed by other local parties.
2. Provide benefits of cost savings for preparation, opportunities for regional funding and grant programs, inclusion of smaller local agencies, and the development of more cooperative groundwater efforts.
3. Allow smaller agencies to participate that otherwise would not have been able to fund the preparation of a GMP.
4. Include participants with overlapping boundaries.

1.4 - Previous Plans

Three participants to this Plan have previously adopted Groundwater Management Plans. FID adopted a Groundwater Management Plan in 1995, and the City of Clovis and the County of Fresno each adopted plans in 1997. This Plan supercedes the existing plans for FID and the City of Clovis, as their service areas are included within the Plan boundary. This Plan boundary only covers a portion of the County of Fresno, so at the time of this Plan's adoption, the County's existing plan will still apply to the area outside of this Plan's boundary. Elements from each of the previously adopted plans have been incorporated into this regional plan.

The participants in this Plan also recognize that many of the components of this Plan were previously identified in the Water Resources Management Plan for Fresno-Clovis Urban and Northeast Fresno County prepared by the County of Fresno in 1986 (herein called the 1986 Plan). The 1986 Plan followed the Interim Best Management Plan for Water Quality, Fresno-Clovis Urban and Northeast Fresno County. The 1986 Plan included detailed descriptions of the groundwater quality and quantity conditions within the area, described the water purveyors within the region, and included five of the same participants to this Plan: County of Fresno, City of Fresno, City of Clovis, Fresno Irrigation District, and Fresno Metropolitan Flood Control District. Other water purveyors within the area were described in the Plan, but not included as participants for

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

implementation. The plan area of the 1986 Plan was smaller than the area described in this Plan. The 1986 Plan includes surface water related objectives that are included in this Plan. Many of the activities of the 1986 Plan are still viable and have become a part of on-going operations for the five agencies involved. However, the committees formed to implement the activities proposed in the 1986 Plan have not actively met for many years, and there is a need to review and update the groundwater related activities described in that plan. This Plan is intended to be a continuation of the groundwater related objectives of the 1986 Plan, which included:

1. Preserve and enhance the existing quality of the area's groundwater.
2. Preserve untreated groundwater as the primary source of domestic water.
3. Maximize the available water supply, including conjunctive use of surface water and groundwater.
4. Conserve the water resource for long-term beneficial use and assure an adequate supply for the future.
5. Manage water resources to the extent necessary to ensure reasonable, beneficial, and continued use of the resource.

1.5 - Statutory Authority for Groundwater Management

The California legislature recognized that local groundwater management is preferable to State or Federal groundwater controls, and passed Assembly Bill 255 (AB 255) in 1989. AB 255 was the first statewide legislation allowing local water agencies to prepare and adopt groundwater management plans for their jurisdictions. California Assembly Bill No. 3030 (AB 3030), which became law on January 1, 1993, superceded AB 255, and authorized local agencies that are within groundwater basins, as defined in California Department of Water Resources (DWR) Bulletin 118, to prepare and adopt groundwater management plans. Each of the public agency participants to this Plan meets the requirements of a "local agency", as defined within Section 10752 of the Water Code.

Agencies adopting a Plan are authorized to enter into agreements with other local agencies or private parties to manage mutual groundwater supplies, including those existing in overlapping areas, as necessary to implement the Plan. Bakman Water Company has been an active participant in the development of this Plan, and has entered into the Memorandum of Understanding for its development and implementation.

1.6 - Groundwater Management Plan Components

This Plan includes the required and recommended components for a Groundwater Management Plan as identified in California Water Code Section 10753, et. seq. This Plan is also consistent with the recommended elements for a Groundwater Management Plan as identified in DWR Bulletin 118 (2003), Appendix C. Table 1-1 identifies the location within this document where each of the components is addressed.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Table 1-1 – Location of Groundwater Management Plan Components

Description	Plan Section(s)
California Water Code Mandatory Requirements (10750 <i>et seq.</i>)	
1. Documentation of public involvement	Appendix A, 1.1, 1.7
2. Groundwater basin management objectives	1.3, 4
3. Monitoring and management of groundwater elevations, groundwater quality, land subsidence and surface water	6
4. Plan to involve other agencies located in the groundwater basin	5.3
5. Monitoring protocols	6.3
6. Map of groundwater basin and agencies overlying the basin	Figure 1-1, 1-2
California Water Code Voluntary Components (10750 <i>et seq.</i>)	
7. Control of saline water intrusion	7.4
8. Identification and management of wellhead protection areas and recharge areas	7.3, 8.1
9. Regulation of the migration of contaminated groundwater	7.4, 7.5, 8.5
10. Administration of well abandonment and well destruction program	7.1
11. Mitigation of conditions of overdraft	8
12. Replenishment of groundwater extracted by water producers	8.1
13. Monitoring of groundwater levels and storage	6.1
14. Facilitating conjunctive use operations	8.4
15. Identification of well construction policies	7.2
16. Construction and operation by local agency of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects.	7.5, 8.1, 8.2, 8.4, 8.5, 8.6
17. Development of relationships with state and federal regulatory agencies	5.2, 5.3
18. Review of land use plans and coordination with land use planning agencies	9.1
Additional Components Recommended by DWR (App. C of Bulletin 118)	
19. Advisory committee of stakeholders	1.1, 5.1
20. Description of the area to be managed under the Plan	1.2, 2, 3
21. Descriptions of actions to meet management objectives and how they will improve water reliability	4 - 9
22. Periodic groundwater reports	9.2
23. Periodic re-evaluation of Groundwater Management Plan	9.4

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

1.7 - Adoption of Plan

Public Notice of Intention to Modify/Prepare a Regional Groundwater Management Plan
As required by the California Water Code, a public hearing was duly noticed on July 26, 2005 and August 2, 2005 consistent with California Water Code Section 10753.2(a), and held on August 10, 2005 to discuss adoption and implementation of the regional Plan. No public comments were received at this meeting.

Resolution of Intention to Modify/Prepare a Regional Groundwater Management Plan
Each agency adopted a Resolution for Intention to Modify/Prepare the Fresno-Area Regional Groundwater Management Plan. A copy of each agency's resolution is included in Appendix A. This resolution was then published on December 20, 2005 and December 27, 2005 consistent with California Water Code Section 10753.2(a).

Public Participation in Plan Development

The public was invited to participate in the development of the updated Groundwater Management Plan through the newspaper notices and the public hearing. The draft regional plan was then prepared with input from a Technical Advisory Committee. The Technical Advisory Committee includes landowners and representatives from each party participating in the plan. In October 2005, the Technical Advisory Committee included:

- Dale Stanton, Assistant General Manager, Fresno Irrigation District
- Lon Martin, Water Division Manager, City of Fresno
- Lisa Koehn, Assistant Utilities Director, City of Clovis
- Alan Weaver, Public Works Director, County of Fresno
- Phil Desatoff, Geologist, County of Fresno
- Jerry Lakeman, Fresno Metropolitan Flood Control District
- Alan Jacobsen, Public Works Director, City of Kerman
- Tim Bakman, Bakman Water Company
- Russ Holcomb, General Manager, Malaga County Water District
- John Garcia, General Manager, Pinedale County Water District
- Richard Carstens, Landowner
- Chris Palmer, Landowner

Public Notice of Intention to Adopt a Regional Groundwater Management Plan

As required by the California Water Code, a public hearing was duly noticed on August 2, 2005 and August 9, 2005, consistent with California Water Code Section 10753.2(a), and held on August 10, 2005 to discuss adoption and implementation of the regional Plan.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Resolution Adopting the Regional Groundwater Management Plan

Each agency adopted a Resolution for Adoption of the Fresno-Area Regional Groundwater Management Plan. A copy of each agency's resolution is included in Appendix A. This resolution was then published on December 20, 2005 and December 27, 2005, consistent with California Water Code Section 10753.2(a).

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

2 - PARTICIPANT INFORMATION

Eight public agencies and one private water company in the Fresno-Clovis metropolitan and surrounding area have collaborated to develop this Plan. The Plan Area covers 455 square miles and is located entirely within Fresno County. The total population in the Plan Area in 2000 was approximately 600,000. Refer to Figure 1-2 for a map showing the Plan Area boundary and the location of each participant. Table 2-1 summarizes the background information on each of the Plan participants. Figure 2-1 shows the major surface water facilities in the Plan Area, including canals, pipelines, streams, and flood control basins. Following is a brief description of each participant including information regarding the history, demographics, water supply, water quality, and facilities of each.

2.1 - Fresno Irrigation District

The Fresno Irrigation District (FID or District) is a public irrigation district formed pursuant to the California Irrigation District Law (Division 11 of the California Water Code). The District was formed in 1920 as the successor to the privately owned Fresno Canal and Land Company. The District is a local agency responsible for delivery of surface water to lands within the District, and management of groundwater in accordance with this adopted Groundwater Management Plan.

FID is located in the geographical center of Fresno County and extends from the San Joaquin River in the north, south to near the City of Fowler, and roughly from the Friant-Kern Canal to about five miles west of the City of Kerman. The District service area is approximately 245,000 acres (about 380 square miles) and includes the Fresno/Clovis metropolitan area near its center. The District now operates approximately 680 miles of canals and pipelines. Water delivery is provided to approximately 190,000 acres, although this number has been decreasing in recent years as a result of urban expansion.

Potable water is used within the District boundary for municipal, industrial and agricultural purposes. The District delivers approximately 500,000 acre-feet (average annual) of water from the Kings River and Central Valley Project water through the Friant-Kern Canal. Most of this water is delivered to agriculture, although an increasing share of the District's water supply is used for groundwater recharge in the urban area. In 2004, FID began delivery of surface water to surface water treatment facilities operated by the City of Fresno and the City of Clovis. In addition to surface water deliveries, a significant amount of groundwater pumping occurs in the District to meet urban and agricultural demands.

The agricultural lands in the District remain predominantly permanent crops, however the rapid growth of urban development is changing the land use in the Fresno/Clovis

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

metropolitan area. About 150,000 acres (or 60%) of the District remains as farmed agricultural land. Vineyards make up the largest category of farmland at nearly 30% of the total District acreage. Almonds and citrus are other significant categories. Nearly 30% of the District is now urban, with the remaining 10% of land area classified as rural residential.

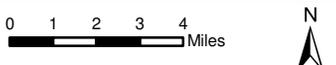
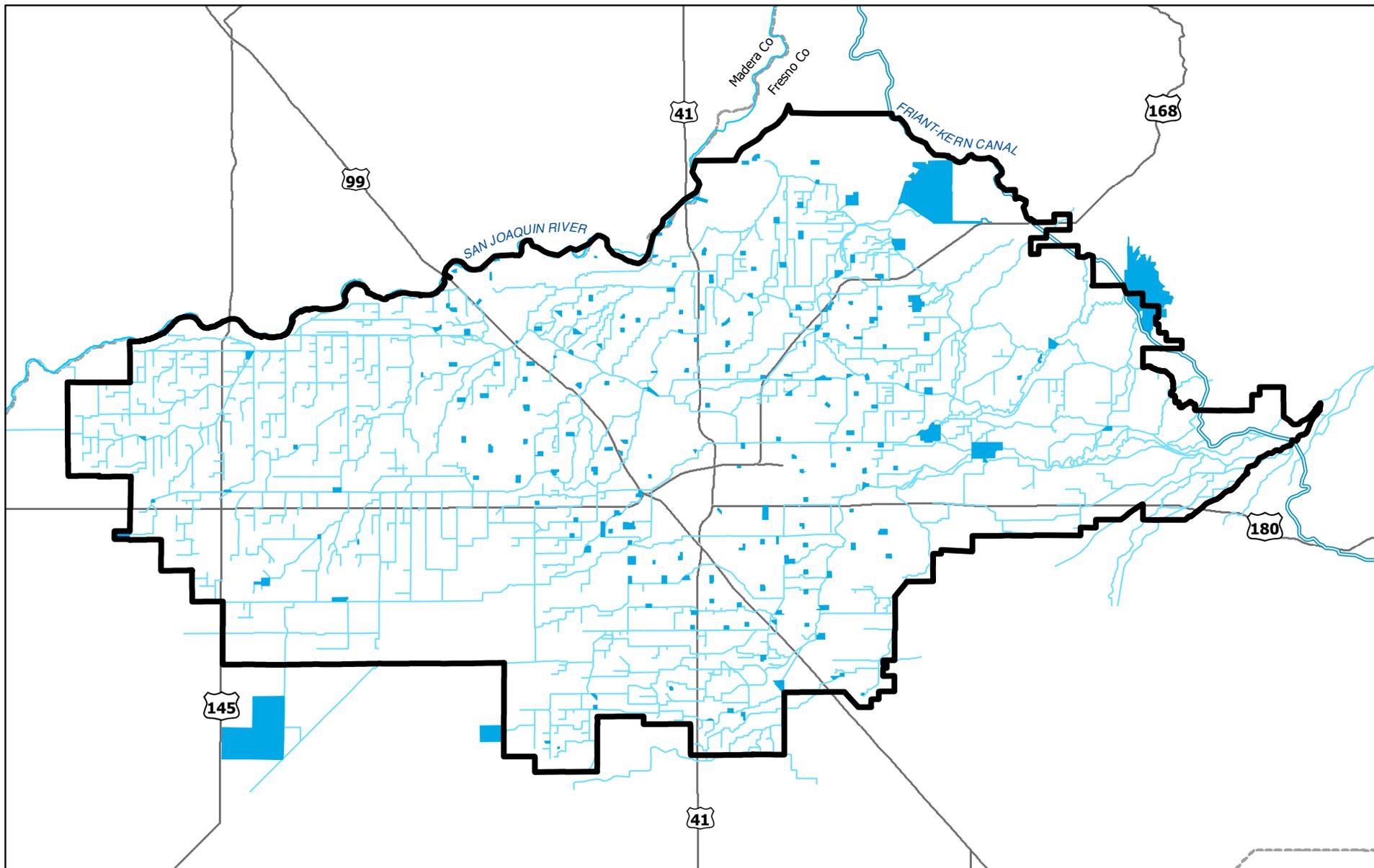
2.2 - Fresno County

Fresno County was established in 1856 and covers 6,016 square miles extending from the Sierra Nevada mountains to the west side of the San Joaquin Valley. The County population was 824,000 in 2000. The area covered in this Plan (455 square miles) lies entirely within Fresno County. Hence, only a portion of Fresno County is addressed in this Plan, although it is generally the most densely populated area in the County.

Fresno County supplies potable water to communities in the Plan Area through six Community Service Areas (CSAs) and one Waterworks District (WWD). The CSAs and WWD have 14 active wells; one of the CSAs is connected to the City of Fresno water system. County staff monitors groundwater levels and groundwater quality in cooperation with CSA and WWD staff. In rural areas, water is supplied from private domestic wells and sewerage is handled almost exclusively with septic systems. Constituents of concern in Fresno County include nitrates, DBCP, radionuclides, and EDB.

Along the eastern border of the Plan Area, groundwater is limited to fractured zones deep within the underlying bedrock. Locating sustainable groundwater supplies in these areas has been problematic in recent years.

Though dated, significant information on the groundwater in Fresno County can be found in the *Water Resources Management Plan for Fresno-Clovis Urban and Northeast Fresno County*, prepared in 1986 by Fresno County.



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-  GMP BOUNDARY
-  FMFCD Basins and FID Ponds
-  Water Facilities (canals, pipelines and streams)

Figure 2-1
Surface Water Facilities
 Fresno-Area Regional
 Groundwater Management Plan

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

2.3 - City of Fresno

The City of Fresno was founded in 1885 and had a population in 2003 of 457,000. The total area of the City is 102.5 square miles, but the City only serves water to 87.2 square miles. The City of Fresno serves customers located within the city limits, as well as in some unincorporated areas (county islands). The City of Fresno has and continues to be one of the fastest growing cities in California.

The City of Fresno supplies water to residential, commercial, industrial and landscape irrigation customers. The City does not provide water for any agricultural purposes. In 2005, the City had 120,399 connections, and 14% of the connections were measured. Since water is metered for all of the large water users, 33% of total water deliveries are measured.

The City of Fresno's primary source of water is groundwater from the Fresno Sole Source Aquifer; a large underground water system supplied by snowmelt from the Sierra Nevada Mountains. The City of Fresno's domestic water system is somewhat unique for a water system of its size. Prior to beginning a new 30 million gallons per day (MGD) surface water treatment plant (SWTP) in 2004, the Fresno water system was one of the largest water systems in the United States relying solely on pumped groundwater as its only source of potable water. The total water pumped from Fresno's 250 wells exceeded 54 billion gallons (166,000 AF) in 2003.

The City of Fresno also has two surface water supplies: 60,000 AF of CVP water from the Friant system (San Joaquin River) and more than 100,000 AF (average annual) from the Kings River through a contract with FID. Since the mid-1960's surface water from these rivers has been imported to the City of Fresno via FID canals and placed into groundwater recharge basins. In cooperation with FID and FMFCD, the City of Fresno currently diverts more than 40,000 acre-feet of surface water per year to more than 70 basins throughout the Plan Area for the purposes of groundwater recharge. More than 40,000 AF was recharged during the 2005 irrigation season. Surface water is now also conveyed to the City's new SWTP located in northeast Fresno.

The City of Fresno measures water levels on a quarterly basis and performs water quality testing according to Department of Health Service (DHS) requirements. Eight major contaminant plumes are present in Fresno, and they are being addressed by the responsible parties through assessment and remediation, and some are in advanced stages of mitigation. The inorganic plume contaminants include chloride, nitrate, arsenic, and chromium. Organic plume contaminants include petroleum hydrocarbons and methyl tertiary-butyl ether (MTBE), chlorinated volatile organic chemicals (VOCs), Dibromo-Chloropropane (DBCP) and other pesticides, and trichloropropane (TCP). The City currently has 32 active municipal wells that are treated for DBCP or TCE.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

For more information on groundwater in the City of Fresno refer to the City of Fresno Water Conservation Plan (2005), the Fresno Metropolitan Water Resources Management Plan (1992), and the Fresno Municipal Code, Chapter 14, Water Regulations.

2.4 - City of Clovis

The City of Clovis (Clovis) is located in eastern Fresno County, just east of the City of Fresno. Clovis was incorporated in 1912 and now covers an area of 19.76 square miles. The population of Clovis in 2005 was 86,215. Clovis also delivers domestic water to the unincorporated area known as Tarpey Village, which in 2005 has a population of 3,957.

In 2004, groundwater pumping in Clovis was about 7,500 MG (23,000 AF). Clovis has 36 active wells; other wells have been abandoned due to low yields, sanding, or contamination problems. Some wells have facilities for granulated activated carbon (GAC) treatment. Clovis monitors groundwater quality according to DHS requirements, and monitors groundwater levels semi-annually.

Clovis lies on the eastern side of a large cone of depression that underlies the Fresno-Clovis Metropolitan area. In 1997, groundwater overdraft was estimated to be 2,500 AF/year. This amount has increased due to rapid urban growth and a corresponding increase in groundwater demand. Clovis performs intentional groundwater recharge using Kings River water derived from entitlements through FID. The annual surface water entitlement for Clovis currently is over 20,000 AF in an average year. Recharge is performed in single purpose recharge basins owned by Clovis, dual-purpose storm drainage basins owned by the Fresno Metropolitan Flood Control District (FMFCD), and local channels including Dry Creek, Redbank Creek, and Dog Creek. More than 9,000 acre-feet of surface water is currently recharged annually.

In 2004, Clovis also constructed and placed into operation a 15 MGD capacity surface water treatment plant. The plant is providing treated surface water to the easterly portion of Clovis. Clovis, in cooperation with FID, also has areas where surface water from FID's canal system is directly delivered to areas of large landscaping such as cemeteries, schools and parks.

For additional information on the groundwater resources in Clovis refer to the following reports prepared by Provost and Pritchard Engineering Group: *City of Clovis Groundwater Recharge Investigation Report* (1997) and *Groundwater Monitoring and Recharge Investigation Project* (2003).

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

2.5 - City of Kerman

The City of Kerman (Kerman) is located in central Fresno County, near the western edge of the Plan Area. Kerman was incorporated in 1946 and had a population of 11,500 in 2004. Kerman occupies 2.5 square miles and the surrounding area is predominantly an agricultural community.

Kerman serves urban water to residential (2,104), commercial (307) and industrial (7) connections. All of Kerman's water supplies come from locally pumped groundwater and the City does not have the water rights for any surface supplies. In 2004, Kerman pumped a total of 988 million gallons (3,030 AF) of groundwater. Kerman has four active wells and one well on standby. The construction of two new wells is planned for 2006. Planned improvements will be capable of meeting projected water demands through 2011. Kerman is also developing a groundwater recharge partnership with FID. The program would place combination flood control/recharge basins close to FID conveyance facilities.

Groundwater is available to Kerman from a deep aquifer, beneath the Corcoran Clay, and a shallow aquifer above the Corcoran Clay. The shallow aquifer sometimes has high levels of uranium. Kerman is experiencing accelerated urban growth and expects new developments to rapidly increase water demands. As a result, Kerman is investigating surface water supplies, or the use of water from the shallow aquifer for landscaping, as alternatives for meeting the growing demand.

For more information on Kerman's water supplies and facilities refer to the *City of Kerman Capital Improvement Plan* prepared by Yamabe and Horn in 2004.

2.6 - Malaga County Water District

Malaga County Water District (Malaga or District) is a water and wastewater utility district covering 2.3 square miles just south of the City of Fresno. Malaga began delivering water in 1965 and now serves a residential population of about 1,300 from 224 residential connections and 220 industrial/commercial connections. Residential development in Malaga is nearly complete; existing zoning and readily available land allow for continued commercial and industrial development. All new industrial and commercial enterprises will be required to connect to the District water system.

