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July 8, 2008

BY E-MAIL

Greg Wilson, WRCE
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814

Re: Petition for Temporary Transfer of River Garden Farms Co. (License 1718; Application 575)

Dear Greg:

I am forwarding Reclamation District No. 787's groundwater management plan (Plan), which was adopted by the District in 2006. You requested the Plan during our meeting on July 2, 2008 to discuss approval of the above-referenced Petition for Temporary Transfer of Water Rights. I am also forwarding the monitoring and mitigation plan River Garden Farms (RGF) submitted to the Bureau of Reclamation in connection with its groundwater-substitution transfer.

The Plan lists four management objectives, one of which is the development of the local groundwater supply. (Plan, p. 7.) "Included in this objective is the intent to participate in ground-water substitution or other similar water transfer opportunities, when possible." (*Id.*)

The Plan also contemplates using the data gathered during water transfers to help accomplish the Plan's main objective of sustainably operating within the yield of the basin. (Plan, p. 17.) In fact, the Plan points out that data gathered during RGF's 2003 water transfer "can be interpreted to indicate[] that at least 1,581 afy of ground water can be pumped. . . without short-term or long-term impacts." (*Id.*) The Plan goes on to state "[o]bservations are expected to continue during future projects that include increases in ground-water pumpage. This type of operational understanding of basin yield will be adequate to accomplish the objectives of operating within the sustainable yield of the basin and avoiding overdraft." (*Id.*)

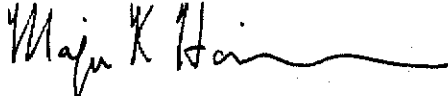
The Plan explicitly includes groundwater-substitution transfers in two of its four objectives. Because the Plan specifically incorporates groundwater-substitution transfers, RGF's proposed transfer is consistent with the Plan.

Greg Wilson
July 8, 2008
Page 2

If you have any questions, feel free to contact me. Thank you for your prompt attention.

Sincerely,

DOWNEY BRAND LLP

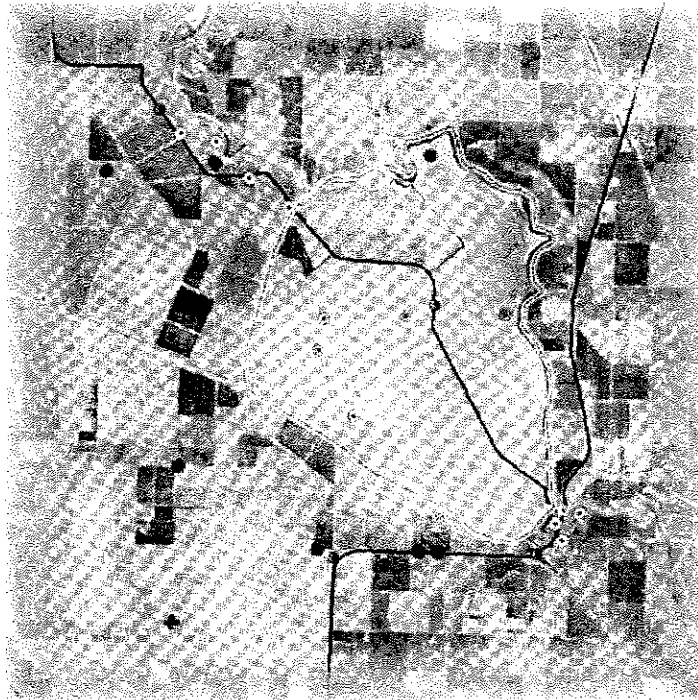


Maja K. Haium

MKH

cc: Marty Stripling, River Garden Farms
938189.1

Ground-Water Management Plan Reclamation District No. 787



November 2005

LS LUHDORFF & SCALMANINI
CONSULTING ENGINEERS

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I. Introduction

This Ground-Water Management Plan (Plan) is comprised of a number of planned actions related to ground-water supply and the long-term sustainability of ground water and interrelated surface waters within Reclamation District No. 787. This Plan provides information about Reclamation District No. 787, its relation to the ground-water basin that underlies it, the role of Ground-Water Management Plans, and ground-water management objectives (goals) for the District. This plan describes existing ground-water conditions, as well as historical and projected water demands within the District. Finally, this Plan presents a set of ground-water management actions that form the central elements of this Ground-Water Management Plan.

Reclamation District No. 787

Reclamation District No. 787 (RD 787, the District) is located in the northeastern portion of Yolo County, west of the town of Knights Landing and adjacent to the Sacramento River (Figure I-1). The District covers approximately 8,950 acres, most of which is irrigated agricultural land. The majority landowner in the District is River Garden Farms, which covers approximately 7,400 acres (nearly 82%) of the District (Figure I-2).

RD 787 was formed under the general reclamation district laws of 1908 for the purposes of providing drainage and reclamation of the lands within its boundary. Irrigation water is delivered to users within the District through a system of canals and ditches that are supplied primarily by surface water diversions from the Sacramento River. The respective landowners within the District (River Garden Farms, Cooling, Faye and Geer) have riparian and appropriative water rights, as well as water rights settlement contracts with the United States Bureau of Reclamation. Although the District does not own or operate water supply wells, there are private well owners within the District, including River Garden Farms, who operate several irrigation wells. The District landowners have historically met demands with surface water supplies, with intermittent supplemental ground-water use during dry years when surface water diversions from the Sacramento River were reduced.

In 2003, River Garden Farms (RGF) implemented a temporary water transfer whereby ground water was used in lieu of surface water. The State Water Resources Control Board authorized the transfer of up to 1,800 acre-feet (af) of surface water to Metropolitan Water District of Southern California as part of this program. RGF pumped 1,581 af of ground water during the transfer, which took place between July 3 and October 31, 2003. The California Department of

Water Resources (DWR) monitored the response of the aquifer system during this period, and determined that no measurable long-term impacts were created by increased ground-water pumpage during the transfer. As a result, the concept of future water transfers based on ground-water substitution is included in this Plan as a potential element within overall ground-water management in the District.

Sacramento Valley Ground-Water Basin, Colusa Subbasin

RD 787 overlies the Sacramento Valley Ground-Water Basin, Colusa Subbasin (Figure I-1). The Colusa Subbasin is part of the larger Sacramento Valley Basin, which includes areas underlying the Sacramento Valley, the Sacramento River, and its tributaries as they flow south and west toward the Sacramento-San Joaquin Delta. The Colusa Subbasin is bounded on the east by the Sacramento River, on the north by Stony Creek, on the west by the Coast Range, and on the south by Cache Creek. The extent of the Colusa Subbasin, as mapped in Bulletin 118, is illustrated in Figure I-1. The Colusa Subbasin is about 1,400 square miles in area, and underlies portions of Tehama, Glenn, Colusa and Yolo Counties.