Since 1982 the demand for water has generally been increasing. Malaga depends entirely upon groundwater to meet its water needs, and, in 2003, District wells supplied 602 million gallons (1,848 AF). However, there is no pumping data available for the many private wells in the area. Malaga is currently in discussions with neighboring agencies to participate in groundwater recharge projects to replenish the groundwater supplies.

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Malaga has three active wells and two that have been removed from service due to a variety of contamination problems, including nitrates and DBCP's. Malaga also operates a wastewater treatment plant (WWTP) with a capacity of 1.2 MGD. Effluent from the WWTP is delivered to percolation ponds. If necessary, tertiary treated overflow is discharged into FID's Central Canal.

Additional information on Malaga's facilities, water usage, and groundwater quality can be found in the *2004 Malaga County Water District Water Supply Report* prepared by Provost and Pritchard Engineering Group.

2.7 - Pinedale County Water District

Pinedale County Water District (PCWD or Pinedale) was formed in 1954 and presently delivers water to approximately 2,400 residential and 550 commercial customers. Pinedale covers 1.7 square miles and is located in the north central portion of the Plan Area, with portions of the district in the City of Fresno and unincorporated Fresno County. Some areas in Pinedale remain undeveloped, and consequently water demands are expected to increase as the lands are occupied.

Pinedale has five active wells, but typically only needs to operate three to meet current water demands. Some other wells in Pinedale are no longer used due to TCE contamination. No treatment or chlorination is presently performed on any of the pumped groundwater. Pinedale monitors groundwater quality according to DHS requirements. Pinedale does not presently monitor groundwater levels.

Pinedale also collects sewage and delivers it to the Fresno sewerage system, except for an area in the northwest portion of the district where sewerage is collected by the Pinedale Public Utilities District. About 20 residential units in the eastern portion of Pinedale are still on underground septic systems.

2.8 - Fresno Metropolitan Flood Control District

The Fresno Metropolitan Flood Control District (FMFCD) was founded in 1956 to provide flood control, local storm drainage management, water conservation, and recreational services in the Fresno-Clovis Area. The district is located in the north-central portion of Fresno County between the San Joaquin and Kings Rivers. FMFCD is authorized to control storm waters within an urban area and rural foothill watersheds of approximately 400 square miles, known as the Fresno County Stream Group. About 270 square miles of the service area lies within the area covered by this Groundwater Management Plan.

The FMFCD currently has three reservoirs, five regional flood control detention basins planned, and 163 local basins constructed or in planning. The principal method of disposal of stormwater in the area is groundwater recharge at all of these basins.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

FMFCD monitors water deliveries to flood control/recharge basins and tests the chemical composition of sediments that collect in basins. FMFCD does not presently monitor groundwater levels or groundwater quality.

FMFCD is the lead agency for stormwater quality management and has primary responsibility for implementing a Stormwater Quality Management Program developed jointly with the City of Clovis, City of Fresno, County of Fresno, and California State University at Fresno. FMFCD has been involved with the Nationwide Urban Runoff Program (NURP) project, in conjunction with the Environmental Protection Agency (EPA). The goal of the program was to determine the extent to which urban runoff contributes to water quality problems and evaluate various management practices.

FMFCD maintains as its first operational priority the protection of people and property from flood damage. However the FMFCD also aims to conserve water by (1) retaining storm water runoff in basins to facilitate storm water percolation; and (2) cooperating with the Cities of Fresno and Clovis to direct imported surface water entitlements to District facilities for percolation.

For more information on FMFCD refer to the *FMFCD District Services Plan* prepared in 2004.

2.9 - Bakman Water Company

Bakman Water Company (Bakman) is a privately owned utility that has provided water service to the Fresno area since 1948. Bakman delivers water to approximately 1,800 connections serving 10,000 customers. Bakman's service area covers 1,660 acres within the southeastern portion of the City of Fresno and parts of unincorporated Fresno County.

Bakman is currently negotiating a contract with FID for a surface water allotment. Bakman does not have any other contract for surface water to be treated and delivered to its customers, and therefore delivers pumped groundwater to its customers. Bakman pumped a total of 1,270 MG (3,900 AF) of water in 2003. Water is served to residential and commercial customers. Bakman currently has ten active wells, three standby wells, and three inactive wells. Numerous private wells are found in the Bakman service area. However, new developments are required to connect to the Bakman water system.

Water quality concerns in Bakman include nitrate contamination from food processing industries and DBCP. Due to these water quality concerns, three wells have been classified as "standby wells" in accordance with Department of Health Services (DHS) standards. Blending and GAC treatments are working at other wells to reduce nitrate and DBCP concentrations within Bakman's boundary. All wells are plumbed and wired to allow for emergency chlorination.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

In 1991, Bakman signed an agreement with FID to fund groundwater recharge projects in FID through an annual payment. In addition, Bakman is presently pursuing groundwater recharge projects within its boundaries.

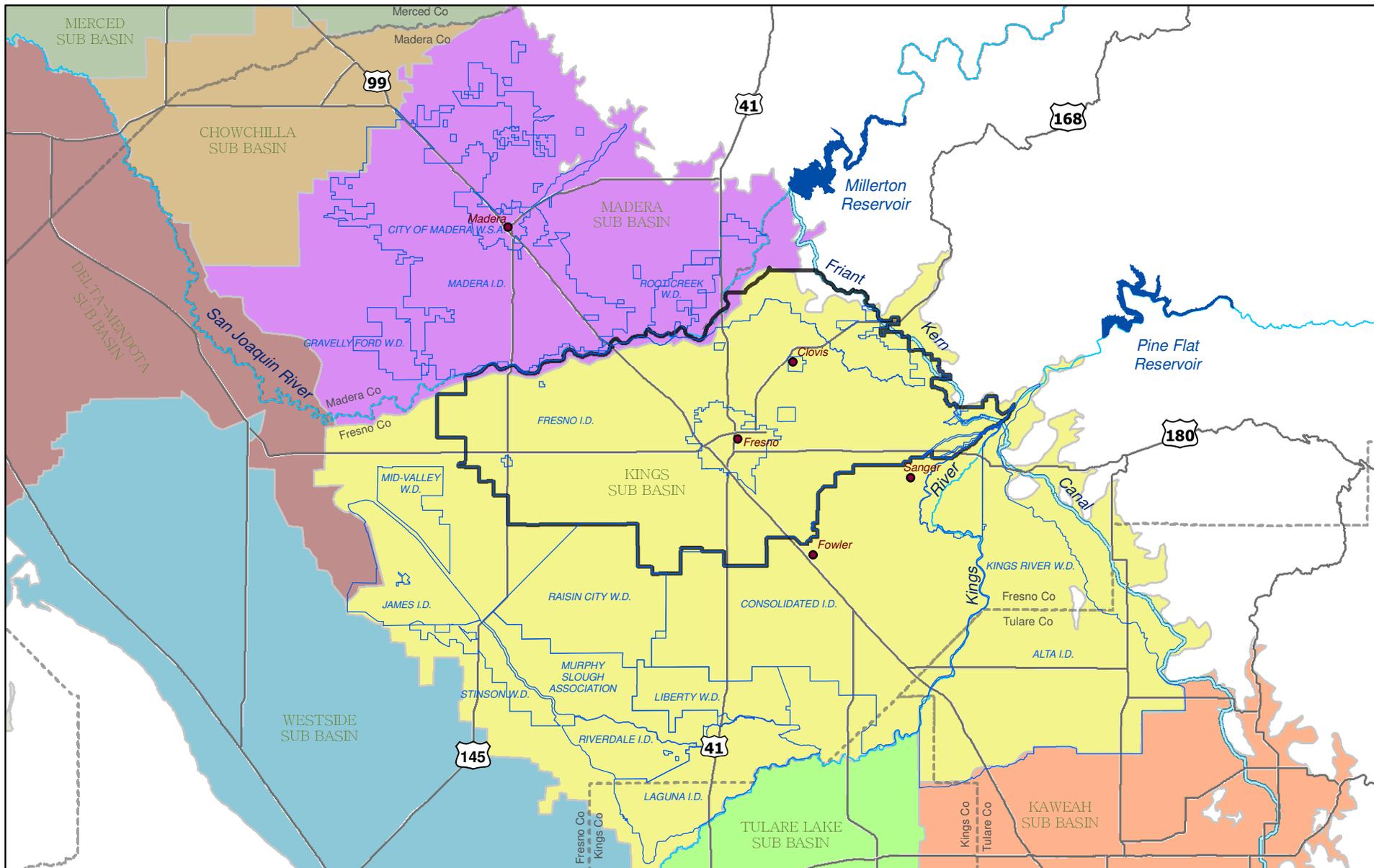
2.10 - Garfield Water District

Garfield Water District (Garfield) delivers surface water for agricultural uses to approximately 1,300 of the 1,750 acres within the District. Garfield recently entered into a Long-Term Renewal Contract with the United States for Project Water Service from the Friant Division. The contract is for 3,500 acre-feet of Class 1 water. Water deliveries to Garfield are made from a turnout on the Friant-Kern Canal, and metered delivery is made to the growers via a pipelined system. The predominant crops in Garfield are grapes, almonds, citrus, olives and stone fruits.

Garfield does not own nor operate any wells. All groundwater within Garfield is pumped from privately owned wells.

2.11 - Surrounding Area

Although not Plan participants, the neighboring water agencies shown in Figure 2-2 will be kept apprised of groundwater projects and policies that may impact them. Lands to the south and west of the Plan Area are particularly important since they are downgradient and located in the same groundwater sub-basin. Lands to the north share less hydrologic connection due to the partial hydraulic barrier created by the San Joaquin River.



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- Groundwater Sub Basins**
- Kaweah
 - Westside
 - Kings
 - Chowchilla
 - Madera
 - Merced
 - Delta-Mendota
 - Tulare Lake

- GMP BOUNDARY
- Water Agencies

Figure 2-2
 Neighboring Agency Map
 Fresno-Area Regional
 Groundwater Management Plan

TABLE 2-1

**FRESNO-AREA REGIONAL GROUNDWATER MANAGEMENT PLAN
SUMMARY OF PARTICIPANTS**

Description	Fresno Irrigation District	Fresno County	City of Fresno	City of Clovis	City of Kerman	Malaga County Water District	Pinedale County Water District	Fresno Metro. Flood Control District	Bakman Water Company
Address	2907 South Maple, Fresno, CA, 93725	2220 Tulare St, 7th Floor, Fresno, CA 93721	1910 East University Ave., Fresno, CA 93703-2988	155 N. Sunnyside Ave. Clovis, CA 93611	850 S. Madera, Kerman, CA 93630	3580 S. Frank St., Fresno, CA 93725	480 W. Birch Avenue, Pinedale, CA 93650	5469 E. Olive Avenue, Fresno, CA 93727	PO Box 7965, Fresno, CA, 93747
Website	www.fresnoirrigation.com	www.co.fresno.ca.us	www.ci.fresno.ca.us	www.ci.clovis.ca.us	-	-	-	www.fresnofloodcontrol.org	www.bakmanwater.com
Gross Area (square miles)	387	6,016 (455 within Plan area)	103	19.8	2.5	2.3	1.7	400 (___ within Plan area)	2.4
Formation Date	1920	1856	1885	1912	1946	1965	1954	1956	1948
Population Served ⁽¹⁾			466,200	90,000	11,500	1,300			10,000
Water Users	Agriculture, Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban	Urban
Production Wells ⁽²⁾	0	14	250	36	4	3	5	0	11
Groundwater Pumping - Volume (year)	0		54,000 MG (2003)	7,500 MG (2004)	990 MG (2004)	600 MG (2003)		None	1,270 MG (2003)
Primary Constituents of Concern		Nitrates, DBCP, radionuclides, EDB	Nitrate, arsenic, petro hydrocarbons, VOCs, DBCP, TCP	DBCP, nitrates, TCP	Uranium	Nitrate, DBCP	TCE	Various urban runoff contaminants	Nitrate, DBCP
Groundwater Level Monitoring Program	Y	Y	Y	Y	Y	Y	N	N	Y
Groundwater Quality Monitoring Program	N	Y	Y	Y	Y	Y	Y	Y (monitors storm water quality)	Y

(1) The 'Population Served' is the approximate population that the agency shown is provided.

(2) Only includes active wells owned and operated by the participant. Does not include private wells in the participant's area.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

3 - GEOLOGY AND HYDROGEOLOGY OF THE FRESNO AREA

This section provides a brief summary of the geology, hydrogeology, and groundwater conditions in the Plan Area. For additional details refer to the reports listed in Section 10 - References.

3.1 - Geology

Geologic deposits at the land surface in the Plan Area have been mapped as Quaternary older alluvium. Unconsolidated alluvial deposits comprised of layers of cobbles, gravel, sand, silt and clay comprise the aquifer. These deposits comprise Quaternary older alluvium and the underlying Quaternary-Tertiary Continental deposits. Highly permeable, coarse-grained deposits of the ancestral San Joaquin River underlie most of the area. These deposits are present above a depth of 350 to 400 feet below land surface and are tapped by most large-capacity wells in the area.

Beneath the older alluvium are the Tertiary-Quaternary continental deposits composed mainly of the fine-grained sands, silts, and clays with some lenses of coarse-grained deposits. The thickness ranges from a feather edge in the east to more than 1,300 feet in the west. These deposits generally yield less groundwater to wells compared to the overlying more permeable deposits.

3.2 - Hydrogeologic Characteristics

Groundwater Basin

The Plan Area lies within the Kings Groundwater Sub-basin, which is located within the San Joaquin Basin Hydrologic Study Area (HSA). The Kings Sub-basin is also identified as sub-basin 5-22.08 of the Tulare Lake Hydrologic Basin in the DWR Bulletin 118 updated in 2003. The Kings Sub-basin extends from the Sierra Nevada foothills on the east to the San Joaquin Valley trough on the west, and from the San Joaquin River on the north to roughly the Fresno County line on the south. Refer to Figure 1-1 for the location of each participant in relation to the Kings Sub-basin. The Kings sub-basin has been identified as critically overdrafted.

Aquifer Characteristics

Most of the aquifer underlying the Plan Area is generally unconfined but may be semi-confined in some locations due to localized, fine-grained, low permeability layers. However, it is important to note that there are no extensive low permeability units to isolate deep aquifers from shallow aquifers. At the west edge of the Plan Area, near the City of Kerman, there is an area underlain by the Corcoran Clay.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Groundwater Levels

Groundwater levels in the Plan Area range from about 10 feet to 400 feet below the ground surface. Figure 3-1 is a chart illustrating the decline in average water level in the Plan Area since 1930. During this period, a large cone of depression under the Fresno/Clovis metropolitan area has developed. Figure 3-2 shows hydrographs of selected wells within the Plan Area. There is also a mound that has formed in the area of the Fresno-Clovis Regional Wastewater Treatment Facility located south and west of the City of Fresno.

Groundwater Movement

Historically, groundwater moved from northeast to southwest. More recently, the heavy municipal and agricultural pumping in the area has influenced the natural groundwater flow. The pumping cone of depression has caused the southwesterly flows to decrease and flows are generally deflected into the urban area. Figure 3-3 shows recent groundwater levels within the Plan Area.

Transmissivity

The ability of an aquifer to transmit groundwater is measured by its transmissivity. Transmissivity is defined as the quantity of groundwater that would move through a one-foot-wide section of the total thickness of the aquifer under a unit hydraulic gradient. Transmissivity in the Plan Area is spatially distributed with the highest transmissivity in the northwest. Well yields are higher in the northwestern and southwestern portions of the Plan Area. The well yields in the northeast are limited because a thinner aquifer is present above bedrock.

Specific Yield

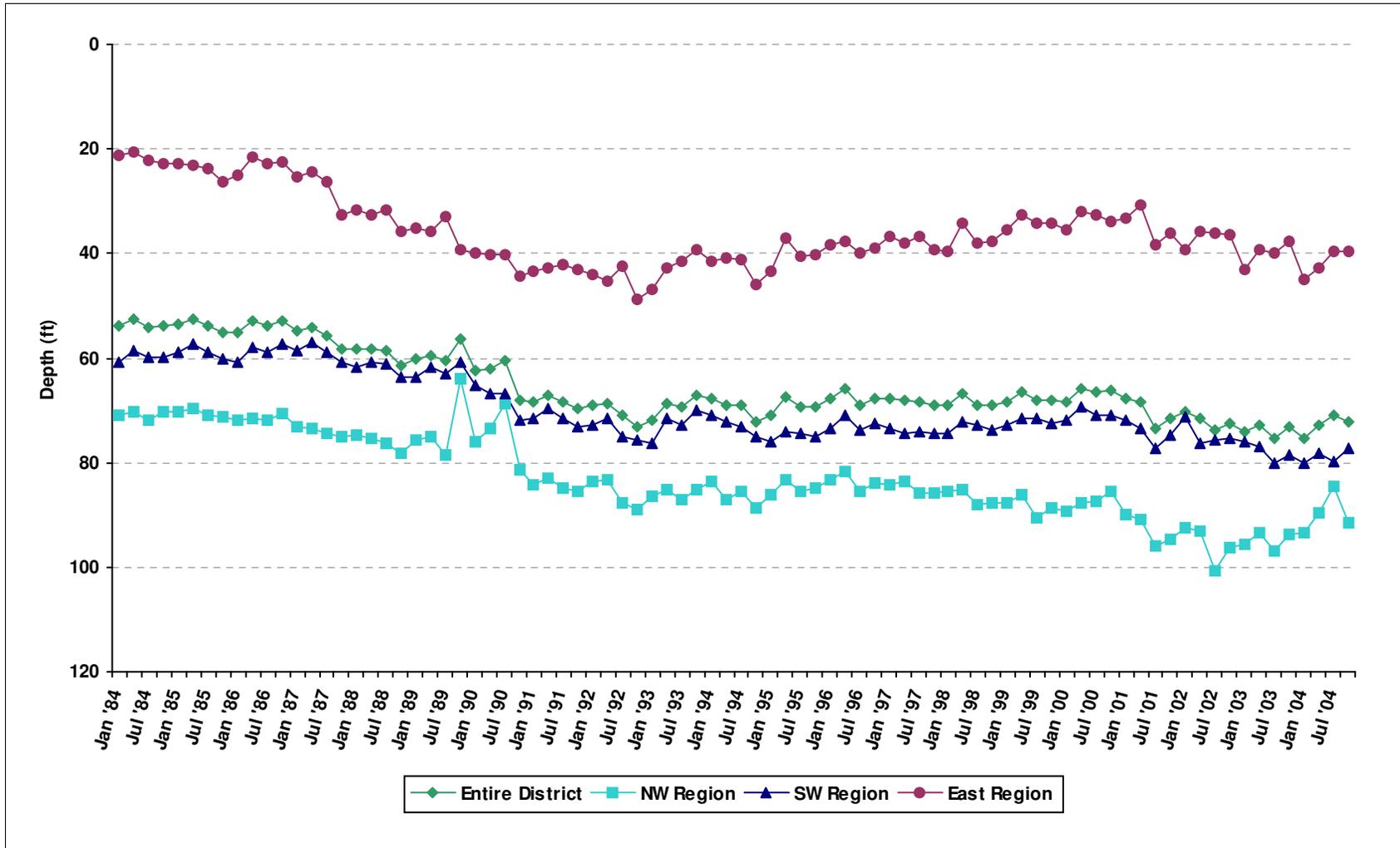
The ability of an aquifer to store groundwater is measured by its specific yield. Specific yield is defined as the quantity of groundwater that could be extracted from a unit volume of aquifer per unit decline in water level. The specific yield of an aquifer is important for evaluating the response of an aquifer to pumping. For example, if the specific yield is known, analysis of well hydrographs can be used to monitor the quantity of groundwater in storage in the reservoir. Estimates of specific yield of the older alluvium range from 0.15 to 0.20. Average values for the underlying continental deposits are estimated to range from 0.07 to 0.12.

Groundwater Development

The most favorable subsurface geologic conditions for the future development of groundwater are in the northwest Fresno area. Subsurface geologic conditions limit groundwater development in the northeast because of shallow bedrock north and northeast of Clovis and the predominance of fine-grained deposits at depth beneath these areas.