Within the Colusa Subbasin, ground water has historically been the primary source of water supply for domestic and municipal uses. Ground water has also been used widely for irrigation purposes; however, surface water supplies are available for irrigation in many parts of the Subbasin. In addition to those within RD 787, there are numerous other water districts and suppliers within the Colusa Subbasin, including the various cities, County Service Areas, Community Service Districts, Water Districts/Companies, Irrigation Districts and Public Utilities Districts. For those entities and others, there are well completion reports on file with DWR for approximately 2,600 domestic and 1,500 irrigation wells within the Colusa Subbasin.

The north and east boundaries of RD 787 are formed by the Sacramento River. On the south and west sides of the District, the adjacent water districts and suppliers are Reclamation District No. 108, Colusa Drain Mutual Water Company, Yolo-Zamora Water District, and Knights Landing Community Service District (Figure I-2). To the east across the Sacramento River, the nearest water districts are the Pelger, Sutter, Pleasant Grove-Verona and Natomas Mutual Water Companies. Collectively, these purveyors supply ground water and surface water for municipal and irrigation supply within their boundaries.

The Colusa Subbasin extends far beyond the boundary of the District; however, the focus of this Plan is on that portion of the overall Colusa Subbasin underlying RD 787. This Plan establishes

a set of management objectives that the District intends to implement within its boundary. The goals and objectives set forth in this Plan are intended to provide for the long-term sustainable use of the resource within the District, and as such would preserve the resource as it relates to other users within the Colusa Subbasin and the greater Sacramento Valley Ground-Water Basin.

Overview of Water Requirements and Supplies

Historically, the majority of water demands within RD 787, which have averaged about 25,000 to 30,000 acre-feet per year (afy) over the last 40 years, have been met with surface water diversions from the Sacramento River. Historical and projected water requirements and supplies for RD 787 are discussed in more detail in Section IV of this Plan.

Legislation Related to Ground-Water Management Plans

The Legislature enacted legislation in 1992 (AB 3030) and 2002 (SB 1938), now incorporated in the Water Code Section 10753, *et seq.* to encourage local public agencies to adopt plans to manage ground-water resources within their jurisdictions. RD 787 will adopt this Ground-Water Management Plan by resolution of its board of trustees.

SB 1938 provided that adoption of a ground-water management plan will be a prerequisite to obtaining funding assistance for ground-water projects or ground-water quality projects from funds administered by DWR. To comply with SB 1938, a ground-water management plan must include ground-water management components that address monitoring and management of water levels, ground-water quality degradation, inelastic land subsidence, and changes in surface flows and quality that either affect ground water or are affected by ground-water pumping. There must be provisions to cooperatively work with other public (and presumably private) entities whose service areas or boundaries overlie the ground-water basin. Provisions must also be made to allow participation by interested parties in development of the Plan. The Plan must include mapping of the ground-water basin, as defined in DWR's Bulletin 118, and the boundaries of the local agencies that overlie the basin. This Plan focuses on that portion of the Colusa Subbasin that underlies RD 787 and, as a result, RD 787 is the only local "agency". Nearby and adjacent water districts and water suppliers within the Colusa Subbasin are shown in Figure I-2. Finally with respect to SB 1938 requirements, monitoring protocols must be designed to detect changes in ground-water levels, ground-water quality, inelastic land subsidence (for basins where subsidence has been identified as a potential problem), and flow and quality of surface water that either directly affect ground water, or are directly affected by

ground-water pumping.

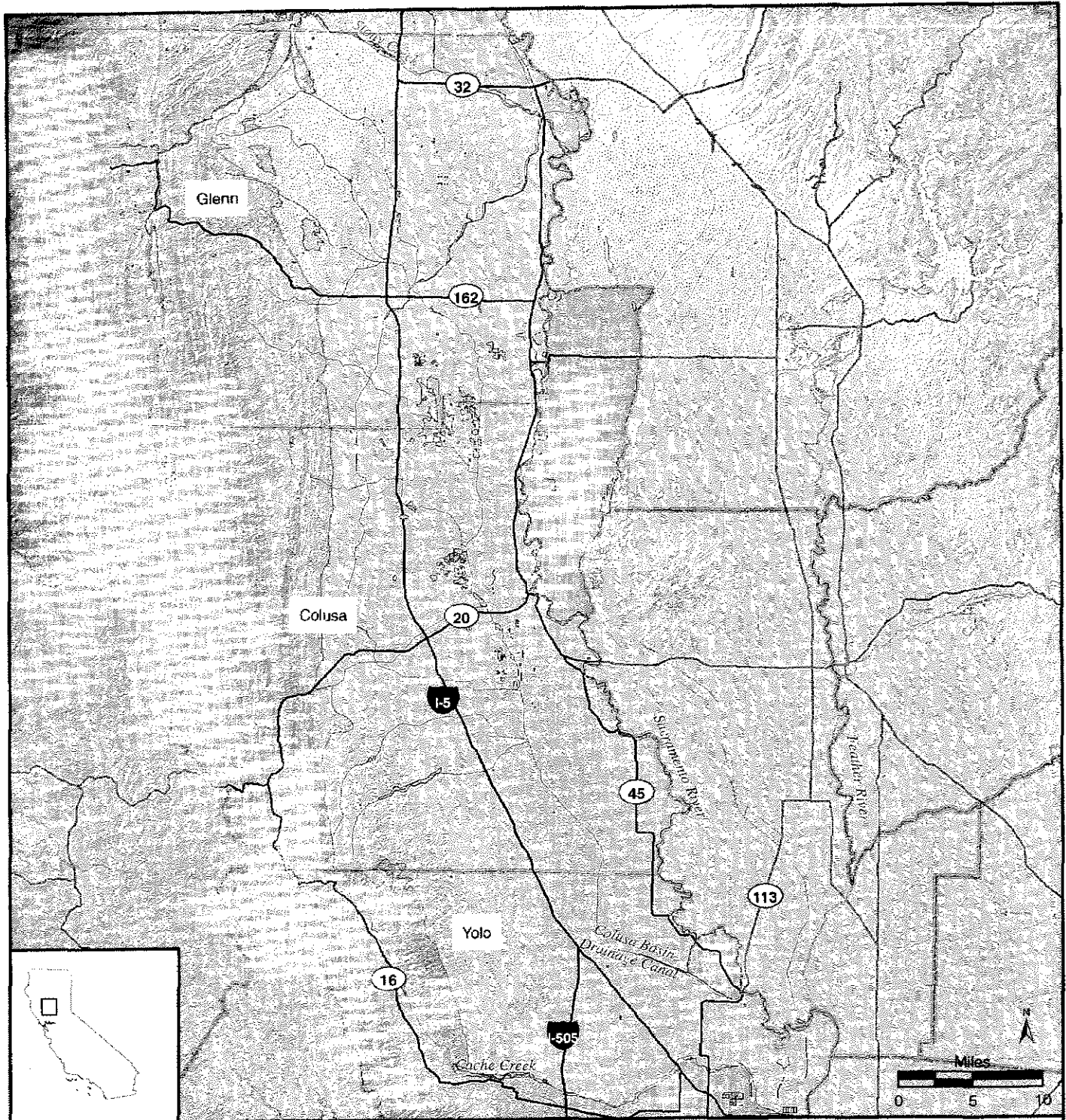
The potential components of ground-water management plans are listed in Water Code Section 10753:

- the control of saline water intrusion;
- identification and management of wellhead protection areas and recharge areas;
- regulation of the migration of contaminated ground water;
- the administration of a well abandonment and well destruction program;
- mitigation of conditions of overdraft;
- replacement of ground water extracted by water producers;
- monitoring of ground-water levels and storage;
- facilitating conjunctive use operations;
- identification of well construction policies;
- the construction and operation by the local agency of ground-water contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects;
- the development of relationships with state and federal regulatory agencies;
- the review of land use plans and coordination with land use planning agencies to assess activities that create a reasonable risk of ground-water contamination.

Not all of these potential components are included in this Plan. Because this Plan is intended to recognize the nature of the District and its included landowners, it includes a number of elements that are intended to accomplish a set of management objectives that, in turn, are focused on the occurrence and use of ground water in the District. Exclusion of other potential components listed in the Water Code reflects an understanding that some are being separately accomplished by others (e.g. well construction practices and well abandonment/destruction programs which are administered by Yolo County), and some are not applicable to this basin (e.g. the control of saline water intrusion).

Public Outreach and Involvement

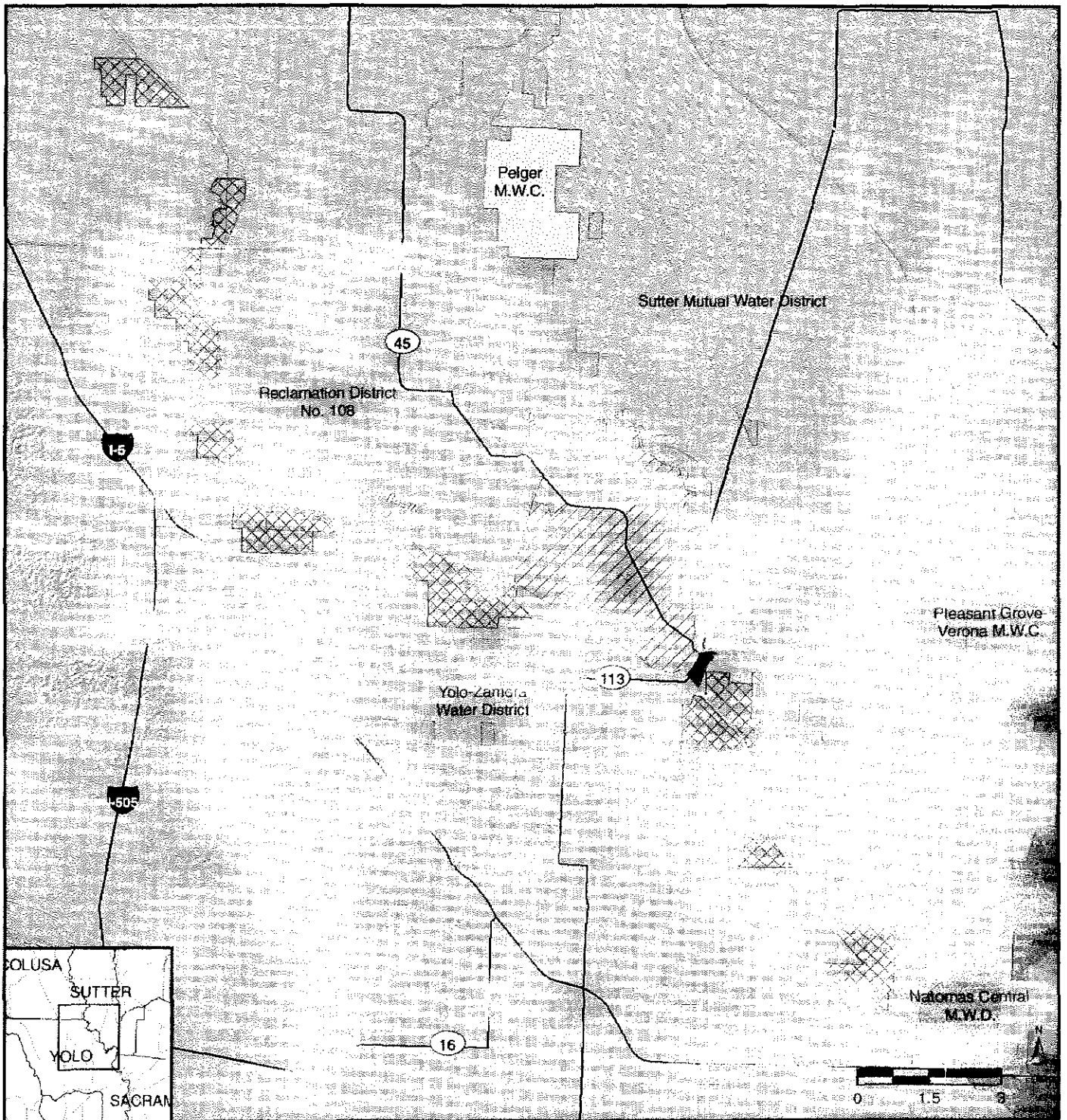
Public outreach and involvement efforts that occurred during development of the Reclamation District No. 787 Ground-Water Management Plan included notifying landowners within the District and also Yolo County, Reclamation District No. 108, Knights Landing Community Service District, and the California Department of Water Resources.



Legend

- Sacramento Valley Ground-Water Basin, Colusa Subbasin
- Reclamation District No. 787
- County Boundaries

**Figure I-1
Location Map**



Legend





-  River Garden Farms
-  Colusa Drain M.W.C.
-  Knights Landing C.S.D.
-  Reclamation District No. 787

Figure I-2
RD 787 and Nearby Water Districts and Suppliers

II. Basin Management and Objectives

Prior and Current Ground-Water Management

Reclamation District No. 787 (RD 787, the District) initially adopted a Groundwater Management Plan in February 1997. That Plan, which is included as Appendix A, was very limited in scope, but described three components whereby the District would collect information necessary for further analysis of its ground-water supply. These components were:

- compile and evaluate ground-water level data;
- sample and test ground-water quality to obtain background data;
- based on these data, make recommendations for the conjunctive use of ground water and surface water.