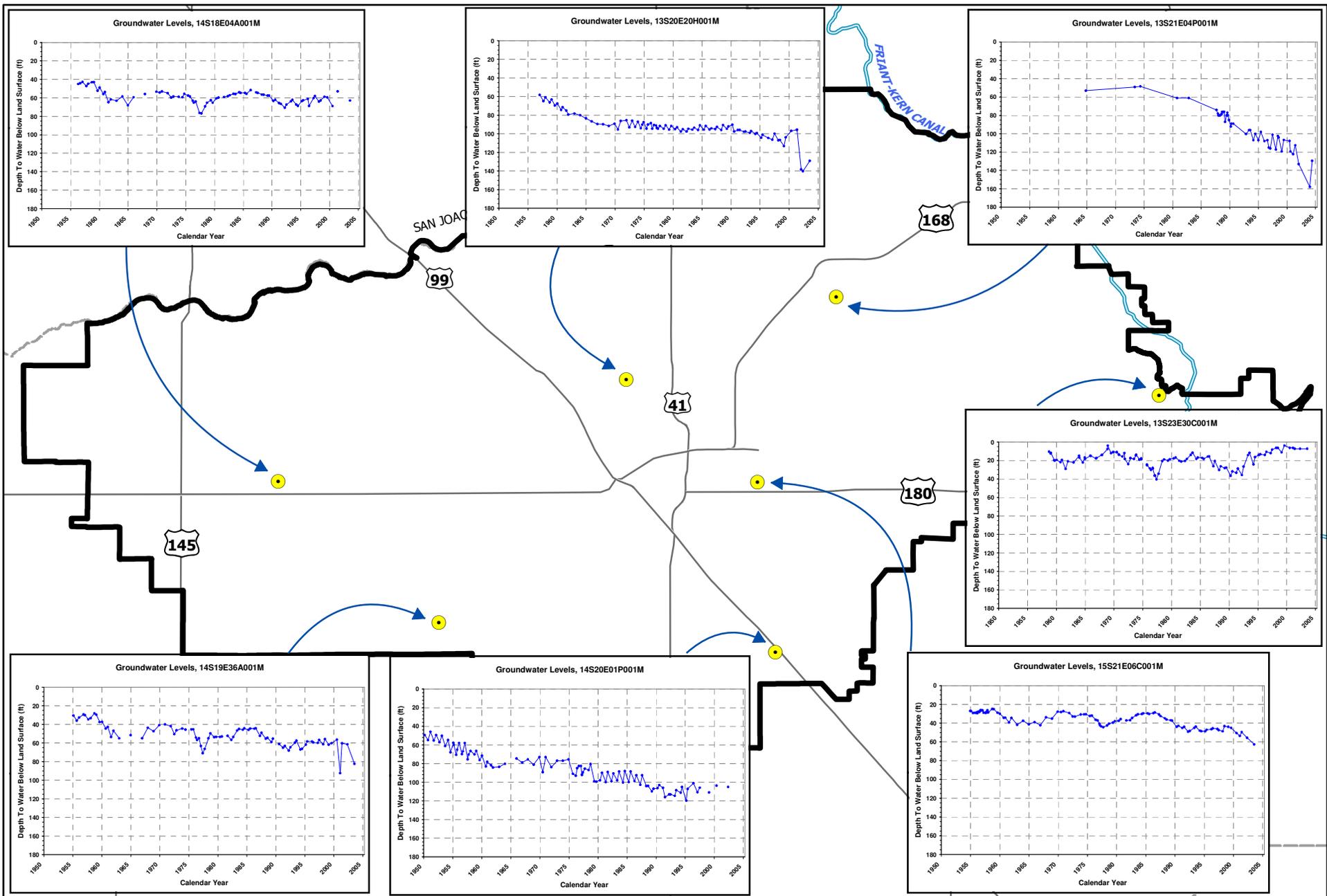
Fresno Irrigation District Regional Quarterly Weighted Average Depth To Groundwater

1/1/1984 To 10/1/2004



*NW Region is north of Belmont Ave, west of Fowler Ave
 *SW Region is south of Belmont Ave, west of Fowler Ave
 *East Region is east of Fowler Ave

Figure 3-1



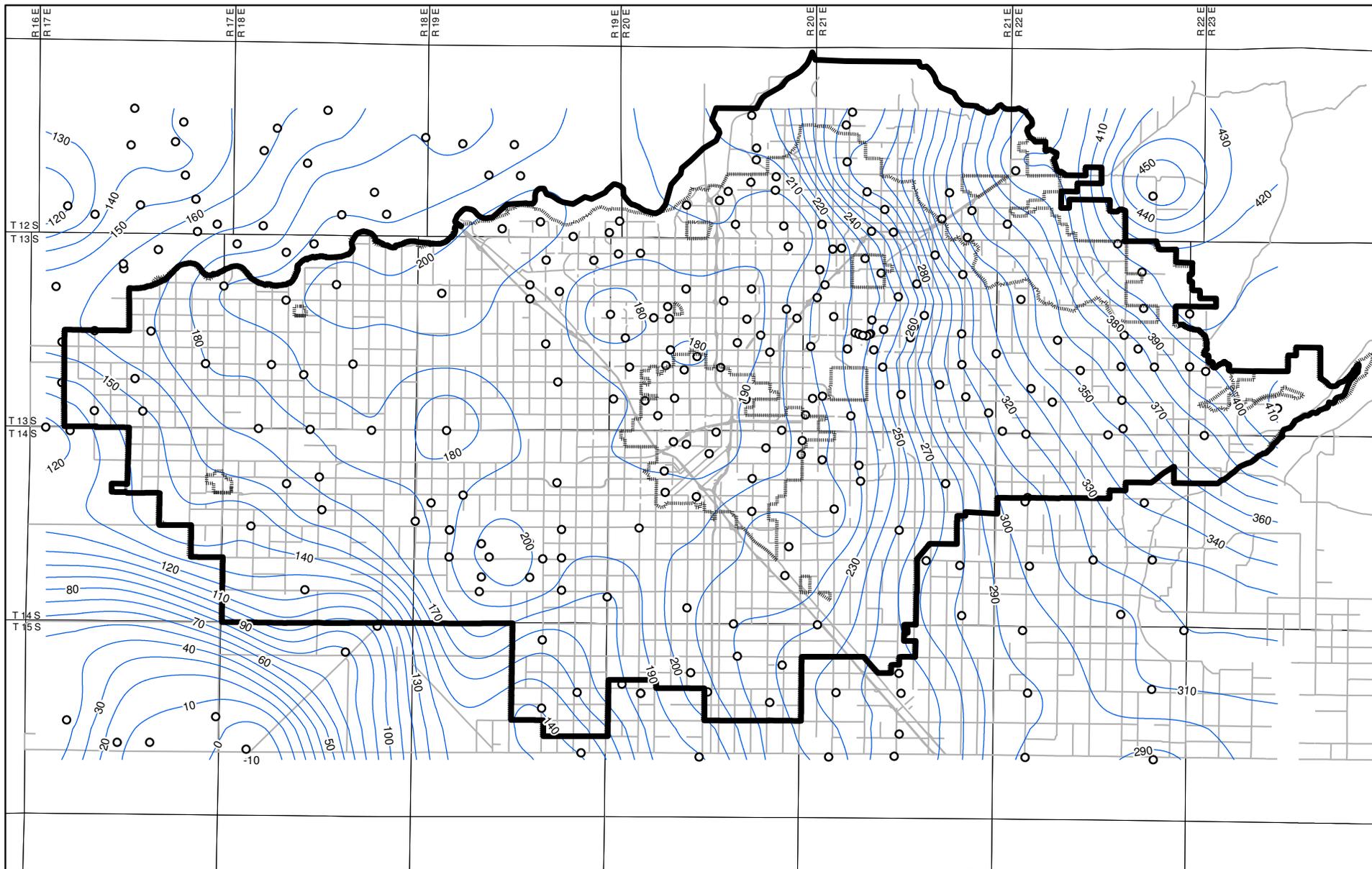
0 1 2 3 4 Miles

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GMP BOUNDARY
 FRIANT-KERN CANAL

Figure 3-2
 Well Hydrographs
 Fresno-Area Regional
 Groundwater Management Plan



0 1 2 3 4 Miles



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Legend

-  WSE (contours 10ft)
-  Fresno ID Boundary
-  Major Streets
-  T / R
-  Wells (Jan2005)
-  GMP BOUNDARY

January 2005 Water Surface Elevation
10 Foot Lines of Equal Elevation

Figure 3-3

**FID Annual Groundwater Report
Water Surface Elevation Contours**

Fresno-Area Regional
Groundwater Management Plan

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Intentional Recharge

Subsurface geologic conditions are favorable for intentional recharge basins beneath the much of the Plan Area. Conditions are less favorable beneath part of the northeast portions of the Plan Area because of the restricting layers above the water table.

Substantial operational information on average infiltration rates is available from stormwater management basins managed by the Fresno Metropolitan Flood Control District. Typical infiltration rates range from about one-third to one-half foot per day. Much of this water is observed to move laterally in highly permeable deposits.

3.3 - Groundwater Conditions within the Plan Area

A combination of surface water supplies and groundwater pumping are used to satisfy the water demands of the area. In agricultural areas, the difference between surface deliveries and the agricultural crop requirements is met by supplemental groundwater pumping almost exclusively by private individual landowners. For many years, all municipal and industrial demands were met entirely from groundwater pumping. However, both the City of Clovis and City of Fresno have recently begun operation of surface water treatment plants.

The Plan participants have long recognized the importance of preserving and maximizing groundwater supplies within its boundaries. Some participants have actively facilitated groundwater recharge and groundwater banking, and have engaged in indirect or "in lieu" recharge programs by delivering surplus surface water whenever possible to minimize groundwater extractions.

Water level measurements taken within the Plan Area show a continued downward trend in the groundwater elevations.

Some areas within the Plan Area's service area suffer from groundwater quality degradation, particularly where the groundwater is used as a potable water supply. Some areas have identified "plumes" of contamination resulting from discharges of industrial or agricultural contaminants, and in some instances groundwater quality has been degraded to below that required by applicable regulatory standards. While most groundwater within the Plan Area is still of acceptable quality, these contamination plumes could spread if not properly managed and controlled.

3.4 - Historic Groundwater Monitoring Programs

Several groundwater studies of the Plan Area have been performed since 1930. These studies are conveniently summarized in the *Water Resources Management Plan for Fresno-Clovis Urban and Northeast Fresno County* (1986) prepared in a cooperative effort by the County of Fresno, the Cities of Clovis and Fresno, the Fresno Irrigation

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

District, and the Fresno Metropolitan Flood Control District. Most of these studies focused on water quality with the remainder focusing on groundwater levels and storage.

Groundwater Levels

A groundwater-level monitoring program was developed when FID was formed in 1920. The program included monthly and quarterly measurement of wells within FID. As more farmers installed wells, FID began to use additional wells for measuring water levels. The water level measurement program has been maintained since 1920 and covers the vast majority of the Plan Area. FID began to store and organize water level data in a database in 1995, and has prepared annual Groundwater Reports for many years.

In the early 1970's the DWR completed a study of the aquifer underlying FID to determine the specific yields and available storage in the aquifer by township and range. FID has incorporated this information into its quarterly groundwater reports so that changes in storage are calculated.

Groundwater Quality

Extensive groundwater-quality testing has been performed by various agencies in the Plan Area. Since the 1960's, testing for general chemical, trace mineral, and inorganic substances has been routinely performed on a large number of the community wells located in the Fresno/Clovis metropolitan area.

The available water quality data is voluminous and therefore is not presented in this Plan. The reader is referred to specific Plan participants if they seek water quality data.

In the *Water Resources Management Plan for Fresno-Clovis Urban and Northeast Fresno County* (1986) water quality was evaluated through research and assimilation of all available data, and the collection and analyses of water samples where additional data was needed. Documentary evidence of water quality held by the California Department of Health Services (DHS), Regional Water Quality Control Board (RWQCB), Department of Water Resources (DWR), Fresno County Health Departments Environmental Health System (EHS), and other agencies and municipalities were examined along with a historical review of pertinent literature. In addition, data developed from water quality hydrographs were grouped and evaluated in the report. Since 1986, a vast quantity of additional water quality data has been collected by the aforementioned agencies and the Plan participants.

Land Subsidence and Groundwater Impacts on Surface Water Flow and Quality

The Plan participants have not historically monitored land subsidence and groundwater impacts on surface water flow and quality. Refer to sections 6.4 and 6.5 for more information on these topics, respectively.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

4 - REGIONAL GROUNDWATER MANAGEMENT OBJECTIVES

The Plan Area is, and will continue to be, dependent on groundwater as a significant water supply source. The Plan objectives have been developed to monitor, protect and sustain groundwater within the region. These objectives of the Fresno-Area Regional Groundwater Management Plan include:

1. Preserve and enhance the existing quality of the area's groundwater.
2. Correct the overdraft and stabilize groundwater levels at the highest practical beneficial levels.
3. Preserve untreated groundwater as the primary source of domestic water.
4. Maximize the available water supply, including conjunctive use of surface water and groundwater.
5. Conserve the water resource for long-term beneficial use and to assure an adequate supply for the future.
6. Manage groundwater resources to the extent necessary to ensure reasonable, beneficial, and continued use of the resource.
7. Monitor groundwater quality and quantity to provide the requisite information for establishing groundwater policies, goals, and recommended actions.
8. Improve coordination and consistency amongst agencies responsible for the monitoring and management of groundwater in the Plan Area.

The proposed actions identified within each of the sections of this Plan are intended to help accomplish these Plan objectives.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

5 - STAKEHOLDER INVOLVEMENT

5.1 - Advisory Committee of Stakeholders

The Technical Advisory Committee (TAC) was formed to guide the development and implementation of this Plan. The TAC includes landowners and representatives from each party participating in the plan. In October 2005, the TAC members include:

- Dale Stanton, Assistant General Manager, Fresno Irrigation District
- Lon Martin, Water Division Manager, City of Fresno
- Lisa Koehn, Assistant Public Utilities Director, City of Clovis
- Alan Weaver, Public Works Director, County of Fresno
- Phil Desatoff, Geologist, County of Fresno
- Jerry Lakeman, Fresno Metropolitan Flood Control District
- Alan Jacobsen, Public Works Director, City of Kerman
- Tim Bakman, Bakman Water Company
- Russ Holcomb, General Manager, Malaga County Water District
- John Garcia, General Manager, Pinedale County Water District
- Richard Carstens, Landowner in Fresno Irrigation District
- Chris Palmer, Landowner in Fresno Irrigation District

The TAC ensures representation from a broad spectrum of interests including public agencies, private utilities, local landowners, agricultural water purveyors, urban water purveyors, and special districts.

Planned Activities

A TAC will meet semi-annually or more frequently if deemed appropriate. The Committee will have the following responsibilities:

- Review trends in groundwater levels and groundwater quality;
- Evaluate the effectiveness of current groundwater management policies and facilities;
- Discuss the need for new groundwater management policies and procedures;
- Discuss the need for new groundwater supply/enhancement facilities;
- Evaluate the progress of on-going groundwater related projects;
- Assess the overall progress in implementing the programs outlined in the Groundwater Management Plan;
- Recommend updates or amendments to the Groundwater Management Plan;
- Identify regional and multi-party groundwater projects;
- Identify and share information on funding opportunities for groundwater projects;
- Share new ideas and methods for managing groundwater;

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

- Update Plan participants on the efforts of other regional groups; and
- Review and comment on the Annual Groundwater Report.

5.2 - Relationships with Other Agencies

The participants have been and continue to be involved in many programs, studies and committees that include groundwater related items in this Plan as part of their focus or charge. The Participants will continue to be involved in these efforts. A summary of some of these efforts is included here.

1986 Water Resources Management Plan

As described in the 1986 Water Resources Management Plan (1986 Plan), the Fresno Irrigation District (FID), City of Fresno (Fresno), the City of Clovis (Clovis), the County of Fresno (County), and the Fresno Metropolitan Flood Control District (FMFCD) have partnered in a cooperative effort to develop and implement a comprehensive surface and groundwater management program consistent with the Water Resources Management Plan for Fresno-Clovis Urban and Northeast Fresno County. The 1986 Plan, prepared with a grant from the Environmental Protection Agency (EPA) under Section 205j of the Clean Water Act, is a water quality and quantity project to plan for the preservation and enhancement of the area water supply.

Fresno/Clovis Area Recharge Program

The five agencies have entered into a Master Agreement for management of water quality and quantity for the area. The main thrust of the program involves using the FID's delivery system to deliver portions of the Fresno and Clovis water allocations to certain FMFCD basins for recharge during the summer when the basins are not needed to control urban storm runoff. Fresno and Clovis both own and operate significant recharge facilities to which a portion of the cities' water allocations is also delivered using the FID's system. This program also contains elements designed to protect the quality of groundwater in the area.

Integrated Storage Investigation Program

Other basin wide groundwater management efforts include a Memorandum of Understanding (MOU) with the Department of Water Resources entered into on May 24, 2001, as part of the Integrated Storage Investigation (ISI) program. The MOU between DWR, the Kings River Conservation District, Alta Irrigation District, Consolidated Irrigation District and Fresno Irrigation District, formed a cooperative effort amongst the agencies to review and investigate groundwater conjunctive use efforts on the Upper Kings Basin. During the formation of this program, the Kings Basin Advisory Panel was formed to include the basin stakeholders. The primary goal of the Basin Advisory Panel is "to stabilize groundwater in the Upper Kings Basin by halting, and ultimately reversing, the current overdraft of the groundwater aquifer."

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Upper Kings Water Forum

Several of the participants to this Plan are actively involved with the Upper Kings Water Forum. Specifically, the City of Fresno, City of Clovis, County of Fresno, and FID have been involved. Representatives from FID serve on the Upper Kings Forum Planning and Steering Committee. The purpose of the forum has been to develop an Integrated Regional Water Management Plan with assistance from State funding. The forum has also sought funding for construction, or implementation, projects within the region, including projects for the City of Clovis and FID. This Fresno-Area Regional Groundwater Management Plan will be incorporated into the Upper Kings Forum Integrated Regional Water Management Plan.

Water and Groundwater Associations

All of the plan participants are active in the groundwater community. Table 5-1 is a matrix illustrating the many water and groundwater related organizations that each participant belongs to. Many participants hold memberships in similar organizations, which increase opportunities for groundwater management coordination and the sharing of ideas.

Planned Activities

- Continue involvement with existing regional programs including the Fresno/Clovis Area Recharge Program, Integrated Storage Investigation Program, and Upper Kings Water Forum.
- Participate in newly formed regional groups that would complement this Plan.

5.3 - Plan to Involve the Public and Non-Participating Agencies

Water purveyors that are within the Plan boundary, but are not participating, include:

- Biola Community Service District
- Easton Community Service District
- International Water District

Each of these member agencies was invited to be a participating agency to the Plan, but could not financially participate. A copy of the draft Plan was sent directly to these agencies for review and comment. The Plan participants would welcome the participation of these and other agencies in the Plan Area, and they will have the opportunity to join the Plan in the future.

Input from neighboring agencies and interested parties was also solicited during this Plan's preparation.

Existing Activities

- Conducted public workshops regarding the Plan prior to adoption.
- Solicited input from neighboring agencies including Biola Community Service District, Easton Community Service District and International Water District.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Planned Activities

- Allow for agencies within the Plan Area to be incorporated into the Plan.
- Publish annual groundwater reports for distribution to stakeholders and interested parties. Notify the public of the availability of the annual report for their review on websites and newsletters.
- Publish information on the accomplishment of the regional group on websites and newsletters.

TABLE 5-1

**FRESNO-AREA REGIONAL GROUNDWATER MANAGEMENT PLAN
MEMBERSHIPS IN WATER-RELATED ORGANIZATIONS**

Organization	Fresno Irrigation District	County of Fresno	City of Fresno	City of Clovis	City of Kerman	Malaga County Water District	Pinedale County Water District	Fresno Metro. Flood Control District	Bakman Water Company
Agricultural Water Management Council	•								
American Public Works Association		•	•	•	•			•	
American Water Works Association			•	•	•				
Association of California Water Agencies	•		•			•	•	•	
Association of Metropolitan Water Agencies	•	•	•	•		•	•	•	•
California Rural Water Association					•				
California Storm Water Quality Association								•	
California Urban Water Conservation Council			•			•			
California Water Awareness Campaign			•	•	•			•	•
Central Valley Project Association			•						
Central Valley Water Awareness Committee	•	•	•	•		•		•	•
Central Valley Water Education Center	•	•	•	•					
Fresno-Area Groundwater Management Group	•	•	•	•	•	•	•	•	•
Fresno County Water Advisory Committee				•					•
Fresno/Clovis Area Recharge Program	•		•	•				•	
Kings River Water Association	•								
National Association of Flood and Stormwater Management Agencies								•	
Waldron Pond Group	•			•					
Water Education Foundation			•	•				•	•

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

6 - MONITORING PROGRAM

A groundwater level and quality monitoring program is a critical component for documenting and evaluating groundwater conditions within the Plan Area. There is a need for a coordinated and consistent level and quality data collection method within the Plan Area as there is not currently a complete groundwater data management system for the Plan Area. The County of Fresno has planned to develop a database management system, but insufficient funding has delayed its development. The cooperative effort through this Plan will help spread some of the financial burden to multiple agencies. The program shall include groundwater level, quality monitoring, as well as any indication of land subsidence. To ensure the integrity and consistency of the data, protocols for collecting and reporting the data are needed, and must be implemented by each agency. The proposed monitoring program is intended to:

1. Provide warning of potential future problems.
2. Use data gathered to generate information for water resources evaluation.
3. Develop meaningful long-term trends in groundwater characteristics.
4. Provide data comparable from place to place in the plan area.
5. Better characterize the quality of well water in the plan area.