The Plan described existing and planned monitoring efforts by DWR, which would encompass the first two Plan components. Since the adoption of the Plan in 1997, DWR has expanded and continued monitoring in and around RD 787. With regard to the third Plan component, and as described above, the majority landowner within the District implemented a ground-water substitution conjunctive use program in 2003 that included DWR analysis and reporting of aquifer response.

Of the potential ground-water management activities listed in Water Code Section 10753, those already being investigated and implemented within the Colusa Subbasin as part of ground-water management by various entities include:

- *implementation of conjunctive use programs;*
- construction of dedicated monitoring wells;
- monitoring of ground-water levels and quality in monitoring and production wells;
- monitoring of subsidence;
- analysis and reporting on basin conditions;
- investigation to assess potential pumping impacts of planned actions on surface water resources.

As described in Section IV, RD 787 has historically obtained its water supply from diversions from the Sacramento River, with ground water used as a supplemental supply during dry years when surface water diversions were reduced. A primary focus of recent ground-water

management activities in the Sacramento Valley Basin has been on the conjunctive use, and the potential for sustainable development of additional ground water, including increasing pumpage to offset decreased surface water supplies during dry years. Several conjunctive use programs along the Sacramento River have been implemented, including the program implemented within RD 787 in 2003. RD 787 is participating in the Sacramento Valley Water Management Program (SVWMP), which is a collaborative effort to coordinate water management and plan for the beneficial use of water resources while providing for the long-term sustainability of those resources and improving water quality and supplies for a variety of uses throughout California. A primary goal of the SVWMP is maintaining surface water flows to the Sacramento-San Joaquin Delta to achieve water quality objectives. To maintain productive use of agricultural lands during selected years when diversions of surface waters would be reduced to maintain surface water flows, ground water would be pumped as a substitute water supply. To assess the impacts of such pumping, and to ensure that the pumping does not adversely affect overall resources, dedicated monitoring programs are being developed for each area in the Valley that might be involved in SVWMP or other similar activities. The monitoring programs include pumpage, ground-water levels, ground-water quality, subsidence, and surface water flows. The data collected from these programs is intended to be interpreted and reported to ensure that pumping does not decrease surface flows, that other ground-water users are not impacted, and that ground water and other resources are not depleted.

Another focus of ground-water management within the Sacramento Valley Basin is the avoidance of overdraft. In several areas of the Basin (outside of the Colusa Subbasin), notably in parts of Sacramento County, water levels declined significantly in response to ground-water pumpage. Conjunctive use efforts are now being implemented in the northern Sacramento area to use surface water in lieu of ground water to refill some of the vacant aquifer storage space for increased dry year water supply. Conjunctive use is also being implemented in the southern Sacramento County area to supplement ground-water supplies with surface water to stabilize ground-water levels and storage. Within the Colusa Subbasin, no such significant ground-water level declines have been identified, and recent trends are toward higher ground-water levels within the Subbasin.

Subsidence is an identified problem within some portions of the Colusa Subbasin, particularly in the Yolo-Zamora area, where well failures have resulted. Ongoing monitoring of surface elevation stations (including one within the District) and extensometers will provide data to evaluate future subsidence, if any. As described in more detail below, a key component of this Ground-Water Management Plan is the avoidance of subsidence through management of ground-

water pumpage within the District to avoid creating conditions of overdraft.

Management Objectives

The goals and objectives set forth in this Plan are intended to provide for the long-term sustainable use of ground water and interrelated surface water resources within the District. Although the objectives only consider the portion of the Colusa Subbasin underlying the District and within its jurisdiction, they would also ensure that ground-water use within the District preserves the resource as it relates to other users within the Colusa Subbasin and the greater Sacramento Valley Ground-Water Basin. The overall basin management objectives, or goals, for RD 787 can be expressed as follows:

Development of Local Ground-Water Supply. This objective includes the sustainable development of the ground-water resource, including conjunctive use of surface water and ground water to provide a flexible and reliable water supply while maintaining the long-term sustainability of both resources. Included in this objective is the intent to participate in ground-water substitution or other similar water transfer opportunities, when possible. This objective would also include monitoring and evaluation of background and project data to evaluate impacts.

Avoidance of Overdraft and Associated Undesirable Effects. In terms of basin goals, the assessment of ground-water conditions, and the development of operational yields for that portion of the overall Subbasin beneath the District, will have the primary objective of ensuring that ground-water development is at a rate that remains within perennial or sustainable yield, i.e. avoids overdraft and the undesirable effects associated with overdraft. In this case, chronic declines in water levels and/or water quality, depletion of local surface water resources, loss of ground-water storage, and permanent (inelastic) subsidence are examples of undesirable effects that are planned to be avoided.

Preservation of Ground-Water Quality. This objective reflects a desire to maintain the utility of the portion of the Colusa Subbasin underlying the District for domestic, irrigation and other beneficial uses, and to avoid any significant loss of ground-water storage or availability due to degradation of ground-water quality.

Protection of Interrelated Surface Water Resources. This objective reflects the need for integrated management of surface water (primarily the Sacramento River) and ground

water to avoid undesirable effects to either resource. For the District's purposes, this objective will be related primarily to specific projects.

Quantitatively, the preceding objectives translate into general preservation of ground-water levels and quality within the District, including fluctuations through seasonal demands, through local hydrologic variations (wet and dry periods), and through short-term increases in ground-water pumpage. In terms of intended management as described in this Plan, understanding historic conditions is essential to achieving the above goals for the District. Historical data are somewhat limited, particularly with regard to water quality, but the available data indicate that ground-water levels have fluctuated over time and that water quality has been stable. Neither water levels nor water quality exhibit any observable trend toward a degradation of the ground-water resource.

The 2003 conjunctive use program implemented by River Garden Farms served as a demonstration that such projects can be undertaken within the District without measurable long-term adverse impacts. Increased use of ground water, if well-managed through integration of a number of complementary management actions designed to make beneficial use of ground water while also maintaining the long-term sustainability of the resource, can be expected to accomplish all four of the basin objectives discussed above.

III. Ground-Water Basin Conditions

Geologic Setting

The aquifer system of the Colusa Subbasin has been studied on a larger scale, but detailed studies of the portion of the Subbasin underlying Reclamation District No. 787 (RD 787, the District) have not been undertaken. RD 787 lies in the laterally central area of the Sacramento Valley Basin, where both western (Coast Range) and eastern (Sierra Nevada) sourced non-marine deposits can be encountered. Generally, the non-marine deposits extend to a depth of more than 2000 feet below ground surface (bgs). Below these depths, undifferentiated tertiary and cretaceous marine deposits are encountered. The geologic description presented herein is as described by LSCE, 2004.