6.1 - Groundwater Level Monitoring

Many of the participants routinely perform groundwater level and quality monitoring in accordance with agency standards and State regulations for water purveyors, however the frequency and method for monitoring varies by participant. FID currently collects well water level readings within most of the Plan Area, but the system only includes a few wells in some areas and has very little water quality information. FID developed a groundwater-monitoring program, when it was formed in 1920, to quantify changes in groundwater depth within the District. FID currently collects water level measurements each quarter, and also compiles water level data that is collected yearly from other agencies. Each agency's water-level measuring-program was established separately and the data are managed separately, but FID compiles all the data into a single database. Other agencies from which FID receives groundwater level data include:

- City of Fresno
- City of Clovis
- Consolidated Irrigation District
- Madera Irrigation District
- James Irrigation District
- Malaga County Water District
- California Department of Water Resources

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

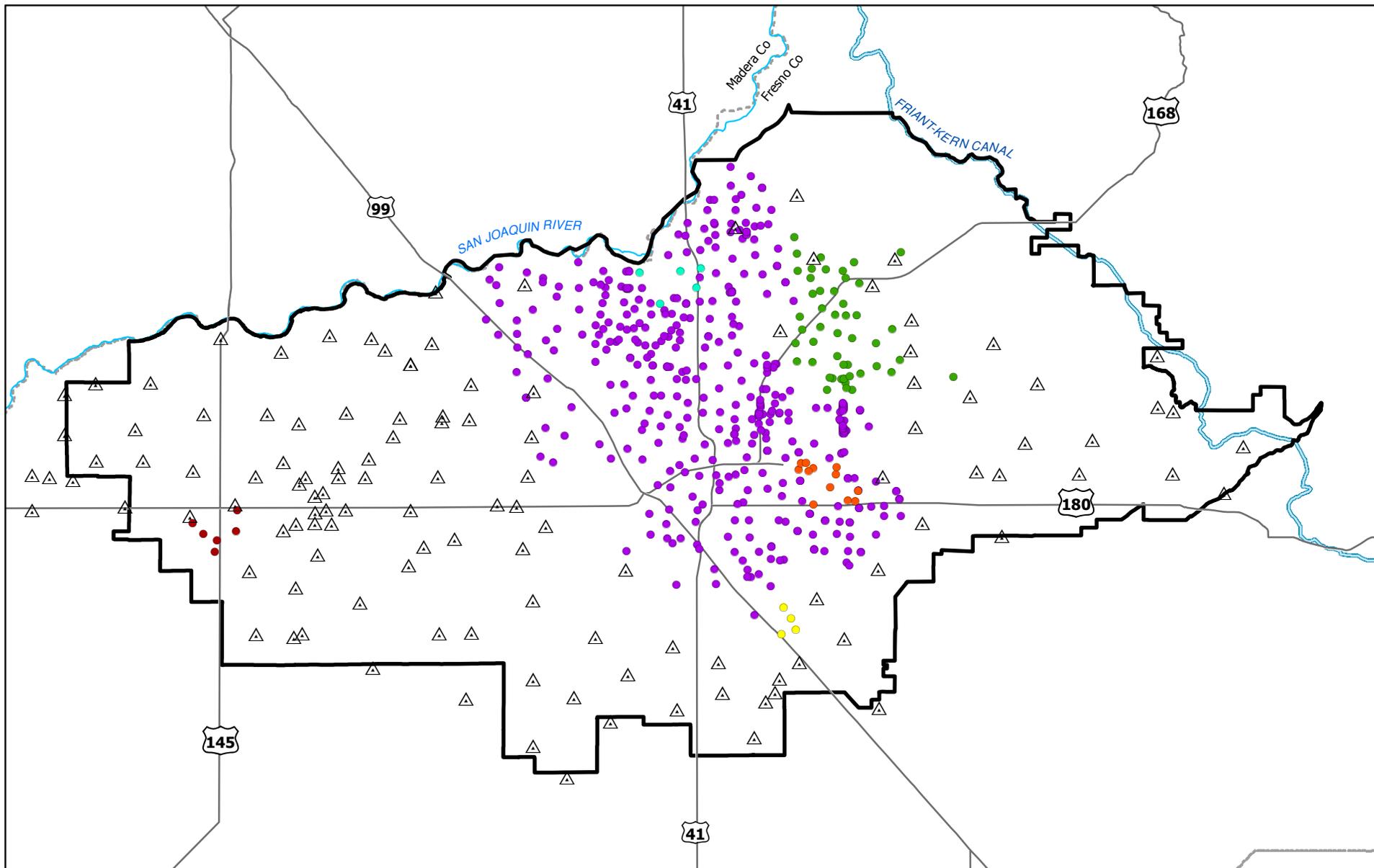
The County of Fresno no longer collects groundwater level data outside of its CSAs or WWDs. Some of the water purveyors, such as Kerman and the City of Fresno, have a water level measurement device in many wells connected to their SCADA systems. Other water purveyors such as Pinedale County Water District do not routinely record groundwater levels. FID and the City of Clovis monitor wells near their recharge facilities. The City of Fresno has several triple completion monitor wells near existing well sites that are monitored, however there are no monitor wells in or around recharge basin facilities that are used to evaluate groundwater recharge effects. A map of the domestic production and monitor wells that are frequently monitored for water level is included as Figure 6-1.

Existing Activities

- Individual monitoring by some participants with limited data sharing.
- Encourage landowners and developers to convert unused wells to monitor wells.

Planned Actions

- Develop a groundwater level monitoring program for the entire Plan Area. This will be accomplished by performing an inventory of monitoring efforts, finding gaps in the data, and adding wells to monitor in gap areas. Well driller's reports or monitored wells will be compared to identify each well's perforation depth.
- Decide on months for water level measurements to be taken so they are consistent for all parties.
- Survey the elevations for all wellheads and use a common survey datum.
- Protect wells in monitoring program from being abandoned.
- Develop Groundwater Database in accordance with 1986 Water Resources Master Plan and Fresno County Ordinance.
- Develop and use standard forms by all participants.
- Develop program for sharing data.



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- GMP BOUNDARY
- Wells Monitored By Other Agencies
- Wells Monitored By FID

Domestic Production Wells

- Bakman W.C.
- City of Kerman
- City of Fresno
- Malaga C.W.D.
- City of Clovis
- Pinedale C.W.D.

Figure 6-1
 Domestic Production and
 Other Monitored Wells

Fresno-Area Regional
 Groundwater Management Plan

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6.2 - Groundwater Quality Monitoring

Groundwater within the Plan Area is generally of good quality, however there are some specific areas of concern. Primary contaminants within these areas of concern are nitrates, Dibromo-Chloropropane (DBCP), and TCE. The domestic water purveyors within the Plan Area perform routine water quality monitoring as required by the State Department of Health Services. The requirements for testing are based on the size of the community system. Additional testing is performed at individual sites for specific constituents of concern. Additional water quality testing is needed to update various plumes that have been identified within the area. In addition, there are many locations within the Plan Area where little to no water quality monitoring is performed. Outside of the boundaries of the domestic water purveyors, the County of Fresno will perform basic water quality monitoring for individual wells, however, the City of Fresno recently completed a study of nitrate in wells in the southeast portion of the Plan Area. The City of Fresno has also recently studied nitrate in wells near the Wastewater Treatment Facility.

The following contaminant plumes are found within the City of Fresno's borders:

- Purity Oil plume
- Fresno landfill
- TCE Pinedale groundwater site
- FMC plume
- Salt Plume
- THAN plume
- Old Hammer Field plume
- Weir Floway plume

Most of the groundwater contaminants in the Fresno area are being addressed by responsible parties through assessment and remediation, and some are in advanced stages of mitigation. The responsible parties of many of the point source contaminants (i.e. hydrocarbons and VOCs) are working with state (Regional Water quality Control Board, Department of Toxic Substances Control) and local (FCEHD) agencies to remediate the contaminants. Area wide contaminants are being addressed via wellhead treatment (DBCP) and plans are underway to address others, such as nitrate.

The groundwater quality beneath portions of the City of Fresno is compromised by a number of inorganic and organic chemical contaminants. The inorganic contaminants include chloride, nitrate, arsenic, manganese and chromium. Organic contaminants include petroleum hydrocarbons and MTBE, volatile organic compounds (VOCs), DBCP and other pesticides, and trichloropropane (TCP). The sources of these contaminants are primarily anthropogenic and include industrial facilities, fuel storage and dispensing sites, agricultural applications, septic systems, and food processing facilities.

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Management of these plumes is a key issue that the City of Fresno has historically focused on and will continue to address.

The Fresno Irrigation District does not have specific water quality requirements since they only supply agricultural water. However, they are cognizant of recommended water requirements for crops and use these as guidelines when evaluating water quality.

Existing Activities

- Routine water quality monitoring and reporting by domestic water purveyors as required by DHS.
- County offers free water quality testing to individual landowners outside of a community system. This data is either not retained or not readily available.
- Monitor sediment in recharge/flood control basins according to FMFCD's Standard Operating Procedures for Monitoring, Maintaining and Disposal of Stormwater Basin Sediment.

Planned Actions

- Develop a coordinated monitoring program by methods similar to groundwater level monitoring evaluation; inventory existing efforts, find gaps in data monitoring, then add wells to monitor in gap areas. Critical to this effort will be an understanding of perforation intervals within each well to identify the depth of the various constituents of concern.
- Protect wells in monitoring program from being abandoned.
- Develop program for sharing data to participants.
- Improve access to County individual water quality testing information.
- Prepare groundwater quality maps on a periodic basis with the aid of a qualified hydrogeologist.

6.3 - Monitoring Protocols

Monitoring protocols are necessary to ensure consistency in monitoring efforts and consistency is required for monitoring evaluations to be valid. Consistency should be reflected in factors such as location and reference elevation at sample points, sampling procedures, testing procedures, time of year and frequency of sample collection. Without such common ground, comparisons between and among reports must be carefully considered. Consequently, more uniform data gathering procedures are proposed in order to increase the reliability of analyses. Specific protocols for water level and water quality monitoring are discussed below.

General protocols that will be used for the groundwater level-measuring program include:

- Perform all water level measurements in as short a period as possible.

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- Perform year-to-year measurements at the same time of the year.
- Document the measurement reference point for each well as well as the measuring device and calibration date for the measuring device.
- Document the date and time of each measurement.
- Test each well twice, or more if needed, until consistent results are obtained.
- If there is reason to suspect groundwater contamination, water level measuring equipment will be decontaminated, and in general, measurements will proceed from the least to the most contaminated wells. Also use standardized decontamination procedures.
- Landowners will be contacted for permission to access their property prior to any fieldwork.

The water-quality monitoring protocols may include the following for existing and future monitoring efforts:

- Adequate pumping time prior to sample collection with documentation of stabilized parameters.
- Proper sample containers, preservatives, and holding times.
- Secure chain-of-custody procedures.
- Testing will only be performed at accredited, state-certified laboratories that use proper quality control and quality assurance procedures.
- All samples will be given a quality assurance code, which represents the relative confidence in the water sample.
- Some testing will include spiked, duplicate and field-blank samples for comparison to genuine samples.
- Proper handling procedures (e.g. placing the containers in an ice chest immediately after collection).
- Documentation of all protocols and procedures that are used.
- Uniform time of year for sampling (during periods of both minimal pumping in the winter and heavy pumping in July and August).
- Document the name, contact information, and qualifications of the individuals taking measurements.
- Landowners will be contacted for permission to access their property prior to any fieldwork.

These protocols, and any new protocols that are adopted, will be documented in future Annual Groundwater Reports.

Existing Activities

- Annual calibration of water level measurement transmitters by some agencies
- Use of well sounder for measurement.
- Conduct water quality testing in accordance with DHS and EPA requirements and testing procedures.

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Planned Actions

- Collect and compare monitoring protocols from all of the Plan participants. Develop standard regional protocols for water level and water quality monitoring.
- Develop standardized form for collection of data.

6.4 - Land Surface Subsidence Monitoring

No information is available on historic land subsidence in the area. The area may have experienced land subsidence in the early 1900's when it was prevalent in the San Joaquin valley. However, no significant land subsidence is known to have occurred in the last 50 years as a result of land development, water resources development, groundwater pumping, or oil drilling. Lands within the Plan Area will be observed for land subsidence, and, if land subsidence becomes a problem, this Plan will be amended to include preventive and mitigative measures for land subsidence. A Global Position System (GPS) control network has been established throughout the Plan Area. This control network consists of more than twenty control points that are tied to the High Precision Grid Network (HPGN), and the vertical datum is North American Vertical Datum 1988 (NAVD 88). This control network can be utilized to survey existing local benchmarks to monitor subsidence.

Existing Activities

- Established GPS Control Network throughout the Plan Area.

Planned Actions

- Periodic resurvey of control points and local benchmarks for land subsidence.

6.5 - Surface Water Monitoring

Within the Plan Area, large areas of agriculture lands that formerly were irrigated with surface water have been urbanized. Much of these urbanized lands rely solely on groundwater for water supply. Surface water is delivered to the outlying agricultural area, stormwater and recharge basins, and some landscaped areas. While a portion of the historically delivered surface water is routed to recharge basins, it was not until 2004, that the cities of Fresno and Clovis were able to utilize surface water through newly constructed surface water treatment facilities. The location of surface water deliveries within the Plan Area has had an impact on groundwater levels as shown in Figure 3-2. FID maintains daily surface water delivery records, and compares surface water delivered within its boundary to groundwater level changes.

Surface water flows can impact groundwater levels and groundwater quality if the two water sources are hydrologically connected. In addition, pumping may also affect nearby surface water rights if the surface supplies are hydrologically connected to the groundwater. Much of the east-side stream flow water enters into the FID canal system

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for delivery to FMFCD and FID basins. FMFCD monitors surface water flows in portions of its boundary.

Changes to surface water quality can also affect groundwater quality by changing the quality of water that seeps from a stream. FID has not performed any water quality monitoring of stream flows entering FID. The water quality of the streams is monitored by other agencies and has historically been found to be of good quality. Between 85% and 90% of the water recharged in the FID is imported water. When importing water for recharge, the FID considers not just the cost but also the quality of the water to be recharged. The Participants will likewise be cognizant of water quality issues on streams in the Plan Area and address water quality issues if they arise.

Existing Activities

- FID reports surface water delivered within Plan Area and compares to groundwater level changes in annual report.
- Monitoring of surface water quality at Fresno and Clovis Surface Water Treatment Plants, as well as along conveyance system to Plants.
- Monitor quality of reclaimed water pumped to FID Canals from wells at the Wastewater Plant.

Planned Actions

- Continue monitoring of surface water deliveries within Plan Area.
- Prepare updated water budget for the City of Fresno and Clovis.
- Prepare water budget for the Plan Area based on annual monitoring program.

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7 - GROUNDWATER RESOURCES PROTECTION

7.1 - Well Destruction

Proper destruction of abandoned wells is necessary to protect groundwater resources and public safety. Improperly destroyed wells can provide a conduit for surface or near-surface contaminants to reach the groundwater. In addition, undesired mixing of water with different chemical qualities from different strata can occur in improperly destroyed wells.

The administration of a well construction, abandonment and destruction program has been delegated to the Counties by the State legislature. Accordingly, Fresno County has adopted a permitting program consistent with DWR Bulletin 74-81 for well abandonment and destruction.

The Participants have and will continue to properly destroy any of their wells that are no longer utilized, and will enforce proper well destruction procedures for all private wells. In addition, the Participants will encourage landowners and developers to convert unusable wells to monitor wells, rather than destroy them, so that they can become a part of the Participants' groundwater monitoring program.

Existing Activities

- The Plan participants destroy wells according to Fresno County or State of California standards.
- Clovis and Fresno require no longer used residential wells within the City to be properly destroyed.

Planned Actions

- Improve enforcement of well destruction policies; currently wells are not usually destroyed until the land is sold or the land use changes.
- Identify and map the locations of wells requiring proper destruction in the Plan Area.
- Maintain records on all well destruction performed in the Plan Area.

7.2 - Well Construction Policies

Proper well construction is important to ensure reliability, longevity, and protection of groundwater resources from contamination. Fresno County has adopted a well construction permitting program consistent with Department of Water Resources Bulletin 74-81 to assure proper construction of groundwater wells within the County. Other Plan participants have adopted similar permitting programs and standards.

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Proper wellhead protection is essential to ensure that contaminants do not inadvertently enter a well. Well construction policies that are intended to ensure proper wellhead protection are discussed in Section 7.3 – Wellhead Protection.

Some participants construct monitor wells to monitor water levels and water quality. Proper construction of monitor wells is essential to ensure their reliability and longevity. Important items to consider for a properly drilled monitor well include (1) method of drilling, (2) casing type and diameter, (3) perforations or well screen, (4) gravel pack, (5) annular seal, and (6) well development. As a general rule, monitor wells should be placed immediately upgradient and downgradient of a waste discharge site. After the monitor well is developed an aquifer test is recommended. Care should be taken to drill monitor wells deep enough so they won't go dry during summer months or drought periods; however, they should not be drilled so deep as to make monitoring of the shallowest strata difficult. Historical water level fluctuations should be examined to determine the magnitude of fluctuations to be expected in the future.

Existing Activities

- Wells are constructed according to State of California standards and may be further modified to meet site-specific requirements to accommodate a unique geologic setting in the local area.
- Records are maintained for all new wells drilled in the Plan Area.

Planned Actions

- Share well construction results in a 'Lessons Learned' format from water wells constructed in the Plan Area to share experiences among the Plan participants, and prevent common and recurring mistakes.

7.3 - Wellhead Protection

Need for Wellhead Protection

Contaminants from the surface can enter an improperly designed or constructed well along the outside edge of the well casing or directly through openings in the wellhead. A well is also the direct supply source to the customer, and such contaminants entering the well could then be pumped out and discharged directly into the distribution system. Therefore, essential to any wellhead protection program are proper well design, construction, and site grading to prevent intrusion of contaminants into the well from surface sources.

Since wells can be a direct conduit to the aquifer, they must be properly destroyed and abandoned or they will provide an unimpaird route for pollutants to enter the groundwater, particularly if pumping equipment is removed from the well and the casing is left uncapped. Well abandonment is discussed in Section 7.1.

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Wellhead Protection Guidelines

Wells constructed by the Participants will be designed and constructed in accordance with DWR Bulletin 74-81. In addition, the Participants will encourage landowners to follow the same standard for privately owned wells. DWR Bulletin 74-81 provides specifications pertaining to wellhead protection, including:

- Methods for sealing the well from intrusion of surface contaminants.
- Covering or protecting the boring at the end of each day from potential pollution sources or vandalism.
- Site grading to assure drainage is away from the wellhead.
- Setback requirements from known pollution sources.

Wellhead Protection Area

As defined in the Federal Safe Drinking Water Act Amendments of 1986, a wellhead protection area is “the surface and subsurface area surrounding a water well or well field supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field.” Wells are randomly spaced throughout the whole Plan Area. Therefore, the entire Plan Area is treated as a wellhead protection area.

Existing Activities

- Wellhead protection is performed according to DWR guidelines.

Planned Actions

- Identify and properly modify all public wells lacking adequate wellhead protection.

7.4 - Saline Water Intrusion

Saline water intrusion is not currently an identified problem in the Plan Area. The Plan Area is not located within or near large saline water bodies such as the ocean, saline inland lakes, or the saline deep aquifer on the Westside of the San Joaquin Valley. In addition, the Participants strive to prevent the importation of saline surface waters that could ultimately degrade the groundwater. When alternative water sources are available for importation, the Participants consider not only the cost but also the quality, including salinity, of the water. The Participants will monitor water quality in a manner that provides management information about salinity in the area. Should saline intrusion become a problem in the future, a Plan amendment will be prepared.

Existing Activities

- None

Planned Actions

- See Groundwater Quality Monitoring Program.

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7.5 - Migration of Contaminated Groundwater

Groundwater contamination can be human induced or caused by naturally occurring processes and chemicals. Sources of groundwater contamination can include irrigation, dairies, pesticide applications, septic tanks, industrial sources, stormwater runoff, and disposal sites. Groundwater within the Plan Area is generally of excellent quality for agricultural use. However, serious water quality problems in the southern and eastern portions of the Plan Area occur due to high concentrations of nitrate and DBCP. The presence of DBCP is primarily due to former pesticide application to the surrounding farmland.

The City of Fresno Nitrate Management Plan project, nearing completion, has yielded 20 to 30 viable projects of various types including blending, intentional recharge, removal of nitrate sources, treatment for nitrate reduction, and exchange of high nitrate water with lower nitrate surface water that can be used for recharge. All of these projects will be compared, ranked for effectiveness, and placed into service as appropriate over the next several years.

Information on existing contaminant plumes is voluminous, particularly for those plumes that have been assessed and are in various stages of remediation. Therefore, information on the plumes is not provided here.

Existing Activities

- Regularly review data and reports from regulatory agencies on contaminant plumes to provide warning of potential future problems.
- Report groundwater contamination to the appropriate regulatory agencies, including the Regional Water Quality Control Board and Department of Toxic Substances Control.

Planned Actions

- Seek to locate recharge basins next to areas with water quality problems to blend water supplies and create a hydraulic barrier to impede movement of contaminant plumes.
- Update maps for all contaminant plumes in the Plan Area.
- Implement some of the viable projects identified in the City of Fresno Nitrate Management Plan to control and reduce nitrate levels in the groundwater.

7.6 - Groundwater Quality Protection

The Fresno groundwater basin has been designated as a Sole Source Aquifer as authorized by Section 14246 of the Federal Safe Drinking Water Act of 1974. The designation, made by EPA in 1978, means the Fresno metropolitan area is dependent on a single source of groundwater and that source must be protected from potential contamination. This designation emphasizes the importance of protecting groundwater

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quality in the Plan Area. Groundwater comprises the majority of water used in the Plan Area; consequently pollution prevention is a cardinal component of this GMP. Groundwater quality can be protected through stormwater quality management, septic system management, and water vulnerability planning and management, as discussed below.

Stormwater Quality Management Program

The Fresno Nationwide Urban Runoff Program project was conducted between 1981 and 1983 in conjunction with the US EPA's national effort. The results indicated that runoff contains significant levels of many contaminants, including most of the heavy metals and some organic compounds. Most stormwater in the Plan Area is delivered to flood control/recharge basins where it can percolate to the groundwater or accumulate in the vadose zone. Hence, stormwater quality management is essential to protecting the quality of the local groundwater.

In compliance with the federal Clean Water Act and storm water permit regulations, the FMFCD, County of Fresno, City of Fresno, City of Clovis, and California State University at Fresno, developed a Stormwater Quality Management Program. The program is documented in the *Fresno-Clovis Storm Water Quality Management Plan*, prepared in February 1999. As owner and operator of the storm water drainage system serving the metropolitan area, the FMFCD has primary responsibility for implementing this mandated program. The program includes pollution prevention and control practices for drainage system planning, design, construction, and maintenance. The program also includes public education programs; commercial, industrial and new development storm water quality control practices; monitoring to assess storm water impacts; and ordinances to enforce storm water quality controls.

Septic Systems

Septic systems have been identified as a major contributor to high nitrate levels in the local groundwater. Septic systems are still present in rural areas and some urban neighborhoods within the Plan Area. The Plan participants generally do not permit septic systems to be installed in urban areas, and specific rules and regulations must be followed for septic systems installed in rural areas. The gradual decommissioning of septic systems in urban areas is a principal goal for the Plan participants.

Water Vulnerability

The local aquifer can be contaminated through intentional acts such as vandalism and terrorism. As a result, the Plan participants have adopted numerous strategies to prevent intentional contamination such as security cameras, fencing, and frequent water quality testing for contaminants.