The non-marine deposits are comprised of alluvial, flood plain and fluvial deposits to a depth of approximately 200 feet bgs, overlying the upper and lower zones of eastern- or western-sourced deposits. These upper and lower zones generally consist of lenses of interbedded sands and clays associated with historic river channels or alluvial fan/plains. The upper zone lies directly beneath the alluvium and extends to a depth of approximately 1500 feet bgs. This zone is comprised of alluvial plain to tributary fluvial deposits that are thought to be the Pliocene upper Laguna Formation to Pleistocene lower River Bank Formation. The lower zone generally extends to a depth of more than 2000 feet bgs, and is comprised of alluvial fan to plain deposits that are thought to be the Late Miocene-Pliocene Mehrten and the Pliocene Laguna Formations. These formations are significant water sources in Sacramento County; however, they are not known to be utilized within the Colusa Subbasin, and thus have not been characterized in the District area.

Aquifer testing by the California Department of Water Resources (DWR) during the River Garden Farms water transfer in 2003 provided some information about aquifer characteristics within the District. The two main findings were lateral hydraulic continuity between wells in an aquifer zone located at a depth of approximately 350 to 600 feet bgs, and vertical hydraulic separation between this zone and a shallower (~200 foot bgs) aquifer zone. These findings are consistent with the conceptual geology presented above.

Subsidence

The most common form of subsidence resulting from ground-water pumping occurs when

sustained ground-water withdrawals cause a permanent dewatering of laterally extensive clay beds. Once dewatered, the framework of the clay particles collapses or becomes compacted, resulting in subsidence of the overall land surface. Yolo County has a network of surface elevation monitoring stations (including a station within the District) that were surveyed in 1999 and 2002 using global positioning system (GPS) equipment to measure land surface elevation. Figure III-1 shows the stations located in and near RD 787. Further monitoring (including a planned 2005 survey) will provide information about surface deformation over time. Additionally, the California Department of Water Resources (DWR) has installed and monitors an extensometer located approximately 2 miles southwest of the District.

As mentioned above, the aquifer zones in the area of RD 787 consist of interbedded sands and clays. The gradation of deposits generally becomes finer with further distance from the source (the Coast Range and/or Sierra Nevada); as such, there may be significant fractions of clays within the finer deposits in the District area. These geologic conditions, combined with reported subsidence in the nearby Yolo-Zamora area, indicate that precautions should be taken by the District to avoid the depression of ground-water levels that would allow dewatering of significant clay beds, resulting in the potential for inelastic (irreversible) subsidence. These precautions are incorporated in this Plan in the form of ongoing monitoring of ground-water levels to ensure that pumpage within RD 787 is within rates that are renewable (recharged) such that it does not result in long-term ground-water level declines.

Historical Ground-Water Development

The history of ground-water development within the District is unknown; however, records of ground-water levels in the area around the District indicate that wells were developed at least as early as the 1940's. Ground water from private wells has historically met potable domestic demands within the District; however, these demands are considered negligible when compared with irrigation demands. Irrigation demands within the District have historically been met with surface water supplies, with ground water used as a supplemental supply during dry years when surface water deliveries were limited. The majority landowner in the District, River Garden Farms, currently owns three production wells with a total capacity of approximately 5,000 to 5,700 gpm. As part of the Sacramento Valley Water Management Program, construction of two new production wells within the District is planned.

Ground-Water Levels

Available ground-water level data in the vicinity of the District dates from 1941. For the wells nearest the District, there is no single well with a long-term record of ground-water levels; however, periods of record from different wells overlap to provide a 'continuous' record from 1941 to present. Wells further from the District, but still within the Colusa Subbasin, do provide longer-term ground-water level records. Most of the ground-water level monitoring in the area has been conducted by DWR. More recently, Yolo County Flood Control and Water Conservation District (YCFWCWD) has taken over monitoring of some wells within Yolo County on a periodic basis. DWR has also constructed dedicated monitoring wells within the adjoining Reclamation District No. 108; these wells have replaced historic monitoring locations and provide static ground-water level data for discrete aquifer zones. River Garden Farms has several wells within the District that were monitored during the 2003 water transfer. The locations of historic ground-water level monitoring are shown in Figure III-1.

A hydrograph of historic water levels as measured in Well 10N/2E-12R1, the well nearest the District with available long-term ground-water level records, is shown in Figure III-2. The collection of ground-water levels from other wells with different periods of record but closer to the District (Figure III-3) indicates that well 10N/2E-12R1 exhibits ground-water level responses similar to those nearer to the District. Ground-water levels exhibit seasonal pumping fluctuations of about 20 feet. Overall, however, ground-water levels have remained fairly stable over the past 50 years, with declines during dry periods when pumpage increases and available recharge decreases. However, these declines have not been permanent, and ground-water levels have recovered following short-term declines. As described above, increased ground-water pumpage during 2003 River Garden Farms water transfer did not result in any measurable long-term impacts, and it is reasonable to assume that pumpage could seasonally increase in the future without resulting in long-term ground-water level declines.

Ground-Water Quality

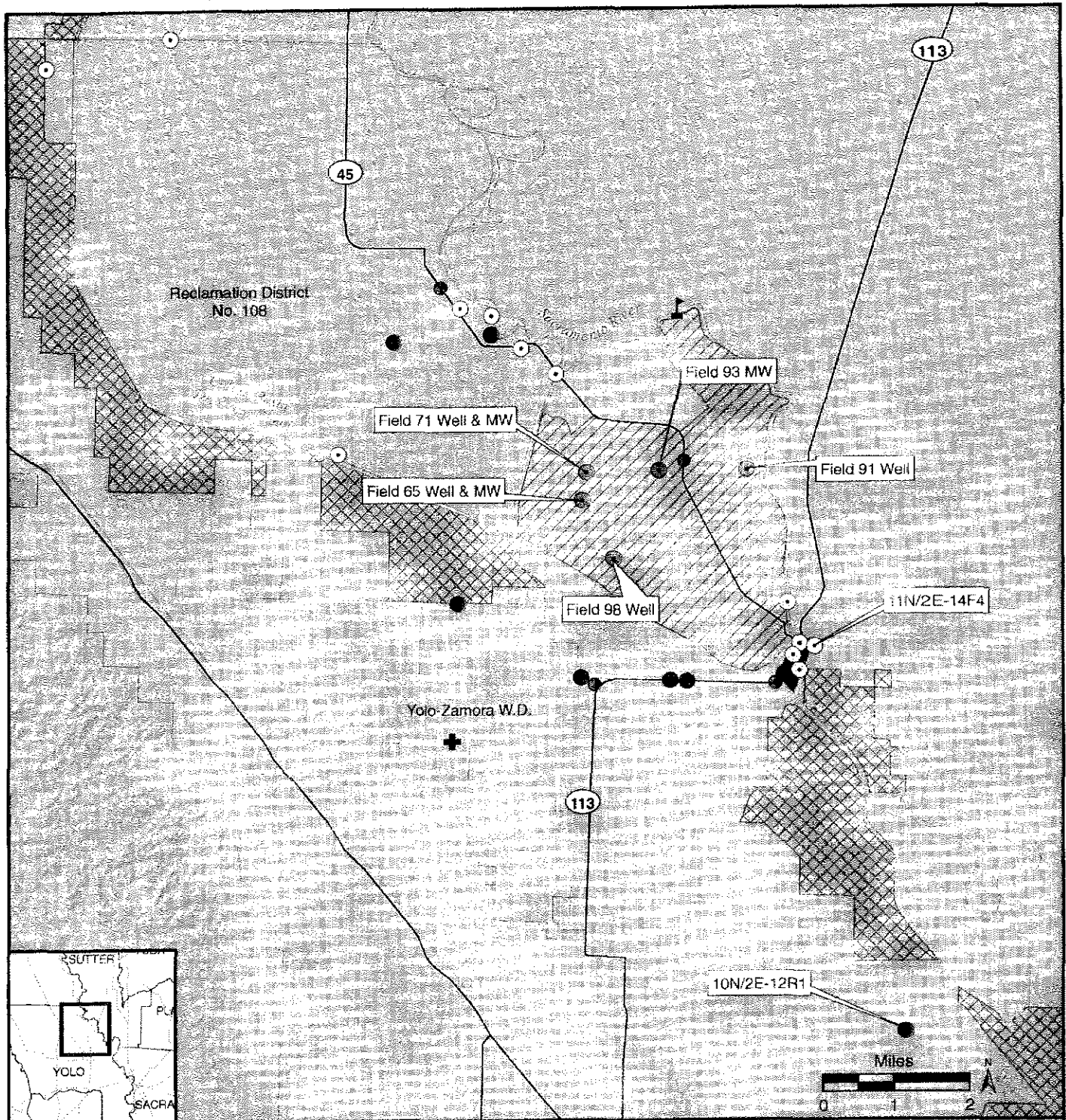
Ground-water quality data for wells near RD 787 dates from 1957 and has been collected mainly by the United States Geological Survey, DWR, and the Knights Landing Community Service District (CSD). Specific conductance has been selected as an indicator of overall ground-water quality because of the number of records for that parameter, and because it generally reflects changes in water composition over time. Figure III-4 presents available specific conductance data for wells near RD 787. The only well with a long-term record is DWR well 11N/2E-14F4,

located immediately southeast of the District. Data from this well show that ground-water quality has remained stable for the last 35 years. Individual data points for other wells are shown to illustrate the range of specific conductance values in the area, which may vary with location and aquifer zone.

The only wells within the District with available water quality data are the River Garden Farms wells, and data for these wells are summarized in Table III-1. These wells are irrigation and monitoring wells, and are not required to comply with the State of California Department of Health Services (DHS) water quality standards for public drinking water wells. However, these standards, in the form of primary (health-based) and secondary (aesthetic) Maximum Contaminant Levels (MCLs), are a useful reference for characterizing overall water quality within the District. The limited water quality data for the River Garden Farms wells generally complies with both the DHS primary and secondary MCLs, except for manganese.

Elevated concentrations of manganese, exceeding the secondary (aesthetic) MCL, are present in wells in and near RD 787. These elevated levels are frequently encountered in deposits near the Sacramento River and its historic channel. However, the presence of manganese does not constrain the use of ground water for agricultural irrigation; such as it might exceed the secondary MCL for municipal supply (e.g. near the District), conventional treatment is commonly used to remove dissolved manganese prior to municipal distribution.

There is one known leaking underground fuel tank near the District, in the town of Robbins, which has reportedly resulted in localized contamination to the drinking water aquifer. Nothing associated with the leaking tank affects or constrains the use of ground water within the District for agricultural irrigation.



Legend

- River Garden Farms Wells
- Water Level Monitoring Location
- Water Quality Monitoring Location
- ▲ Stream Gage
- Surface Subsidence
- ⊕ Zamora Extensometer
- Knights Landing C.S.D.
- ▨ River Garden Farms
- ▩ Colusa Drain M.W.C.
- ▧ Reclamation District No. 787

**Figure III-1
Historic Monitoring Locations
In and Near RD 787**

Figure III-2
Long-Term Ground-Water Levels Near RD 787
(DWR Well 10N/2E-12R1)