Some plan participants have also prepared Vulnerability Assessments and Emergency Response Plans in compliance with the 2002 Bioterrorism Act. The Bioterrorism Act requires communities serving water to more than 3,300 persons to:

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1. Conduct a Vulnerability Assessment.
2. Certify and submit a copy of the Vulnerability Assessment to the EPA Administrator.
3. Prepare or revise an Emergency Response Plan based on the results of the vulnerability assessment.
4. Certify to the EPA Administrator, within 6 months of completing the assessment, that an Emergency Response Plan has been completed or updated.

Existing Activities

- A Stormwater Quality Protection Program is being implemented by FMFCD, Fresno, Clovis and the County of Fresno to reduce the volume of stormwater pollutants that reach the groundwater.
- Runoff-borne pollutants are trapped in flood control/recharge basin sediments for subsequent removal. All new basins are constructed in accord with FMFCD design standards that facilitate pollutant entrapment and management.
- Plan participants that are required to have prepared Vulnerability Assessments and Emergency Response Plans will keep these documents updated.
- The County of Fresno enforces rules and regulations for newly installed septic systems to reduce the incidence of nitrate contamination in the groundwater.

Planned Actions

- Plan participants will seek funding to sewer areas still served with septic tanks, when practical.
- Plan participants will seek funds to improve security at their water facilities and reduce the potential for contamination from acts of vandalism or terrorism.
- Plan participants will make use of available tools, such as View Fresno, to strictly enforce rules and regulations regarding permits for new septic systems in locations where there is an existing sewer collection system in close proximity.

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8 - GROUNDWATER SUSTAINABILITY

The region is dependant on sustaining the long-term available groundwater in the Plan Area, as it is critical to the livelihood and economy of the area. The actions described within this section are intended to maintain or increase the volume of groundwater that is stored within the Plan Area. Water conservation, groundwater recharge, surface water treatment for domestic delivery, and water recycling are some of the efforts that are used within the area to mitigate the groundwater overdraft and replenish the groundwater supply.

Historic groundwater pumping within the urban area has developed a large cone of depression within the Plan Area. At the present time, groundwater replenishment efforts within the Plan Area do not offset the combined effect of groundwater extractions and subsurface outflow. The result is that the groundwater overdraft within just the FID boundary has been estimated to be approximately 20,000 acre-feet annually (FID GMP Supporting Documents, 1995). The overdraft within the Plan Area is believed to be even greater. This overdraft is evidenced by falling groundwater levels, and manifested by increasing costs of groundwater pumping, some groundwater degradation, and the undesirable migration of contaminant plumes. It is the specific goal of the Plan to correct the overdraft and to stabilize groundwater levels at the highest practical beneficial levels.

The Plan participants view groundwater usage tolls as a last resort for reducing groundwater pumping and reducing overdraft. The participants strive to ensure the unrestricted, non-export related, private use of groundwater within the Plan Area. The Plan participants believe that proper management, conservation and education programs will help to stabilize groundwater levels and preclude the need for groundwater usage fees.

8.1 - Groundwater Recharge

Substantial portions of the groundwater basin underlying the Plan Area are subject to conditions of critical overdraft as designated by the California DWR. Drinking water supplies and much of the agricultural water supply in the Plan Area are currently dependent on groundwater and, as a result, the groundwater resource has been stressed. Groundwater is a renewable resource through its proper management. Groundwater recharge is a viable method of renewing groundwater consumed. Recharge of surface water through the soils to the groundwater reservoir is also an economical alternative to replacing the existing groundwater supply system with a surface water supply system requiring treatment, storage, and delivery facilities.

Stabilization and recovery of the aquifer are the goals of groundwater replenishment and will result in (1) decreasing the pumping lifts and thereby decreasing the energy

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needed for pumping; (2) preventing expenditures for deepening wells; and (3) preventing the premature abandonment of wells which would be necessitated by the lowering of the water table.

Groundwater recharge efforts within the Plan Area primarily involve using FID's delivery system to deliver portions of the Fresno and Clovis water allocations to specific FMFCD basins for recharge during the summer when the basins are not needed to control urban storm runoff. FMFCD owns and operates these basins. Not all basins are used for groundwater recharge, as some have been, or will be, converted to recreational facilities such as parks or athletic fields. Within the City of Fresno, the City Water Division and Parks and Recreation Division have developed a recommended designation for the proposed use of each basin during the non-storm season. FMFCD refers to this designation as each basin's secondary use designation. The designations include recharge, recreation, or dual use. The dual use designation is used for basins that have been developed for recreation, but also have a significant area of the basin remaining for recharge. The City's recommendation was considered and approved by FMFCD's Board of Directors. As new storm water basin locations are identified by FMFCD, the City makes a recommended designation for that basin, and it is then presented to FMFCD's Board of Directors for final determination. Recharge capability is an important consideration when making these designations.

To maintain needed groundwater recharge at these basin sites, it is important to preserve the recharge capability provided by the basin sites designated for recharge.

Although some basins are designated as recreation or dual use facilities, they are not developed as a recreational facility for many years because of a lack of funding or the basins not being fully excavated. This interim period can last several years. In some situations, these basins have been utilized for recharge during the interim period before it is converted to a recreational facility. Once a basin is fully developed as a recreational facility, it is no longer utilized for recharge.

Fresno and Clovis both own and operate significant recharge facilities, to which a portion of the cities' water allocations is also delivered using FID's system.

Some areas in the United States, including Arizona and some parts of California, are performing aquifer storage and recovery through wells. In these programs, surface water (often treated) is directly injected to the groundwater aquifer through existing wells during available periods when the well is not needed for extraction, then the recharged water is later extracted from that same well. Although this type of groundwater storage and recovery is not known to be occurring within the Plan Area, there may be application for such a program within certain portions of the Plan Area.

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Existing Activities

- Increase groundwater recharge capabilities within the Plan Area.
- Periodically remove sediment and rip the soils in recharge basins to maintain recharge rates.
- Maintain irrigation canals in an unlined or open bottom condition in those locations where it is determined that canal seepage is a significant source of recharge and does not create detrimental side effects.
- Work cooperatively to minimize development on lands that are favorable for artificial recharge.
- Without compromising flood protection, maximize retention and detention periods for stormwater runoff to maximize percolation to groundwater.
- Measure the volume of water delivered to groundwater recharge basins.
- Use FMFCD basins that are designated for recreational use as recharge basins prior to its conversion to a recreational facility.

Planned Activities

- Investigate the feasibility of groundwater recharge using flood control basins in the vicinity of Bakman Water Company.
- Seek funding to investigate the feasibility of groundwater recharge facilities in western Clovis.
- Construct additional interties between conveyance facilities and flood control basins to facilitate groundwater recharge.
- Develop and maintain an inventory of sites in the region that are suitable for recharge.
- Install flowmeters on all unmetered turnouts to recharge basins in FID.
- Prepare a water budget for the Plan Area to estimate total groundwater pumping, intentional recharge, deep percolation, groundwater inflow and outflow, change in groundwater storage, and, ultimately, the safe yield of the local aquifer.
- Investigate feasibility of aquifer storage and recovery within the Plan Area.
- Investigate feasibility of increasing use of surface water for landscape areas.
- Consider recharge capability of FMFCD basins when considering the secondary use designation for that basin.
- Seek to minimize reduction of groundwater recharge capabilities caused by the conversion of basins already designated for recharge purposes to recreational uses by increasing awareness or impacts of lost recharge capability, promoting alternative considerations, and pursuing replacement recharge capability when necessary.

8.2 - Water Conservation and Education

The Plan participants will at all times encourage effective water conservation measures, including residential and on-farm water saving technologies which produce a true savings of water. Plan participants intend to investigate possible incentive programs

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that might be made available to landowners and water users to enhance the efficient use of water within the Plan Area. The participants have always been, and will continue to be, committed to efficiently managing water supplies so as to maximize the beneficial use of surface water while enhancing and preserving the groundwater resources to meet the balance of the water needs of the landowners and water users within the Plan Area. The participants will also participate in cooperative conservation efforts with other agencies and private parties.

Existing Activities

The Plan participants practice a variety of measures to educate the public and encourage water conservation. Some of these measures include:

- Watering restrictions on certain days and certain times of the day.
- Educational and informational programs through mailings, newsletters, websites, radio and television commercials, newspaper advertisements and pamphlets.
- Designated water conservation coordinator to enforce conservation measures, assess fines for water wasting, and perform water audits.
- Rebates for low water use fixtures.
- Require new developments to include water conservation fixtures and technology.
- Involvement in organizations that promote water education and water conservation such as the California Water Awareness Campaign, California Water Education Center, and the Water Education Foundation.
- Require new developments to use water conserving technologies, methods, and practices.
- Some participants use water meters and tiered water pricing to encourage conservation through cost savings to the consumer.
- In compliance with AB 2572, the City of Fresno has developed a water meter installation program and schedule. Meter installations will begin about 2008 and are planned for completion in 2013.

Planned Activities

- Share information among the Plan participants on methods that have been successful in conserving water.
- Secure funds to perform metering studies and install water meters at unmetered residential, commercial, and industrial connections.
- Bakman to implement plan to install meters on new development and existing services by 2025.

8.3 - Groundwater Use Limitations

The California Water Code gives certain participants the power to limit or suspend groundwater extractions. However, such limits will only be implemented if the

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

participants determine through study and investigation that groundwater replenishment programs or other alternative sources of water supply have proved insufficient or infeasible to lessen groundwater demand. In the unlikely event that it becomes necessary to reduce groundwater extractions, the participants intend to accomplish such reductions under a voluntary program, which will include suitable incentives to compensate users for reducing their groundwater pumping. The participants will not attempt to restrict or otherwise interfere with any landowner or water user exercising a valid right to pump and utilize groundwater.

County of Fresno Ordinance No. 00-013 regulates groundwater extractions and requires permits for transferring groundwater outside of the County. The Participants generally do not support groundwater pumping for export out of the Plan Area unless it involves a transfer or exchange of water that will not negatively impact the water supply available to the Plan Area.

Pumping Well Interference from Adjacent Properties

One cause of overdraft within the Plan Area is pumping by adjacent landowners, primarily to the south and west of the Plan Area. This occurs when water users in an area pump groundwater and the extraction well's capture zone entrains groundwater from a neighboring entity.

Most of the pumping by adjacent landowners is not offset by groundwater replenishment, which results in the lowering of groundwater levels. That, in turn, causes a subsurface outflow of groundwater from the Plan Area. Previous estimates place the combined subsurface outflow to the south and west as much as 80,000 acre-feet annually.

The Participants intend to encourage efforts to secure supplemental surface water supplies for these areas outside of the Plan Area that have insufficient surface water supplies. The Participants have and will continue to consider entering into cooperative agreements with water users and/or appropriate agencies located outside the Plan Area's boundaries but within or adjacent to the Kings sub-basin. Such cooperative agreements may implement voluntary programs and/or may provide for other actions acceptable to the participants and the affected water users/agencies. However, in no event will the participants attempt to unilaterally impose limits on the lawful extraction and use of groundwater outside its boundaries, and nothing in this section is intended to confer powers on the participants to act within the boundaries of another agency in contravention of the Water Code.

Existing Activities

- Some agencies do not permit individual wells to be drilled in their service area, and all new development must be connected to the agency's water system.
- Restrictions on groundwater exporting.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Planned Activities

- Encourage efforts to secure supplemental surface water supplies for these areas outside of the Plan Area that have insufficient surface water supplies.

8.4 - Conjunctive Use of Water Resources

Conjunctive use of water is defined as the coordinated use of both underground and surface water sources so that the combination will result in optimum benefits. The members believe that they will continue to be water short for the foreseeable future. Conjunctive use is one method to provide more water to users while conserving groundwater resources.

The Cities of Fresno and Clovis have constructed water treatment plants for treating their surface water entitlements. This will ultimately result in a reduction in groundwater pumping within the Plan Area and should slow declining groundwater levels. The Plan Participants support these efforts and will continue to encourage other local agencies to maximize use of their surface waters to conserve groundwater resources.

Groundwater banking is the process of recharging excess surface water into the aquifer, storing the water in the aquifer for a period of time, then extracting the recharged water for delivery. This process allows surface water supplies to be extended, as available surface water can be captured, stored, and then delivered during periods of higher demand. The Plan participants will limit extraction to a percentage of the banked water such that benefits are derived for all parties involved, including adjacent landowners. In addition, banking and subsequent extraction of the banked water shall, to the extent possible, occur in close proximity to each other unless the affected parties agree otherwise, and there will be no adverse impact on the local groundwater supply. FID is developing the Waldron Banking Facility located near Kerman, and is also considering an additional banking facility in the southern portion of FID.

Direct delivery of surface water from the canal system to areas of large landscaping, such as cemeteries, golf courses, schools and parks, is another example of a conjunctive use program. Untreated surface water is filtered and then pumped into the landscape irrigation system at these sites. Certain regulations and limitations for the use of untreated surface water apply, but it is permissible. The direct delivery reduces the amount of groundwater needed, and can be less expensive than delivering surface water treated to drinking water standards. Within the Plan Area, only one school site, one park and one cemetery are known to currently be utilizing surface water for irrigation. The large irrigated turf locations are a primary concern, however there are also other locations in the western United States, including California, that are providing direct delivery of surface water for landscaping irrigation at residences. This is not being performed within the Plan Area, but is being considered.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Existing Activities

- Pending development of Waldron Banking Facility.
- Delivery of surface water for landscaping to a few areas of large irrigated turf.

Planned Activities

- Encourage and assist landowners and water users in the transfer of water into the Plan Area, which will have the effect of causing "in lieu" recharge.
- Pursue the acquisition of new water supplies should they become available at affordable costs.
- Support the development of new surface storage and water supply projects that would permit the participants to better utilize surface water supplies.
- Expand conveyance systems to provide surface water to additional land.
- Wherever appropriate and practical, encourage groundwater conservation through the use of available surface irrigation water for non-agricultural purposes.
- Encourage those municipal water agencies that have not already done so to contract for available surface water.
- Work with all appropriate public agencies, private organizations, and individuals within and outside of the plan area to protect existing surface water rights and supplies.
- Seek opportunities to increase conservation storage through groundwater banking programs or off-stream storage to help balance full contract supply years with drought years.
- Construct additional surface water treatment plant capacity for the Cities of Fresno and Clovis.
- Investigate additional groundwater banking facilities.
- Investigate and encourage use of surface water for irrigation of large irrigated turf such as schools, golf courses, cemeteries and parks.

8.5 - Wastewater Reclamation and Recycling

The recycling or reclamation of treated wastewater will extend the overall water supply within the Plan Area. The Regional Water Quality Control Board regulates the use of recycled water based on the treatment method of treatment facilities. While wastewater treatment methods are outside the scope of this plan, the overall water supply of the Plan Area is extended by the reuse of this water.

Wastewater within the City of Fresno is currently piped to the Fresno-Clovis Regional Wastewater Treatment Facility, as shown in Figure 2-1. This facility provides secondary level treatment, and nearly all of the effluent is sent to percolation ponds at the facility. A portion of the water is then reclaimed through a series of reclamation wells, and delivered to FID facilities for on-farm irrigation. The water reclaimed is metered, and the amount delivered is approximately 26,000 acre-feet per year.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Malaga County Water District and the City of Kerman also operate smaller wastewater treatment facilities. The City of Kerman currently delivers tertiary treated wastewater from its facility to neighboring agricultural lands for irrigation. There are other smaller wastewater treatment facilities that are distributing treated wastewater for landscape and irrigation purposes.

The City of Clovis is planning construction of a WWTF in the northeast portion of the Plan Area. The City is also planning to construct distribution facilities for delivering tertiary treated water from this facility to irrigate large landscape areas, including parks, local street and Caltrans right of way landscaping, and agricultural irrigation at California State University Fresno.

Existing Activities

- Delivery of reclaimed water at the Fresno-Clovis Regional WWTF.
- Direct application of effluent for irrigation at the Kerman WWTF.

Planned Activities

- Explore opportunities to optimize reuse of reclaimed water from the Fresno-Clovis Regional Wastewater Treatment Facility.
- Institute water recycling program planned for reuse of wastewater at the proposed Clovis wastewater treatment facility.
- Encourage higher level treatment facilities to facilitate less restricted use of recycled water.
- Encourage new developments to incorporate dual water systems. The secondary water system would use recycled water or groundwater of marginal quality for landscape irrigation.

8.6 - Operation of Facilities

The construction and proper operation of groundwater management facilities is an important facet of this plan. New facilities are needed to keep pace with increased water demands and the desire for improved management.

The participants have a number of opportunities to further improve and enhance the water and groundwater supplies of its landowners and neighbors. The participants will continue to evaluate potential projects that would involve the construction and operation of additional groundwater management facilities. Additional groundwater management facilities can provide needed flexibility and thus allow more optimal management of the groundwater.

Lastly, the members strive to provide the best facilities for delivery of surface water supplies, since they are used conjunctively with groundwater. The members realize that the success of conjunctive-use programs is often contingent on the quality of surface water and conveyance systems.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Existing Activities

- Policy to keep canals unlined where practical to allow for groundwater recharge.
- Cooperative use of stormwater facilities for groundwater recharge.
- Frequent maintenance of recharge ponds to maintain higher infiltration rates.

Planned Activities

- Maintain and upgrade conveyance facilities for capacity and stability.
- Improve canal maintenance procedures to eliminate or reduce canal downtime for deliveries to surface water treatment facilities.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

9 - GROUNDWATER PLANNING AND MANAGEMENT

9.1 - Plan Implementation

The Participants have executed a Memorandum of Understanding (MOU) to facilitate the implementation of this Plan. This Plan and associated agreement, serve as a mechanism for cooperative efforts amongst the participants and other agencies within the region. Many of the activities described in the Plan target specific locations within the Plan Area, and therefore may involve only one or a few of the participants. Although certain activities may only involve some participants, the TAC meetings will serve as the primary forum for coordination of cooperative efforts. The annual report will also summarize all related activities within the Plan Area. Implementation of this Plan is expected to result in significant amounts of new knowledge and an achievable improvement in groundwater management in the basin. The participants also recognize that implementing the GMP is in the best interest of their water users. The participants plan to continue all of the 'Existing Activities' listed throughout this Plan. Implementation of each of these tasks would be beneficial to the Plan participants, but will be contingent on available staff time and funding.

Planned Activities

- Implement the Planned Activities described in the Plan.
- TAC to meet semi-annually to discuss regional groundwater management. Comments on the content and value of the GMP will be solicited at each meeting.
- Prepare Annual Reports and Reevaluate the Plan as described herein.

9.2 - Groundwater Reports

The Participants will prepare groundwater reports every year to document groundwater levels, available groundwater storage, historical trends, groundwater quality, and progress on groundwater projects. This information will be used to forecast future problems, plan future groundwater projects, and develop new groundwater policies.

Existing Activities

- Several agencies prepare reports (i.e. water supply reports, water master plans, water conservation plans, urban water management plans, etc.) that document groundwater conditions. These reports will continue to be prepared for use in assessing groundwater conditions within individual agencies.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Planned Activities

- Prepare Fresno Area Regional Groundwater Management Plan Annual Report and include information on all of the Plan participants. Plan will likely include:
 - Groundwater level data
 - Groundwater contour maps
 - Groundwater storage calculations (using specific yield values for each township and range)
 - Evaluation of one-year and five-year historical trends in groundwater levels, contours, and storage, and perceived reasons for any changes
 - Estimation of deliveries to recharge basins
 - Summary of important groundwater management actions during the period covered by the report
 - Discussion on whether management actions are meeting the management objectives
 - Summary of proposed management actions for the future
 - Summary of actions taken to coordinate with other water management, land-use and government agencies
 - Summary of groundwater related actions taken by other regional groups
 - Recommendations for changes in the content or format of the annual report
 - Recommendations for updates to the GMP
- The annual report will cover the prior calendar year and will be completed each year by May 31st.

9.3 - Plan Re-evaluation

Most of the strategies that make up this Plan are established policies, procedures, and ordinances. The goal of this document is to codify them for purposes of identifying an overall management program. Implementation of the various components of the Plan will continue on an on-going basis. As new policies, practices, or ordinances become necessary or desirable to enhance groundwater management, this Plan will be amended as necessary.

The Technical Advisory Committee (TAC) will be responsible for monitoring the progress of the GMP objectives. Refer to Section 5.1 for more information on the membership, policies, and procedures of the TAC. The TAC will attempt to meet twice each year to review and evaluate groundwater conditions as well as evaluate the effectiveness of the GMP.

Planned Activities

- The TAC will meet semi-annually to discuss regional groundwater management. Comments on the content and value of the GMP will be solicited at each meeting.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

- Recommendations for modifying, updating, or expanding the GMP will be recorded annually in the Plan Group's Annual Groundwater Report.
- The GMP will be revised through a formal public process every five years, or earlier if a sufficient quantity of revisions, updates, and additions have been identified.

9.4 - Land Use Planning

The intent of this Plan is not to dictate land-use planning policies, but rather to establish some land-use planning goals that can aid in protecting and preserving groundwater resources. Some of the Plan participants have direct land-use planning authority while others do not. However, all of the participants have the opportunity to comment on environmental documents for land-use related activities. The Plan participants will attempt to work cooperatively with other agencies to minimize adverse impacts to groundwater supplies and quality as a result of proposed land-use changes. Some specific land-use planning goals include: (1) preserving areas with high groundwater recharge potential for recharge activities; (2) protecting areas sensitive to groundwater contamination; (3) requiring hydrogeologic investigations, water master plans, and proven and sustainable water supplies for all new developments; and (4) requiring appropriate mitigation for any adverse impacts that land use changes have on groundwater resources. A map showing the extent of the general urbanization within the Plan Area is included as Figure 9-1.

Existing Activities

- Notify residents and agencies of projects that have the potential to impact groundwater within their sphere of influence.
- When appropriate, comment on environmental documents and land-use plans that have the potential to impact groundwater.