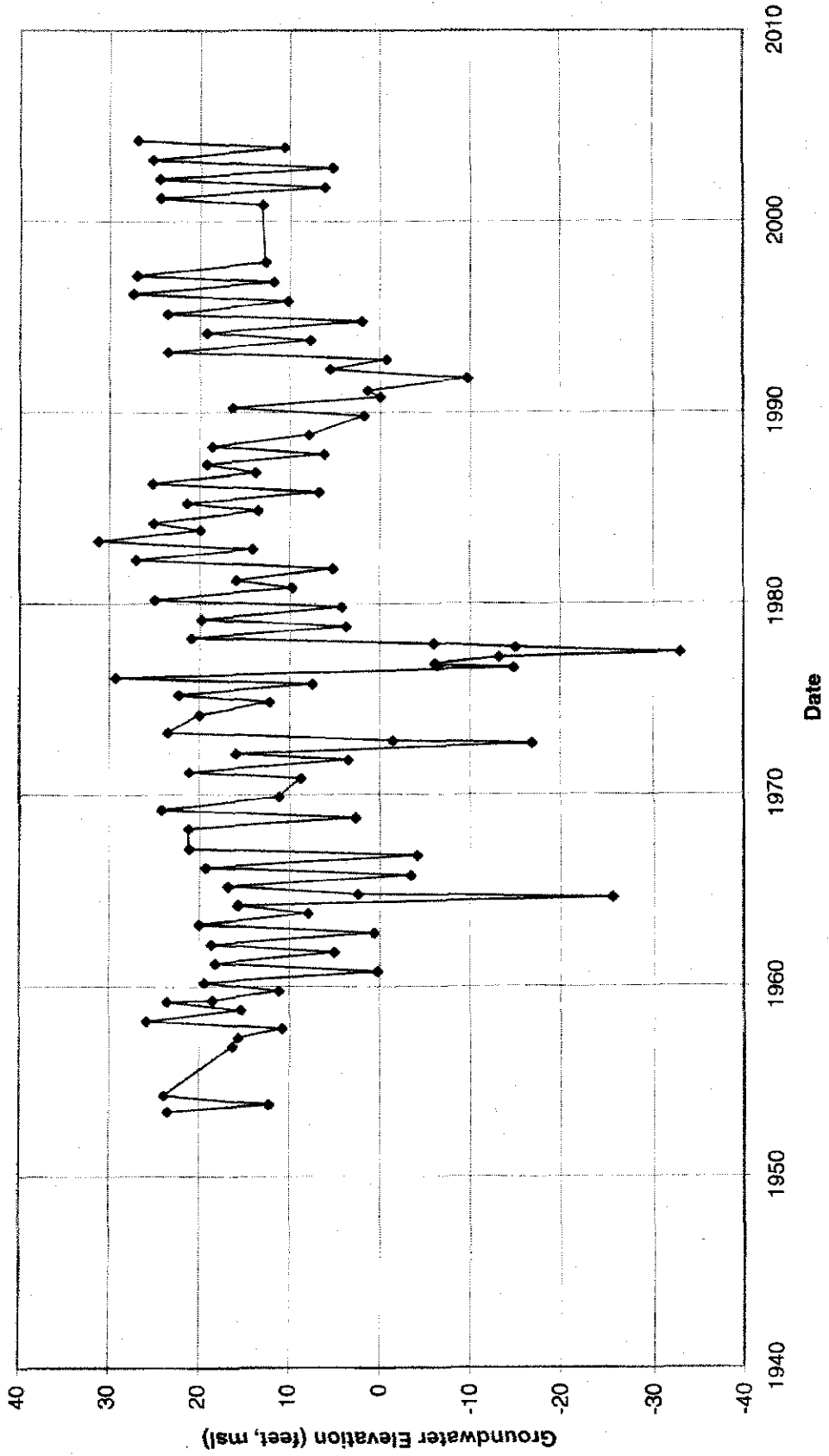


Figure III-3
Combined Record of Historic Ground-Water Levels Near RD 787
(DWR Wells)