Planned Activities

- Determine ways to improve communication between County, Cities and other Private/Public agencies regarding landuse changes that may have an impact on groundwater.

9.5 - Dispute Resolution

Each participant has their own mechanisms for dispute resolution related to groundwater issues. These may include procedures for filing complaints and appeals to a manager, board, or committee. The Plan participants recognize the importance of groundwater as their primary water source and will work diligently to resolve any groundwater disputes according to their internal rules and regulations.

This regional GMP will provide a forum for the participants to discuss groundwater related disputes and identify possible solutions. In addition, it is envisioned that the

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

regional coordination, improved communication, and multi-party projects that develop as part of this Plan will help to reduce future conflicts among the participants.

Planned Activities

- Discuss issues of concern at semi-annual TAC meeting. Provide recommendations for resolution if appropriate.

9.6 - Program Funding and Fees

Funding individual activities described in this Plan will be provided for in each agency's individual budget. Funding of the Plan preparation and annual report are included in the MOU for implementation. The Plan participants have a variety of options for funding groundwater projects as discussed below.

Water Replenishment Fees

Included in the authority granted to local agencies under the California Water Code were the powers to limit groundwater extractions and implement water replenishment fees based upon the amount of water extracted (extraction based fees must first be approved by majority vote of impacted landowners). Inherent in these powers is the authority to implement metering of private wells. These are considered measures of last resort and the members will make any and all efforts to ensure the private, non-metered use of groundwater by their water users.

Capital Improvement Fees

Some participants have the authority to finance capital improvement projects and collect repayment charges from the benefited parties. This process would require a favorable vote from the constituency approving the repayment fees prior to implementation, and is considered a realistic alternative for large capital projects to improve groundwater facilities.

Grants

Some participants have successfully acquired funding from the DWR and other public agencies for projects that are consistent with the goals of their Groundwater Management Plan. The participants will continue to pursue available grants and low-interest loans from the DWR as well as other state and federal agencies.

Other Revenue Sources

Groundwater projects are also financed through a variety of water user fees, property taxes, sales taxes, fine payments, and development impact fees.

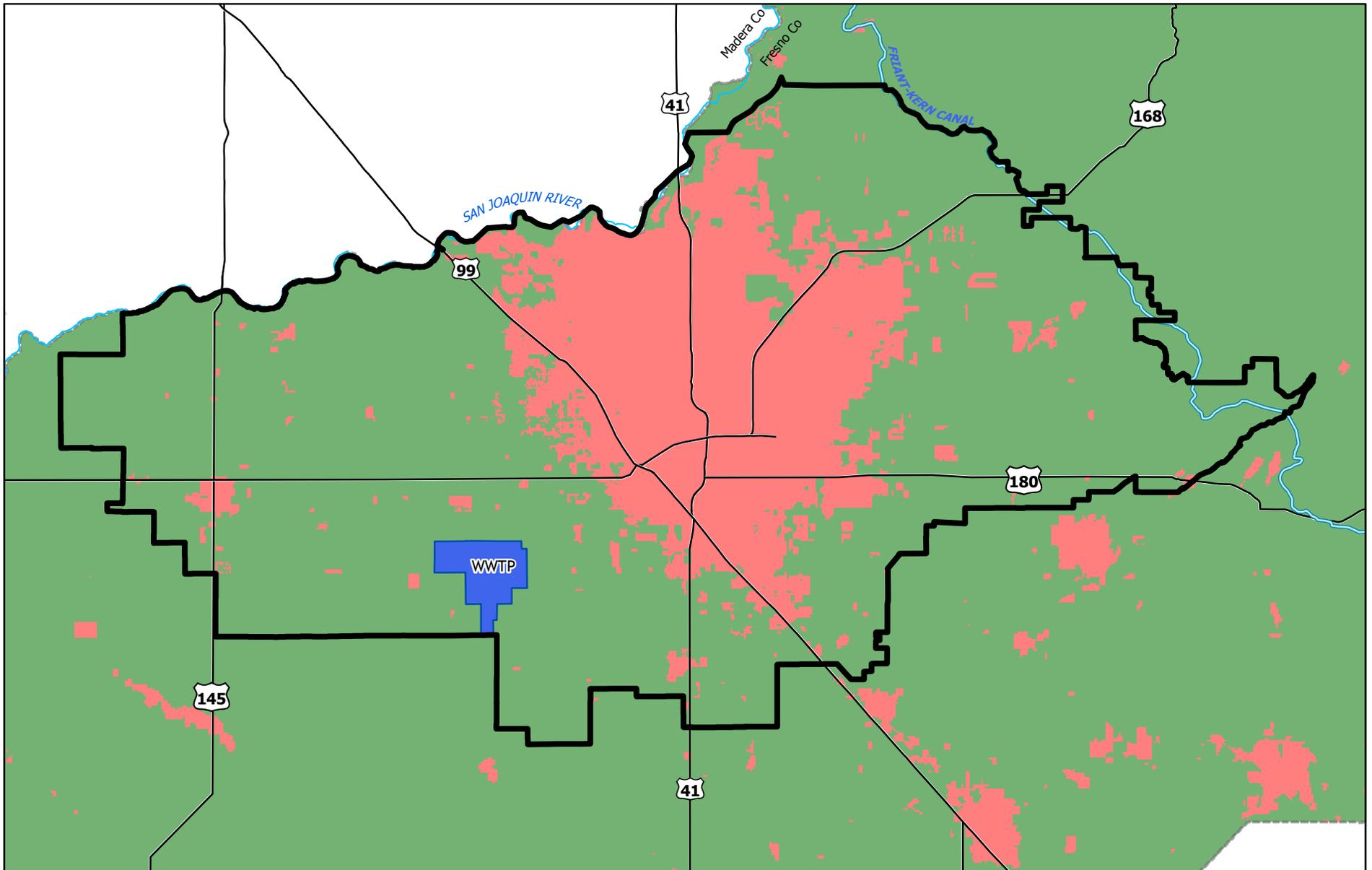
Cost Sharing Agreement

Costs for GMP updates, annual groundwater reports, and other projects involving all of the Plan participants will be distributed according to an accepted cost-sharing agreement that is documented in the MOU.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

Planned Activities

- Share information on funding opportunities for groundwater related projects.
- Identify beneficial groundwater projects that become economically feasible when costs are shared among two or more participants.



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 GMP BOUNDARY

 FRIANT-KERN CANAL

 Urban Land Use

 Ag / Irrigated Land Use

Figure 9-1
 Landuse Map

Fresno-Area Regional
 Groundwater Management Plan

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

10 - REFERENCES

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FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

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FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

APPENDIX A

PUBLIC PARTICIPATION IN PLAN ADOPTION

RESOLUTION NO. 2005-09

**RESOLUTION OF THE BOARD OF DIRECTORS OF THE
FRESNO IRRIGATION DISTRICT**

**FOR INTENTION TO ADOPT THE
FRESNO-AREA REGIONAL GROUNDWATER MANAGEMENT PLAN**

WHEREAS, Part 2.75 of Division 6 of the California Water Code permits the adoption and implementation of groundwater management plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the Fresno Irrigation District adopted a groundwater management plan consistent with the provisions of the California Water Code Section 10750 et. seq. on August 12, 1996; and

WHEREAS, the Fresno Irrigation District desires to adopt a groundwater management plan that is consistent with recent amendments to the provisions of the California Water Code Section 10750 et. seq.; and

WHEREAS, the Fresno Irrigation District, City of Fresno, City of Clovis, Fresno Metropolitan Flood Control District, County of Fresno, City of Kerman, Malaga County Water District, Pinedale County Water District and Bakman Water Company have entered into a Memorandum of Understanding to cooperate and participate in the development of the Fresno-Area Regional Groundwater Management Plan for the planning and monitoring activities of groundwater conditions within their respective jurisdictions; and

WHEREAS, each of the parties has the authority pursuant to law and their local governing authorities to enter into this cooperative effort to study and plan for the management of groundwater conditions within their respective jurisdictions; and

WHEREAS, the District's Board of Directors believes that groundwater can best be managed, as in the past, by local agencies in coordination with owners of lands overlying the groundwater basin; and

WHEREAS, the Board of Directors believes the updating and adoption of a new groundwater management plan will be in the best interests of its constituents and water users and can help meet the projected long-term water needs of the Fresno Irrigation District; and

WHEREAS, a public hearing was held on August 10, 2005 to discuss the adoption and implementation of the Fresno-Area Regional Groundwater Management Plan.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of the Fresno Irrigation District as follows:

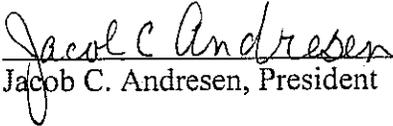
The foregoing findings are true and correct:

1. It is the intention of the Fresno Irrigation District to adopt the Fresno-Area Regional Groundwater Management Plan in accordance with Part 2.75 of Division 6 of the California Water Code, and the District's consultant is hereby authorized and directed to draft such a plan;
2. That this resolution shall be deemed a resolution of intention in accordance with California Water Code Section 10753.2;
3. After such a plan has been prepared, a second public hearing will be conducted in accordance with the California Water Code Section 10753.5, et seq. to determine whether to adopt the plan;
4. That the officers of the Fresno Irrigation District are authorized and directed to publish this resolution of intention to update the District's groundwater management plan in accordance with the provisions of California Water Code Section 10753.3 and to provide interested persons with a copy of this resolution upon written request;
5. That the Board of Directors hereby authorizes its officers to execute all documents and take any other action necessary or advisable to carry out the purposes of this resolution.

RESOLVED by the Board of Directors of the Fresno Irrigation District that the Fresno-Area Regional Groundwater Management Plan be developed to be in compliance with California Senate Bill No. 1938.

The General Manager of the Fresno Irrigation District is hereby authorized and directed to prepare the necessary data, make investigations, sign, and file such application with the California Department of Water Resources.

PASSED AND ADOPTED at a regular meeting of the Board of Directors of Fresno Irrigation District on August 10, 2005.

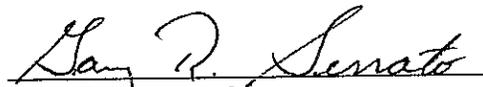


Jacob C. Andresen, President

CERTIFICATE OF SECRETARY

I, GARY SERRATO, Secretary of the Fresno Irrigation District hereby certify that the Board of Directors at a regular meeting on August 10, 2005 adopted the foregoing Resolution by the following roll call vote:

	<u>Aye</u>	<u>Nay</u>	<u>Absent</u>	<u>Abstain</u>
President Andresen	✓	—	—	—
Vice-President Boswell	✓	—	—	—
Director Niederfrank	✓	—	—	—
Director Balls	✓	—	—	—
Director Neely	✓	—	—	—



Gary R. Serrato, Secretary

RESOLUTION NO. 05-140

A RESOLUTION OF INTENTION OF THE COUNCIL OF THE CITY OF CLOVIS, CALIFORNIA, TO ADOPT THE FRESNO-AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

WHEREAS, Part 2.75 of Division 6 of the California Water Code permits the adoption and implementation of groundwater management plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the City of Clovis adopted a groundwater management plan consistent with the provisions of the California Water Code Section 10750 et. seq. on November 17, 1997; and

WHEREAS, the Fresno Irrigation District, City of Fresno, City of Clovis, Fresno Metropolitan Flood Control District, County of Fresno, City of Kerman, Malaga County Water District, Pinedale County Water District and Bakman Water Company have entered into a Memorandum of Understanding to cooperate and participate in the development of the Fresno-Area Regional Groundwater Management Plan for the planning and monitoring activities of groundwater conditions within their respective jurisdictions; and

WHEREAS, each of the parties has the authority pursuant to law and their local governing authorities to enter into this cooperative effort to study and plan for the management of groundwater conditions within their respective jurisdictions; and

WHEREAS, the City of Clovis desires to adopt a groundwater management plan that is consistent with recent amendments to the provisions of the California Water Code Section 10750 et. seq.; and

WHEREAS, a public hearing was duly noticed consistent with California Water Code Section 10753.2(a), and held on August 10, 2005 to discuss the adoption and implementation of the Fresno-Area Regional Groundwater Management Plan; and

WHEREAS, the Clovis City Council believes that groundwater can best be managed, as in the past, by local agencies in coordination with owners of lands overlying the groundwater basin; and

WHEREAS, the Clovis City Council believes the updating and adoption of a new groundwater management plan will be in the best interests of its constituents and water users and can help meet the projected long-term water needs of the City of Clovis.

NOW, THEREFORE, BE IT RESOLVED by the Clovis City Council as follows:

1. It is the intention of the City of Clovis to adopt the Fresno-Area Regional Groundwater Management Plan in accordance with Part 2.75 of Division 6 of the California Water Code, and the Fresno Irrigation District's consultant is hereby authorized and directed to draft such a plan;
2. That this resolution shall be deemed a resolution of intention in accordance with California Water Code Section 10753.2;
3. After such a plan has been prepared in accordance with all applicable law, including but not limited to the California Environmental Quality Act, a second public hearing will be conducted in accordance with the California Water Code Section 10753.5, et seq. to determine whether to adopt the plan;
4. That the officers of the City of Clovis are authorized and directed to publish this resolution of intention to adopt the Fresno-Area Regional Groundwater Management Plan in accordance with the provisions of California Water Code Section 10753.3 and to provide interested persons with a copy of this resolution upon written request;
5. That the Clovis City Council hereby authorizes its officers to execute all documents and take any other action necessary or advisable to carry out the purposes of this resolution.

BE IT RESOLVED by the City Council of the City of Clovis that the Fresno-Area Regional Groundwater Management Plan be developed to be in compliance with California Senate Bill No. 1938.

The Director of Public Utilities of the City of Clovis is hereby authorized and directed to prepare the necessary data, make investigations, sign, and file such application with the California Department of Water Resources.

* * * * *

The foregoing resolution was introduced and adopted at a regular meeting of the City Council of the City of Clovis held on September 6, 2005 by the following vote, to wit:

AYES: Councilmembers Armstrong, Ashbeck, Flores, Whalen, Mayor Magsig

NOES: None

ABSENT: None

ABSTAIN: None

DATED: September 6, 2005



Mayor



City Clerk

BAKMAN WATER COMPANY

TELEPHONE (559) 255-0324 • P.O. BOX 7965 • 5105 E. BELMONT • FRESNO, CA 93747

MINUTES OF THE SPECIAL MEETING OF THE BOARD OF DIRECTORS OF BAKMAN WATER COMPANY, A CALIFORNIA CORPORATION.

A special meeting of the Board of Directors of the Bakman Water Company was held at the Bakman Water Co. office located at 5105 E. Belmont Ave, Fresno, California.

Date: July 8, 2005

Time: 9:00am

Officers present were Richard Tim Bakman, Virginia Bakman, and Dottie Patton.

On July 8, 2005, a special meeting was called to discuss the possibility of being a part of **Memorandum of Understanding** regarding The Fresno Area Regional Groundwater Management Plan.

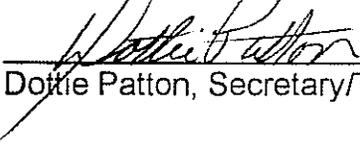
Purpose This MOU is intended to promote and to provide a means to establish an orderly process to share information, develop courses of action, and to resolve any issues with respect to the cooperative development of the groundwater management plan and with respect to the administration of the groundwater management plan. Administration will include coordination of data received from each party, public noticing, meetings and annual reporting as described herein. This MOU memorializes the interests, intent and responsibilities of the parties with respect to the adoption of a groundwater management plan consistent with the provisions of the California Water Code to provide for collection of data and the development of a plan for the management of groundwater resources within the jurisdictions of the parties hereto.

Payment of Costs Each of the parties hereto shall contribute to the cost of updating the groundwater management plan in accordance with the obligations specified in Exhibit "2" attached hereto. Additionally, any ongoing fees or costs incurred in the administration of the plan (as administration is defined and limited in Section 1 of this MOU) or of this Memorandum of Understanding will be shared by the parties in accordance with percentages identified in Exhibit "2".

The following being all of the directors of Bakman Water Company, hereby consent to and agree to be a part of the **Memorandum of Understanding** regarding The Fresno Area Regional Groundwater Management Plan.


Richard Tim Bakman Water


Virginia A. Bakman


Dottie Patton, Secretary/Treasurer



RESOLUTION NO. 2005-386

A RESOLUTION OF THE COUNCIL OF THE CITY OF
FRESNO, CALIFORNIA, FOR INTENTION TO ADOPT
THE FRESNO-AREA REGIONAL GROUNDWATER
MANAGEMENT PLAN

WHEREAS, Part 2.75 of Division 6 of the California Water Code permits the adoption and implementation of groundwater management plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the Fresno Irrigation District adopted a groundwater management plan consistent with the provisions of the California Water Code Section 10750 et. seq. on August 12, 1996; and

WHEREAS, the Fresno Irrigation District, City of Fresno, City of Clovis, Fresno Metropolitan Flood Control District, County of Fresno, City of Kerman, Malaga County Water District, Pinedale County Water District and Bakman Water Company have entered into a Memorandum of Understanding to cooperate and participate in the development of the Fresno-Area Regional Groundwater Management Plan for the planning and monitoring activities of groundwater conditions within their respective jurisdictions; and

WHEREAS, each of the parties has the authority pursuant to law and their local governing authorities to enter into this cooperative effort to study and plan for the management of groundwater conditions within their respective jurisdictions.

WHEREAS, the City of Fresno desires to adopt a groundwater management plan that is consistent with recent amendments to the provisions of the California Water Code Section 10750 et. seq.; and

WHEREAS, a public hearing was duly noticed consistent with California Water Code Section 10753.2(a), and held on August 10, 2005 to discuss the adoption and implementation of the Fresno-Area Regional Groundwater Management Plan; and

Adopted			05
Approved		10	
Effective			



WHEREAS, the Council believes that groundwater can best be managed, as in the past, by local agencies in coordination with owners of lands overlying the groundwater basin; and

WHEREAS, the Council believes the updating and adoption of a new groundwater management plan will be in the best interests of its constituents and water users and can help meet the projected long-term water needs of the City of Fresno.

NOW, THEREFORE, BE IT RESOLVED by the Council of the City of Fresno as follows:

The foregoing findings are true and correct:

1. It is the intention of the City of Fresno to adopt the Fresno-Area Regional Groundwater Management Plan in accordance with Part 2.75 of Division 6 of the California Water Code, and the District's consultant is hereby authorized and directed to draft such a plan;
2. That this resolution shall be deemed a resolution of intention in accordance with California Water Code Section 10753.2;
3. After such a plan has been prepared in accordance with all applicable law, including but not limited to the California Environmental Quality Act, a second public hearing will be conducted in accordance with the California Water Code Section 10753.5, et seq. to determine whether to adopt the plan;
4. That the officers of the City of Fresno are authorized and directed to publish this resolution of intention to update the District's groundwater management plan in accordance with the provisions of California Water Code Section 10753.3 and to provide interested persons with a copy of this resolution upon written request;
5. That the Council hereby authorizes its officers to execute all documents and take any other action necessary or advisable to carry out the purposes of this resolution.

BE IT FURTHER RESOLVED that the Fresno-Area Regional Groundwater Management Plan be developed to be in compliance with California Senate Bill No. 1938.



BE IT FURTHER RESOLVED that the Director of the Department of Public Utilities is hereby authorized and directed to prepare the necessary data, make investigations, sign, and file such application with the California Department of Water Resources.

STATE OF CALIFORNIA)
COUNTY OF FRESNO) ss.
CITY OF FRESNO)

I, REBECCA E. KLISCH, City Clerk of the City of Fresno, certify that the foregoing resolution was adopted by the Council of the City of Fresno, at a regular meeting held on the 20th day of September, 2005.

AYES : Boyajian, Calhoun, Duncan, Perea, Sterling, Westerlund, Dages
NOES : None
ABSENT : None
ABSTAIN : None

REBECCA E. KLISCH
City Clerk

BY: Rebecca Klisch
Deputy

APPROVED AS TO FORM:
CITY ATTORNEY'S OFFICE

BY: [Signature]
Chief Assistant City Attorney

RESOLUTION NO. 05-___

**RESOLUTION OF THE OF THE BOARD OF DIRECTORS OF THE
PINEDALE COUNTY WATER DISTRICT**

**FOR INTENTION TO ADOPT THE
FRESNO-AREA REGIONAL GROUNDWATER MANAGEMENT PLAN**

WHEREAS, Part 2.75 of Division 6 of the California Water Code permits the adoption and implementation of groundwater management plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the Fresno Irrigation District, City of Fresno, City of Clovis, Fresno Metropolitan Flood Control District, County of Fresno, City of Kerman, Malaga County Water District, Pinedale County Water District and Bakman Water Company have entered into a Memorandum of Understanding to cooperate and participate in the development of the Fresno-Area Regional Groundwater Management Plan for the planning and monitoring activities of groundwater conditions within their respective jurisdictions; and

WHEREAS, each of the parties has the authority pursuant to law and their local governing authorities to enter into this cooperative effort to study and plan for the management of groundwater conditions within their respective jurisdictions.

WHEREAS, the Pinedale County Water District desires to adopt a groundwater management plan that is consistent with recent amendments to the provisions of the California Water Code Section 10750 et. seq.; and

WHEREAS, a public hearing was duly noticed consistent with California Water Code Section 10753.2(a), and held on August 10, 2005 to discuss the adoption and implementation of the Fresno-Area Regional Groundwater Management Plan; and

WHEREAS, the Board of Directors believes that groundwater can best be managed, as in the past, by local agencies in coordination with owners of lands overlying the groundwater basin; and

WHEREAS, the Board of Directors believes the updating and adoption of a new groundwater management plan will be in the best interests of its constituents and water users and can help meet the projected long-term water needs of the Pinedale County Water District,

BE IT RESOLVED, by the Board of Directors as follows:

The foregoing findings are true and correct:

1. It is the intention of the Pinedale County Water District to adopt the Fresno-Area Regional Groundwater Management Plan in accordance with Part 2.75 of Division 6 of the California Water Code, and the District's consultant is hereby authorized and directed to draft such a plan;

2. That this resolution shall be deemed a resolution of intention in accordance with California Water Code Section 10753.2;
3. After such a plan has been prepared in accordance with all applicable law, including but not limited to the California Environmental Quality Act, a second public hearing will be conducted in accordance with the California Water Code Section 10753.5, et seq. to determine whether to adopt the plan;
4. That the officers of Pinedale County Water District are authorized and directed to publish this resolution of intention to update the District's groundwater management plan in accordance with the provisions of California Water Code Section 10753.3 and to provide interested persons with a copy of this resolution upon written request;
5. That the Board of Directors hereby authorizes its officers to execute all documents and take any other action necessary or advisable to carry out the purposes of this resolution.

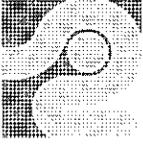
RESOLVED by the Board of Directors of the Pinedale County Water District that the Fresno-Area Regional Groundwater Management Plan be developed to be in compliance with California Senate Bill No. 1938.

The General Manager of the Pinedale County Water District is hereby authorized and directed to prepare the necessary data, make investigations, sign, and file such application with the California Department of Water Resources.

PASSED AND ADOPTED at a regular meeting of the Board of Directors of Pinedale County Water District on 10/5, 2005.



(General Manager)



FRESNO METROPOLITAN FLOOD CONTROL DISTRICT

CERTIFICATION

I, Esther Schwandt, as Clerk to the Board of Directors of the Fresno Metropolitan Flood Control District, do hereby certify the foregoing to be a full, true and correct copy of **Resolution No. 2005-473** adopted by the Board of Directors on **August 24, 2005**, the original of which is on file at the District office.

In witness whereof, I have hereunto set my hand and affixed the Seal of the Fresno Metropolitan Flood Control District.


Esther Schwandt
Clerk to the Board

October 10, 2005
Date

Original document bears our embossment

RESOLUTION NO. 2005-473

**BEFORE THE BOARD OF DIRECTORS OF THE
FRESNO METROPOLITAN FLOOD CONTROL DISTRICT**

**RESOLUTION OF INTENTION TO ADOPT THE
FRESNO-AREA REGIONAL GROUNDWATER MANAGEMENT PLAN**

WHEREAS, Part 2.75 of Division 6 of the California Water Code permits the adoption and implementation of groundwater management plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the Fresno Irrigation District, City of Fresno, City of Clovis, Fresno Metropolitan Flood Control District, County of Fresno, City of Kerman, Malaga County Water District, Pinedale County Water District and Bakman Water Company have entered into a Memorandum of Understanding to cooperate and participate in the development of the Fresno-Area Regional Groundwater Management Plan for the planning and monitoring activities of groundwater conditions within their respective jurisdictions; and

WHEREAS, each of the parties has the authority pursuant to law and their local governing authorities to enter into this cooperative effort to study and plan for the management of groundwater conditions within their respective jurisdictions; and

WHEREAS, the Fresno Metropolitan Flood Control District, "District", desires to adopt a groundwater management plan that is consistent with recent amendments to the provisions of the California Water Code Section 10750 et. seq.; and

WHEREAS, a public hearing was duly noticed consistent with California Water Code Section 10753.2(a), and held on August 10, 2005 to discuss the adoption and implementation of the Fresno-Area Regional Groundwater Management Plan; and

RESOLUTION NO. 2005-473

Page 2 of 3

WHEREAS, the Board of Directors believes that groundwater can best be managed, as in the past, by local agencies in coordination with owners of lands overlying the groundwater basin; and

WHEREAS, the Board of Directors believes the updating and adoption of a new groundwater management plan will be in the best interests of its constituents and water users and can help meet the projected long-term water needs of the District,

BE IT RESOLVED, by the Board of Directors as follows:

The foregoing findings are true and correct:

1. It is the intention of the District to adopt the Fresno-Area Regional Groundwater Management Plan in accordance with Part 2.75 of Division 6 of the California Water Code, and the Fresno Irrigation District's consultant is hereby authorized and directed to draft such a plan;
2. That this resolution shall be deemed a resolution of intention in accordance with California Water Code Section 10753.2;
3. After such a plan has been prepared in accordance with all applicable law, including but not limited to the California Environmental Quality Act, a second public hearing will be conducted in accordance with the California Water Code Section 10753.5, et seq. to determine whether to adopt the plan;

RESOLUTION NO. 2005-473

Page 3 of 3

4. That the officers of District are authorized and directed to publish this resolution of intention to update the Fresno Irrigation District's groundwater management plan in accordance with the provisions of California Water Code Section 10753.3 and to provide interested persons with a copy of this resolution upon written request;
5. That the Board of Directors hereby authorizes its officers to execute all documents and take any other action necessary or advisable to carry out the purposes of this resolution.

RESOLVED by the Board of Directors of the District that the Fresno-Area Regional Groundwater Management Plan be developed to be in compliance with California Senate Bill No. 1938.

The General Manager-Secretary of the District is hereby authorized and directed to prepare the necessary data, make investigations, sign, and file such application with the California Department of Water Resources.

PASSED AND ADOPTED this 24th day of August 2005 by the following vote to wit:

AYES: Franco, Spina, Marcus, Groom, Welton, Williams and Rastegar

NOES: None

ABSTAIN: None

ABSENT: None

1 RESOLUTION NO. 05-54

2 **RESOLUTION OF THE CITY COUNCIL OF THE CITY OF KERMAN APPROVING**
3 **ENTERING INTO MEMORANDUM OF UNDERSTANDING (MOU) WITH FRESNO**
4 **IRRIGATION DISTRICT (FID) AND OTHER AGENCIES AND WATER COMPANIES**
5 **ON GROUNDWATER MANAGEMENT PLAN (GWMP) FOR KERMAN**

6 **WHEREAS**, the City Council of the City of Kerman ("Kerman") as the legislative body of
7 the City, has authorized the negotiation of a Memorandum of Understanding (MOU) with Fresno
8 Irrigation District ("District"), the City of Fresno ("Fresno"), the City of Clovis ("Clovis"), the
9 Fresno Metropolitan Flood Control District ("Metropolitan"), the Bakman Water Company
10 ("Company"), the City of Kerman ("Kerman"), the County of Fresno ("County"), the Malaga
11 County Water District ("Malaga"), and the Pinedale County Water District ("Pinedale") to provide
12 a means to promote an orderly process to share information, develop courses of action, and to
13 resolve any issues with respect to the cooperative development and administration of the groundwater
14 management plan; and

15 **WHEREAS**, the attached Memorandum of Understanding (MOU), Exhibit "A" memorializes
16 the interests, intent and responsibilities of the parties with respect to the adoption of the groundwater
17 management plan consistent with the provisions of the California Water Code; and

18 **WHEREAS**, conditions of the MOU are as outlined therein under Conditions and Covenants
19 1 through 12.

20 **NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF THE CITY**
21 **OF KERMAN RESOLVES THAT** the City Manager is authorized to sign the Memorandum of Understanding
22 regarding The Fresno Area Regional Groundwater Management Plan and the City Clerk is to attest.

23 The foregoing resolution was introduced at a regular meeting of the City Council of the City of
24 Kerman held on the 6th day of July, 2005, and passed at said meeting by the following vote:

25 **AYES:** Cromartie, Rodriguez, Sidhu, Stockwell
26 **NOES:** None
27 **ABSENT:** Moore
28 **ABSTAIN:** None

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The foregoing resolution is hereby approved.

ATTEST:


MAYOR, CITY OF KERMAN


CITY CLERK, CITY OF KERMAN

CITY CLERK'S CERTIFICATE

EDITH M. FORSSTROM does hereby certify as follows:

That she is the City Clerk of the City of Kerman and that the foregoing Resolution, being Resolution No. 05-54 was passed at a regular meeting of the City Council of the City of Kerman held on the 6th day of July, 2005 and she further certifies that the foregoing is a true and correct copy of said Resolution No. 05-54 so adopted.



EDITH M. FORSSTROM, City Clerk

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RESOLUTION NO. 05-08-23

**RESOLUTION OF THE BOARD OF DIRECTORS OF THE
MALAGA COUNTY WATER DISTRICT**

**FOR INTENTION TO ADOPT THE
FRESNO-AREA REGIONAL GROUNDWATER MANAGEMENT PLAN**

WHEREAS, Part 2.75 of Division 6 of the California Water Code permits the adoption and implementation of groundwater management plans to encourage authorized local agencies to manage groundwater resources within their service areas; and

WHEREAS, the District adopted a groundwater management plan consistent with the provisions of the California Water Code Section 10750 et. seq. on August 12, 1996; and

WHEREAS, the Fresno Irrigation District, City of Fresno, City of Clovis, Fresno Metropolitan Flood Control District, County of Fresno, City of Kerman, Malaga County Water District, Pinedale County Water District and Bakman Water Company have entered into a Memorandum of Understanding to cooperate and participate in the development of the Fresno-Area Regional Groundwater Management Plan for the planning and monitoring activities of groundwater conditions within their respective jurisdictions; and

WHEREAS, each of the parties has the authority pursuant to law and their local governing authorities to enter into this cooperative effort to study and plan for the management of groundwater conditions within their respective jurisdictions.

WHEREAS, the Malaga County Water District desires to adopt a groundwater management plan that is consistent with recent amendments to the provisions of the California Water Code Section 10750 et. seq.; and

WHEREAS, a public hearing was duly noticed consistent with California Water Code Section 10753.2(a), and held on August 10, 2005 to discuss the adoption and implementation of the Fresno-Area Regional Groundwater Management Plan; and

WHEREAS, the Board of Directors believes that groundwater can best be managed, as in the past, by local agencies in coordination with owners of lands overlying the groundwater basin; and

WHEREAS, the Board of Directors believes the updating and adoption of a new groundwater management plan will be in the best interests of its constituents and water users and can help meet the projected long-term water needs of the Malaga County Water District,

BE IT RESOLVED, by the Board of Directors as follows:

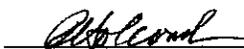
The foregoing findings are true and correct:

1. It is the intention of the Malaga County Water District to adopt the Fresno-Area Regional Groundwater Management Plan in accordance with Part 2.75 of Division 6 of the California Water Code, and the District's consultant is hereby authorized and directed to draft such a plan;
2. That this resolution shall be deemed a resolution of intention in accordance with California Water Code Section 10753.2;
3. After such a plan has been prepared in accordance with all applicable law, including but not limited to the California Environmental Quality Act, a second public hearing will be conducted in accordance with the California Water Code Section 10753.5, et seq. to determine whether to adopt the plan;
4. That the officers of Malaga County Water District are authorized and directed to publish this resolution of intention to update the District's groundwater management plan in accordance with the provisions of California Water Code Section 10753.3 and to provide interested persons with a copy of this resolution upon written request;
5. That the Board of Directors hereby authorizes its officers to execute all documents and take any other action necessary or advisable to carry out the purposes of this resolution.

RESOLVED by the Board of Directors of the Malaga County Water District that the Fresno-Area Regional Groundwater Management Plan be developed to be in compliance with California Senate Bill No. 1938.

The General Manager of the Malaga County Water District is hereby authorized and directed to prepare the necessary data, make investigations, sign, and file such application with the California Department of Water Resources.

PASSED AND ADOPTED at a regular meeting of the Board of Directors of the Malaga County Water District on August 23, 2005.



Russ Holcomb
General Manager

PROVOST & PRICHARD

ATTN: MICHAEL TAYLOR

286 W CROMWELL AVE

FRESNO, CA 937116162

PROOF OF PUBLICATION

COUNTY OF FRESNO STATE OF CALIFORNIA

EXHIBIT A.

PUBLIC NOTICE
#173824
**NOTICE OF HEARING ON INTENTION TO ADOPT
THE FRESNO AREA REGIONAL
GROUNDWATER MANAGEMENT PLAN**

NOTICE IS HEREBY GIVEN that at 4:30 pm on the 10th day of August, 2005, at the office of the Fresno Irrigation District at 2907 S. Maple Avenue, Fresno, California, a public hearing will be held to discuss whether or not the Fresno Irrigation District, City of Fresno, City of Clovis, Fresno Metropolitan Flood Control District, Bakman Water Company, City of Kerman, County of Fresno, Malaga County Water District and Pinedale County Water District should adopt a resolution of intention to adopt a Fresno Area Regional Groundwater Management Plan to be in compliance with California Senate Bill No. 1938. This regional groundwater management plan will replace the existing groundwater management plans adopted by the Fresno Irrigation District and the City of Clovis. This regional groundwater management plan will also replace the County of Fresno's existing groundwater management plan for the portion of the county within the plan area.

Part 2.75 of Division 6 of the California Water Code permits the adoption and implementation of groundwater management plans to encourage authorized local agencies to manage groundwater resources within their service areas.

Landowners within these agency boundaries and other interested parties are invited to attend the hearing. Copies of the proposed resolution and other relevant written materials will be available for review by the public at the hearing or may be obtained in advance at the District Office, 2907 S. Maple Avenue, Fresno, California 93725. Opportunity for public questions & input will be provided at the hearing.

In compliance with Water Code 10753.4 (b), landowners and other interested parties who wish to participate in updating the groundwater management plan, including becoming a member of a technical advisory committee, may do so by attending the hearing and indicating their interest or by submitting a written letter to Gary Serrato, Secretary, Fresno Irrigation District, 2907 S. Maple Avenue, Fresno, California 93725.

/s/ Gary Serrato
General Manager

FPROC July 21, 2005
(PUB: July 26, August 2, 2005)

The undersigned states:

McClatchy Newspapers in and on all dates herein stated was a corporation, and the owner and publisher of The Fresno Bee.

The Fresno Bee is a daily newspaper of general circulation now published, and on all-the-dates herein stated was published in the City of Fresno, County of Fresno, and has been adjudged a newspaper of general circulation by the Superior Court of the County of Fresno, State of California, under the date of November 22, 1994, Action No. 520058-9.

The undersigned is and on all dates herein mentioned was a citizen of the United States, over the age of twenty-one years, and is the principal clerk of the printer and publisher of said newspaper; and that the notice, a copy of which is hereto annexed, marked Exhibit A, hereby made a part hereof, was published in The Fresno Bee in each issue thereof (in type not smaller than nonpareil), on the following dates.

July 26, 2005;
August 2, 2005

I certify (or declare) under penalty of perjury that the foregoing is true and correct.

Dated AUGUST 2, 2005

Cathy Aguilera

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

APPENDIX B

MEMORANDUM OF UNDERSTANDING

MEMORANDUM OF UNDERSTANDING

REGARDING

THE FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

This Memorandum of Understanding ("MOU") is entered into on this 11th day of October, 2005 by and between the FRESNO IRRIGATION DISTRICT ("District"), the CITY OF FRESNO ("Fresno"), the CITY OF CLOVIS ("Clovis"), the FRESNO METROPOLITAN FLOOD CONTROL DISTRICT ("Metropolitan"), the BAKMAN WATER COMPANY ("Company"), the CITY OF KERMAN ("Kerman"), the COUNTY OF FRESNO ("County"), the MALAGA COUNTY WATER DISTRICT ("Malaga"), and the PINEDALE COUNTY WATER DISTRICT ("Pinedale").

RECITALS

WHEREAS, the District adopted a regional groundwater management plan consistent with the provisions of the California Water Code Section 10750 et. seq. on August 12, 1996; and

WHEREAS, the District desires to update its groundwater management plan to make it consistent with recent amendments to the provisions of the California Water Code Section 10750 et. seq.; and

WHEREAS, other parties that are within the boundary of the District wish to enter into this Memorandum of Understanding, so that the parties may cooperate and participate in the cost-efficient development of a regional groundwater management plan for the planning and monitoring activities for groundwater conditions within their respective jurisdictions; and

WHEREAS, the District desires to incorporate the concerns and conditions of the other parties to this Memorandum of Understanding into its updated regional groundwater management plan so that the plan may provide a more comprehensive view and approach toward groundwater within the jurisdictional territory of the parties as identified, more or less, on the map included as Exhibit "1", attached hereto; and

WHEREAS, each of the parties has the authority pursuant to law and their local governing authorities to enter into this cooperative effort to study and plan for the management of groundwater conditions within their respective jurisdictions.

NOW THEREFORE, BE IT RESOLVED, in consideration of the promises contained herein the parties hereto agree upon the following covenants and conditions:

1. Purpose. This MOU is intended to promote and to provide a means to establish an orderly process to share information, develop courses of

action, and to resolve any issues with respect to the cooperative development of the regional groundwater management plan and with respect to the administration of the regional groundwater management plan. Administration will include coordination of data received from each party, public noticing, meetings and annual reporting as described herein. This MOU memorializes the interests, intent and responsibilities of the parties with respect to the adoption of a regional groundwater management plan consistent with the provisions of the California Water Code to provide for collection of data and the development of a plan for the management of groundwater resources within the jurisdictions of the parties hereto.

2. District's Responsibility. The District shall review and revise its groundwater management plan consistent with the current requirements of the California Water Code and the intentions of the parties hereto. The plan will be based upon the existing groundwater management plan of the District and shall incorporate new provisions required by recent changes in California law. The plan will be updated to include necessary revisions to incorporate the jurisdictions of the parties other than the District into the plan, so that the resulting document will satisfy the requirement of the Water Code that each of the parties has prepared a groundwater management plan. The District intends to complete the update of the regional groundwater management plan by December 2005.

3. Payment of Costs. Each of the parties hereto shall contribute to the cost of updating the groundwater management plan in accordance with the obligations specified in Exhibit "2" attached hereto. Additionally, any ongoing fees or costs incurred in the administration of the plan (as administration is defined and limited in Section 1 of this MOU) or of this Memorandum of Understanding will be shared by the parties in accordance with the percentages identified in Exhibit "2".

4. Coordination and Meetings. There shall be an annual coordination meeting between the parties. The District shall provide notice to the parties to this Memorandum of Understanding of the date and time of the meeting and submit a proposed agenda for such meeting. Each of the parties hereto agrees to provide a representative to participate in each of the annual meetings held during the effective dates of the regional groundwater management plan. The meeting may be held more often than annually if the parties hereto agree that more frequent meetings are necessary.

5. Data Provision. The parties to this agreement shall provide water quantity and water quality data for the purposes of preparing an annual report for public and state dissemination. The purpose of such data will be to evaluate the effectiveness of the implementation of the regional groundwater management plan by the parties. The parties hereto may employ consultants or contractors to assist in the preparation of the annual report which costs shall be shared according to the percentages specified in Exhibit "2". Preparation of the first annual report is estimated at 10% of the total Exhibit "2" fees to be shared at the same percentages as identified in Exhibit "2".

6. Membership. Any party to this Memorandum of Understanding may terminate their participation in the Memorandum of Understanding by providing ninety (90) days written notice to the District. Such member shall be responsible for their proportionate share of any costs incurred in administration of the Memorandum of Understanding through the effective date of their termination. Additionally, by agreement of all of the parties hereto, additional parties may be permitted to become participants in the Memorandum of Understanding and the regional groundwater management plan and will be required to pay their proportionate share of costs. Upon the termination of any member's participation or the addition of any additional member, the parties to the Memorandum of Understanding will revise the percentages for cost sharing purposes contained in Exhibit "2" appropriately. Participation in this MOU does not obligate parties to contribute to construction or implementation of groundwater related projects, unless mutually agreed upon.

7. Lead Agency. The District shall be the lead agency for contracting services associated with the development and implementation of the regional groundwater management plan. To the extent the District wishes to receive reimbursement for costs it incurs in addition to those costs identified on Exhibit "2", it shall obtain the prior written approval of each party. Promptly upon incurring approved costs, the District shall submit invoices according to the percentages contained in Exhibit "2" to each of the parties hereto for payment. The parties hereto shall remit payment of their appropriate portion of any such costs and expenses to the District within thirty (30) days of receipt of an invoice. Each party's share of contribution for preparation of the updated regional groundwater management plan as specified in Exhibit "2" shall be paid prior to the initiation of work to update the plan.

8. Budgets. The District shall prepare a proposed annual budget for consideration of the parties hereto at the annual meeting. The budget shall estimate the expenses and costs to be incurred with development of the updated regional groundwater management plan and any subsequent administration and implementation of the plan.

9. Amendments. This Memorandum of Understanding may be amended only by the express written consent of all of the parties hereto.

10. Severability. If any part of this agreement is found to be in conflict with applicable laws, such part shall be inoperative, null and void and so far as it is in conflict with said law that the remainder of the agreement shall remain in full force and effect.

11. Counterparts. This agreement may be executed in counterparts by the parties.

12. Governing Law and Venue. Any disputes or claims arising in connection with, or out of the implementation of this agreement shall be governed by the law of the State of California.

Executed on this _____ day of _____, 2005.

FRESNO IRRIGATION DISTRICT

By: Gary R. Serrato

CITY OF CLOVIS

By: _____

BAKMAN WATER COMPANY

By: _____

COUNTY OF FRESNO

By: _____

CITY OF FRESNO

By: _____

APPROVED AS TO FORM:

HILDA CANTU MONTOY
City of Fresno Attorney

By: _____
Deputy

ATTEST

REBECCA E. KLISCH
City of Fresno Clerk

By: _____

PINEDALE COUNTY
WATER DISTRICT

By: _____

FRESNO METROPOLITAN
FLOOD CONTROL DISTRICT

By: _____

CITY OF KERMAN

By: _____

MALAGA COUNTY WATER
DISTRICT

By: _____

Executed on this _____ day of _____, 2005.

FRESNO IRRIGATION DISTRICT

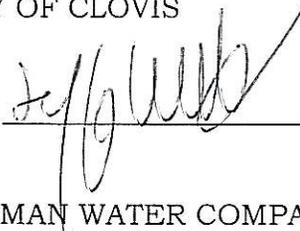
PINEDALE COUNTY
WATER DISTRICT

By: _____

By: _____

CITY OF CLOVIS

FRESNO METROPOLITAN
FLOOD CONTROL DISTRICT

By:  _____

By: _____

BAKMAN WATER COMPANY

CITY OF KERMAN

By: _____

By: _____

COUNTY OF FRESNO

MALAGA COUNTY WATER
DISTRICT

By: _____

By: _____

CITY OF FRESNO

By: _____

APPROVED AS TO FORM:

HILDA CANTU MONTOY
City of Fresno Attorney

By: _____
Deputy

ATTEST

REBECCA E. KLISCH
City of Fresno Clerk

By: _____

Executed on this _____ day of _____, 2005.

FRESNO IRRIGATION DISTRICT

PINEDALE COUNTY
WATER DISTRICT

By: _____

By: _____

CITY OF CLOVIS

FRESNO METROPOLITAN
FLOOD CONTROL DISTRICT

By: _____

By: _____

BAKMAN WATER COMPANY

CITY OF KERMAN

By: *H. Potter Patton*

By: _____

COUNTY OF FRESNO

MALAGA COUNTY WATER
DISTRICT

By: _____

By: _____

CITY OF FRESNO

By: _____

APPROVED AS TO FORM:

HILDA CANTU MONTOY
City of Fresno Attorney

By: _____

Deputy

ATTEST

REBECCA E. KLISCH
City of Fresno Clerk

By: _____

Executed on this _____ day of _____, 2005.

FRESNO IRRIGATION DISTRICT

PINEDALE COUNTY
WATER DISTRICT

By: _____

By: _____

CITY OF CLOVIS

FRESNO METROPOLITAN
FLOOD CONTROL DISTRICT

By: _____

By: _____

BAKMAN WATER COMPANY

CITY OF KERMAN

By: _____

By: _____

COUNTY OF FRESNO

MALAGA COUNTY WATER
DISTRICT

By: _____

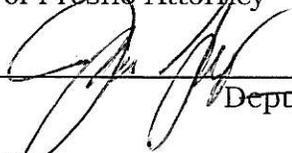
By: _____

CITY OF FRESNO

By: 

APPROVED AS TO FORM:

HILDA CANTU MONTÓY
City of Fresno Attorney

By: 
Deputy Chief Asst.

ATTEST

REBECCA E. KLISCH
City of Fresno Clerk

By: 
Deputy (8/9/05)

Executed on this _____ day of _____, 2005.

FRESNO IRRIGATION DISTRICT

By: _____

CITY OF CLOVIS

By: _____

BAKMAN WATER COMPANY

By: _____

COUNTY OF FRESNO

By: _____

CITY OF FRESNO

By: _____

APPROVED AS TO FORM:

HILDA CANTU MONTROY
City of Fresno Attorney

By: _____
Deputy

ATTEST

REBECCA E. KLISCH
City of Fresno Clerk

By: _____

PINEDALE COUNTY
WATER DISTRICT

By: *Joh Garcia*

FRESNO METROPOLITAN
FLOOD CONTROL DISTRICT

By: _____

CITY OF KERMAN

By: _____

MALAGA COUNTY WATER
DISTRICT

By: _____

Executed on this _____ day of _____, 2005.

FRESNO IRRIGATION DISTRICT

PINEDALE COUNTY
WATER DISTRICT

By: _____

By: _____

CITY OF CLOVIS

FRESNO METROPOLITAN
FLOOD CONTROL DISTRICT

By: _____

By: Bodwan Wyk

BAKMAN WATER COMPANY

CITY OF KERMAN

By: _____

By: _____

COUNTY OF FRESNO

MALAGA COUNTY WATER
DISTRICT

By: _____

By: _____

CITY OF FRESNO

By: _____

APPROVED AS TO FORM:

HILDA CANTU MONTROY
City of Fresno Attorney

By: _____
Deputy

ATTEST

REBECCA E. KLISCH
City of Fresno Clerk

By: _____

Executed on this _____ day of _____, 2005.

FRESNO IRRIGATION DISTRICT

By: _____

PINEDALE COUNTY
WATER DISTRICT

By: _____

CITY OF CLOVIS

By: _____

FRESNO METROPOLITAN
FLOOD CONTROL DISTRICT

By: _____

BAKMAN WATER COMPANY

By: _____

CITY OF KERMAN

By: *D. Mufidi*
Attest: *Adith M. Santalucia*

City Clerk

COUNTY OF FRESNO

MALAGA COUNTY WATER
DISTRICT

By: _____

By: _____

CITY OF FRESNO

By: _____

APPROVED AS TO FORM:

HILDA CANTU MONTOY
City of Fresno Attorney

By: _____
Deputy

ATTEST

REBECCA E. KLISCH
City of Fresno Clerk

By: _____

Executed on this _____ day of _____, 2005.

FRESNO IRRIGATION DISTRICT

PINEDALE COUNTY
WATER DISTRICT

By: _____

By: _____

CITY OF CLOVIS

FRESNO METROPOLITAN
FLOOD CONTROL DISTRICT

By: _____

By: _____

BAKMAN WATER COMPANY

CITY OF KERMAN

By: _____

By: _____

COUNTY OF FRESNO

MALAGA COUNTY WATER
DISTRICT

By: _____

By: *Abelcord*

CITY OF FRESNO

By: _____

APPROVED AS TO FORM:

HILDA CANTU MONTOY
City of Fresno Attorney

By: _____
Deputy

ATTEST

REBECCA E. KLISCH
City of Fresno Clerk

By: _____

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REVIEWED AND RECOMMENDED
FOR APPROVAL

COUNTY OF FRESNO

By: Alan Weaver
Alan Weaver, Director
Department of Public Works and
Planning

Judith G. Case
Judith G. Case
CHAIRMAN, Board of Supervisors

OCT 11 2005

APPROVED AS TO ACCOUNTING
FORM

ATTEST:

By: Vicki Crow
Vicki Crow, Auditor-
Controller/Treasurer-Tax
Collector

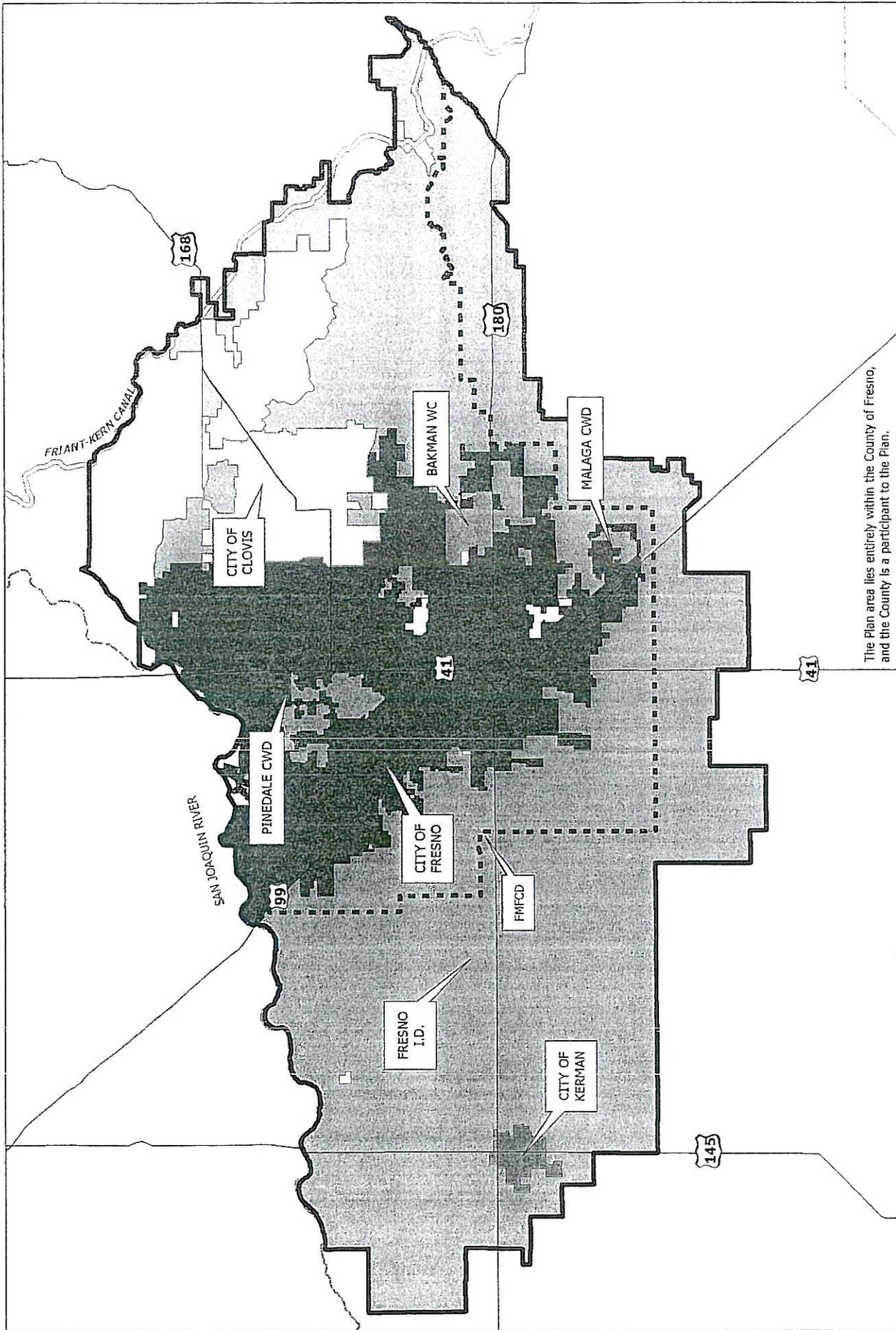
Bernice E. Seidel
Bernice E. Seidel, Clerk
Board of Supervisors

APPROVED AS TO LEGAL FORM
Dennis Marshall, County Counsel

By: Susan F. Caherly
Deputy

Fund: 0001
Subclass: 10000
Org Number: 436000300
Account: 7010
Project No.:

EXHIBIT "1"



The Plan area lies entirely within the County of Fresno, and the County is a participant to the Plan.

Exhibit 1 Fresno Area Regional Groundwater Management Plan Boundary Map

- GWMP BOUNDARY
- FRESNO I.D.
- FRIANT-KERN CANAL
- FMFCD
- CITY OF KERMAN
- MALAGA CWD
- PINEDALE WD
- BAKMAN WD
- CITY OF CLOVIS
- CITY OF FRESNO

PROVOST & PRITCHARD
 CONSULTING ENGINEERS
 1122 20th St.
 Fresno, CA 93703
 (559) 233-1100

EXHIBIT 2

Agency	Cost Share	Percent Total
Fresno Irrigation District	\$25,000	23.81%
City of Fresno	\$30,000	28.57%
City of Clovis	\$20,000	19.05%
Fresno Metropolitan Flood Control District	\$7,500	7.14%
Bakman Water Company	\$5,000	4.76%
City of Kerman	\$5,000	4.76%
County of Fresno	\$5,000	4.76%
Malaga County Water District	\$5,000	4.76%
Pinedale County Water District	\$2,500	2.38%
Total Estimated GW Mgmt. Plan Cost	\$105,000	100%¹
¹ Rounded		
NOTE: Estimate does not include agency staff time, legal fees or required newspaper notices. Estimate includes consultant work only as required to prepare the Regional Groundwater Management Plan in compliance with SB 1938.		

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

APPENDIX C

GLOSSARY

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

GLOSSARY

Acre-Foot: A quantity or volume of water covering one acre to a depth of one foot; equal to 43,560 cubic feet or 325,851 gallons.

Alluvium: A stratified bed of sand, gravel, silt, and clay deposited by flowing water.

Aquifer: A geologic formation that stores and transmits water and yields significant quantities of water to wells and springs.

Confined Aquifer: A water bearing subsurface stratum that is bounded above and below by formations of impermeable, or relatively impermeable, soil or rock.

Conjunctive Operation: The operation of a groundwater basin in combination with a surface water storage and conveyance system. Water is stored in the groundwater basin for later use by intentionally recharging the basin during periods of above-average water supply.

Deep Percolation: The percolation of surface water through the ground and beyond the lower limit of the root zone of plants into a groundwater aquifer.

Ecology: The study of the interrelationships of living organisms to one another and to their surroundings.

Ecosystem: Recognizable, relatively homogeneous units, including the organisms they contain, their environment, and all the interactions among them.

Effluent: Waste water or other liquid, partially or completely treated or in its natural state, flowing from a treatment plant.

Environment: The sum of all external influences and conditions affecting the life and development of an organism or ecological community; the total social and cultural conditions.

Evapotranspiration Of Applied Water (ETAW): The portion of the total evapotranspiration which is provided by irrigation.

Groundwater: Water that occurs beneath the land surface and completely fills all pore spaces of the alluvium, soil, or rock formation in which it is situated.

Groundwater Banking: The importation and storage of a new water supply in a groundwater aquifer for subsequent extraction of a fraction thereof for use by designated beneficiaries. The fraction of the water stored (i.e. banked) in the underground that may be withdrawn is a function of the groundwater mitigation

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

GLOSSARY

required. Approval, oversight, mitigation and accounting for groundwater banking shall be the responsibility of the local agency whose AB 3030 plan governs. Agreement of the impacted local water service agencies shall also be obtained.

Groundwater Basin: A groundwater reservoir, defined by all the overlying land surface and the underlying aquifers that contain the water stored in the reservoir. In some cases, the boundaries of successively deeper aquifers may differ and make it difficult to define the limits of the basin.

Groundwater Mining: The withdrawal of water from an aquifer in excess of recharge over time. If continued, the underground supply would eventually be exhausted or the water table could drop below economically feasible pumping lifts.

Groundwater Mitigation: An action or activity designed to compensate for the actual or expected negative impact caused by groundwater pumping by appropriators and/or groundwater bankers. Mitigation shall include making provisions for sufficient recharge to offset the effects of all extractions, subsurface outflow and other unrecoverable losses attributable to the appropriation or banking activity. Mitigation may be incorporated into a conjunctive operation of a groundwater basin or subarea thereof with the consent of the agency or agencies responsible for the conjunctive management of such basin or subarea.

Groundwater Overdraft: The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average.

Groundwater Recharge: Increases in groundwater storage by natural conditions or by human activity.

Groundwater Reservoir: An aquifer or an aquifer system in which groundwater is stored.

Groundwater Storage Capacity: The space or voids contained in a given volume of deposits. Under optimum conditions, the usable groundwater storage capacity is the volume of water that can, within specified economic limitations, be alternately extracted and replaced in the reservoir.

Groundwater Table: The upper surface of the zone of saturation (all pores of subsoil filled with water), except where the surface is formed by an impermeable body.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

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Hardpan: A layer of nearly impermeable soil beneath a more permeable soil, formed by natural chemical cementing of the soil particles.

Hydrologic Balance: An accounting of all water inflow to, water outflow from, and changes in water storage within a hydrologic unit over a specified period.

Hydrologic Basin: The complete drainage area upstream from a given point on a stream.

In-Lieu Groundwater Recharge: A method of replenishing a groundwater resource by delivering an alternate surface supply to agricultural or urban users instead of pumping groundwater, thus leaving water in the underground for future use. Deliveries of surface water to parks, golf courses and freeway landscaping are examples of urban in-lieu recharge.

Intentional Recharge: The addition of surface water to a groundwater reservoir by human activity, such as putting surface water into spreading basins.

Irrecoverable Losses: The water lost to a salt sink or lost by evaporation or evapotranspiration from a conveyance facility, drainage canal, or in fringe areas.

Irrigation Efficiency: The efficiency of water application. Computed by dividing evapotranspiration of applied water by applied water and converting the result to a percentage. Efficiency can be computed at three levels: farm, district, or basin. Applied water may exclude water that percolates to groundwater for subsequent reuse.

Irrigation Return Flow: Applied water that is not transpired, evaporated, or deep percolated into a groundwater basin but that returns to a surface water supply.

Land Subsidence: The lowering of the natural land surface in response to: earth movements; lowering of fluid pressure (or lowering of groundwater level); removal of underlying supporting materials by mining or solution of solids, either artificially or from natural causes; compaction caused by wetting (hydrocompaction); oxidation of organic matter in soils; or added load on the land surface.

Leaching: The flushing of salts from the soil by the downward percolation of applied water.

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

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Leaching Requirement: The incremental water necessary to prevent harmful salt accumulations in the soil. $LR = ETAW \times LF \text{ DU}100 (1-LF)$ where LF is the leaching fraction.

Mean Annual Runoff: The average value of annual runoff amounts calculated for a selected period of record for a specified area.

Milligrams Per Liter (mg/L): The weight in milligrams of any substance dissolved in one liter of liquid. Nearly the same as parts per million.

Moisture Stress: A condition of physiological stress in a plant caused by a lack of water.

Natural Flow: The flow past a specified point on a natural stream that is unaffected by stream diversion, storage, import, export, return flow, or change in use caused by modifications in land use.

Net Water Demand: The amount of water needed in a water service area to meet all requirements. It is the sum of evapotranspiration of applied water (ETAW) in an area, the irrecoverable losses from the distribution system, and the outflow leaving the service area.

New Water Supply: A surface water supply which has not historically been imported or brought under control and put to beneficial use by recharge of the groundwater or by direct use. New water would include, but not be limited to:

- a. Fresno Stream Group water.
- b. C.V.P. Class II water not historically diverted (i.e. obligation water subject to spill from Friant Dam).
- c. Kings River flood releases from Pine Flat Dam and divertable under existing license conditions and applicable agreements.
- d. Fresno County's C.V.P. Cross Valley Supply.
- e. Any other water purchased, exchanged, developed or otherwise acquired that did not constitute a part of the historic water supply for the area in question.
- f. City of Fresno's C.V.P. Class I Supply. While this is an existing supply, it can be redirected to portions of the City outside of the District, at any time and at the City's sole discretion, and therefore has all the characteristics of new water.

Nonpoint Source: Waste water discharge other than from point sources. (See Point Source).

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

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Perched Groundwater: Groundwater supported by a zone of material of low permeability located above an underlying main body of groundwater with which it is not hydrostatically connected.

Percolation: The downward movement of water through the soil or alluvium to the groundwater table.

Permeability: The capability of soil or other geologic formation to transmit water.

Point Source: A specific site from which waste or polluted water is discharged into a water body, the source of which can be identified. See also Nonpoint source.

Pollution (of water): The alteration of the physical, chemical, or biological properties of water by the introduction of any substance into water that adversely affects any beneficial use of water.

Recharge Basin: A surface facility, often a large pond, used to increase the infiltration of surface water into a groundwater basin.

Reclaimed Waste Water: Waste water that becomes suitable for a specific beneficial use as a result of treatment.

Return Flow: The portion of withdrawn water not consumed by evapotranspiration or system losses which returns to its source or to another body of water.

Reuse: The additional use of previously used water.

Riparian: of, or on the banks of, a stream or other body of water.

Riparian Vegetation: Vegetation growing on the banks of a stream or other body of water.

Runoff: The surface flow of water from an area; the total volume of surface flow during a specified time.

Safe Yield: The maximum quantity of water that can be withdrawn from a groundwater basin over a long period of time without developing a condition of overdraft. Sometimes referred to as sustained yield.

Salinity: General, the concentration of mineral salts dissolved in water. Salinity may be measured by weight (total dissolved solids), electrical conductivity, or osmotic pressure. Where sea water is known to be the major source of salt,

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

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salinity is often used to refer to the concentration of chlorides in the water. See also Total Dissolved Solids.

Secondary Treatment: In waste water treatment, the biological process of reducing suspended, colloidal, and dissolved organic matter in effluent from primary treatment systems. Secondary treatment is usually carried out through the use of trickling filters or by the activated sludge process.

Seepage: The gradual movement of a fluid into, through, or from a porous medium.

Service Area: The geographical land area served by a distribution system of a water agency.

Streamflow: The rate of water flow past a specified point in a channel.

Surface Supply: Water supply from streams, lakes and reservoirs.

Tail Water: Applied irrigation water that runs off the end of a field. Tail water is not necessarily lost; it can be collected and reused on the same or adjacent fields.

Tertiary Treatment: In sewage, the additional treatment of effluent beyond that of secondary treatment to obtain a very high quality of effluent.

Total Dissolved Solids: A quantitative measure of the residual minerals dissolved in water that remain after evaporation of a solution. Usually expressed in milligrams per liter. Abbreviation: TDS. See also Salinity.

Transpiration: The process in which plant tissues give off water vapor to the atmosphere as an essential physiological process.

Waste Water: The water remaining after use, liquid waste, or drainage from a community, industry, or institution.

Water Conservation: As used in this report, water conservation is the reduction in depletion. This reduction includes the reduction of the evapotranspiration of applied water and irrecoverable losses to salt sinks.

Waste Water Reclamation: The planned reuse of waste water for specific beneficial purposes.

Water Demand Schedule: A time distribution of the demand for prescribed quantities of water for specified purposes. It is usually a monthly tabulation of

FRESNO AREA REGIONAL GROUNDWATER MANAGEMENT PLAN

GLOSSARY

the total quantity of water that a particular water user intends to use during a specified year.

Water Quality: Used to describe the chemical, physical, and biological characteristics of water, usually in regard to its suitability for a particular purpose.

Water Reclamation: The treatment of water of impaired quality, including brackish water, waste water, and sea water to produce a water of suitable quality for the intended use.

Water Right: A legally protected right to take possession of water occurring in a natural water way and to divert that water for beneficial use.

Water Year: A continuous 12-month period for which hydrologic records are compiled and summarized. In California, it begins on October 1.