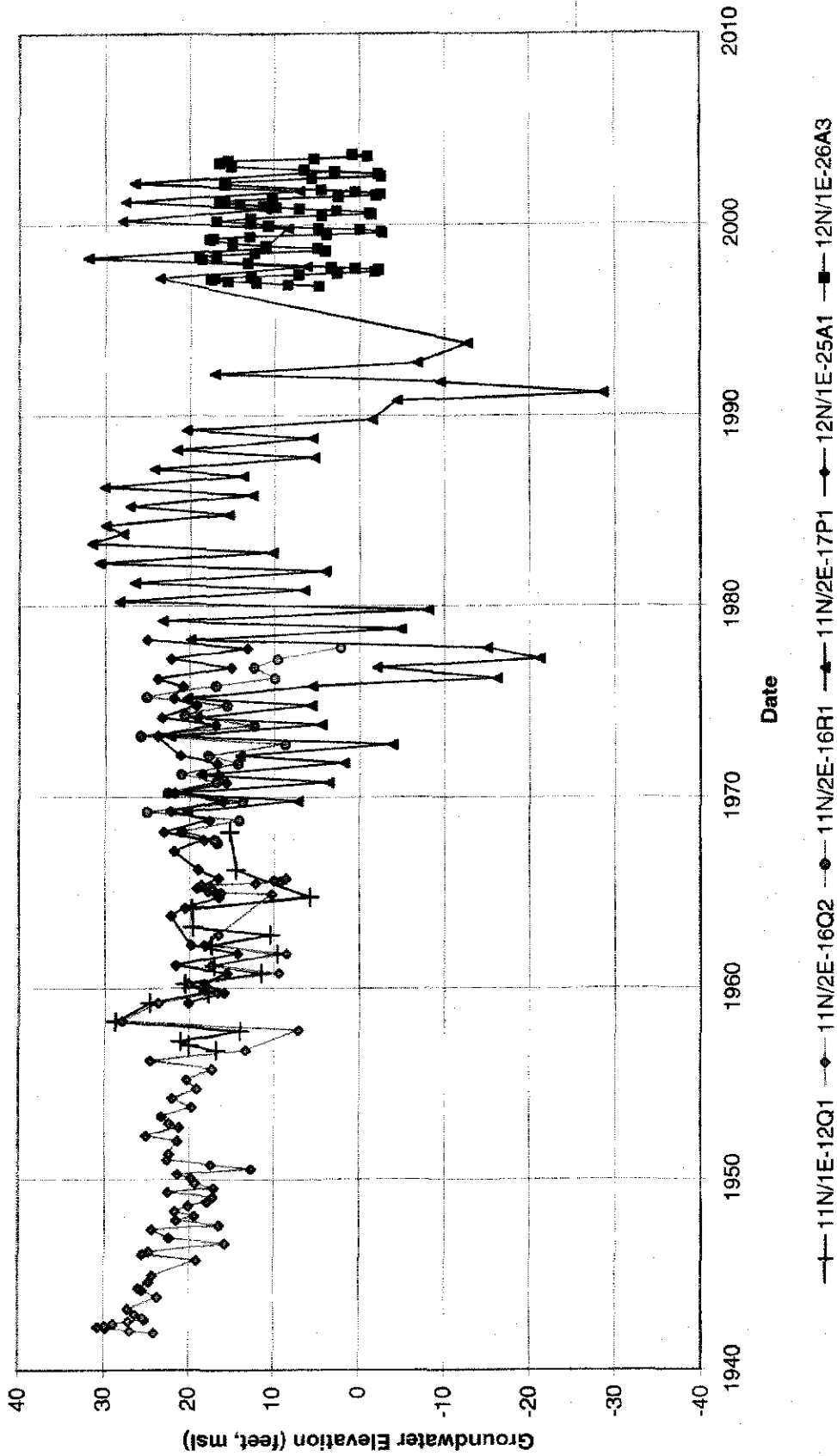


Figure III-4
Ground-Water Quality In and Near RD 787

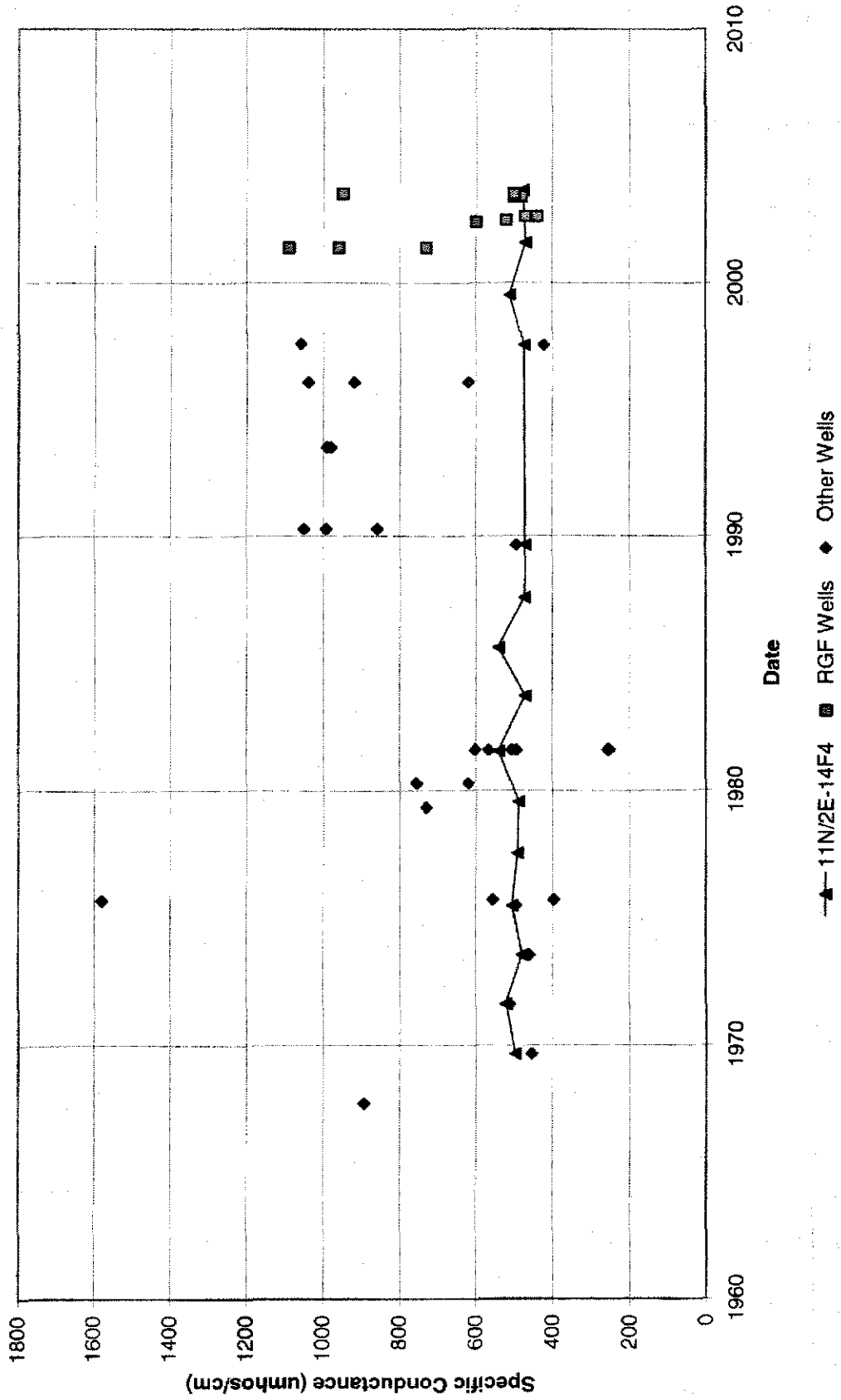


Table III-1
Summary of Ground-Water Quality Data
River Garden Farms Wells

ANALYTE	UNITS	MCL	Field 65 Well		Field 71 Well		Field 91 Well		Field 93 MW		Field 93 MW		Field 98 Well	
			5/21/01	6/27/02	5/29/03	6/2/03	6/16/03	7/8/03	5/21/01	8/15/02	8/15/02	8/15/02	5/24/02	5/21/01
CATIONS														
Calcium	mg/L		55	16				47	33	19	16	68		
Magnesium	mg/L		47	7.8			36	24	15	5.3	43			
Potassium	mg/L			3.9				2.6	3.1	9.2				
Sodium	mg/L		98	100			62	47	71	130	52			
Total Hardness	mg/L		330	72			265	180	110	62	348			
ANIONS														
Bicarbonate Alkalinity	mg/L			240				200	230	250				
Carbonate Alkalinity	mg/L			<1.0				16	14	<1.0				
Chloride	mg/L	250/500 ²	130	11			21	33	9.5	36				
Fluoride	mg/L	2.0 ¹	0.12	0.24			0.15	0.24	0.23	0.16				
Hydroxide Alkalinity	mg/L			<1.0				<1.0	<1.0	<1.0				
Nitrate (as NO3)	mg/L	45 ¹	<2.0	<2.0			<2.0	<2.0	<2.0	<2.0				
Sulfate	mg/L	250/500 ²	110	8.9			48	15	7.9	25	64			
Total Alkalinity	mg/L		205	240			287	220	250	250	181			
PHYSICAL PARAMETERS														
pH	pH units	6.5/8.5 ⁴	7.8	8.2	8.25	8.7	8.66	8.65	8.2	8.1	8.2	7.9	8.6	
Specific Conductivity	mmhos/cm	900/1600 ²	1090	520	481	500	501	500	470	440	600	960	950	
Total Dissolved Solids	mg/L	500/1000 ²	690	330				420	300	320	410	850		
INORGANICS														
Aluminum	µg/L	1000 ¹ /200 ³	100					<50				<50		
Arsenic	µg/L	10 ¹	6.9					5.7				<2.0		
Barium	µg/L	1000 ¹	<100					140				220		
Boron	µg/L	1000 ³		970					1300	590	<50			
Chromium	µg/L	50 ¹	<1.0					<1.0				3.4		
Copper	µg/L	1000 ²	<50					<50				<50		
Iron	µg/L	300 ²	140					<100				<100		
Lead	µg/L	15 ³	<5.0					<5.0				<5.0		
Manganese	µg/L	50 ²	79					400				<20		

1 - Primary MCL
2 - Secondary MCL (recommended/upper range)
3 - Action Level
4 - Suggested lower/upper acceptable range

IV. Current and Projected Water Requirements and Supplies

Water Demands

For all practical purposes, historical and projected water requirements in the District can be considered to be essentially constant. Since essentially all water demand (aside from negligible potable demand) is for agricultural irrigation, total water requirements on the approximately 8,950 acres of land within the District could potentially be as great as about 36,000 acre-feet per year (afy) if all land is in production. Obviously, if less than the full area of the District is planted in any given year, and depending on exact cropping patterns, total water requirements in any given year could be less than the full potential water demand.

Forty years of available record (from 1964 through 2003) of surface water diversions by River Garden Farms, which represents nearly 82 percent of the total area in the District, show that its diversions from the Sacramento River have averaged about 22,000 afy, and have been as great as about 30,000 af in a single year. On an average basis, the historical diversions represent, for the entire River Garden Farms area, a unit water demand in the range of 3 to 4 afy per acre.

With no plans for permanent change of land use in the District, it is reasonable to project that total water demands will remain comparable to those of the last several decades. Thus, on an average basis, water requirements for River Garden Farms can be expected to be on the order of 22,000 afy; for the entire District, average water requirements can be expected to be on the order of 26,250 afy. If all lands are in production in any give year, total water demands could be on the order of 30,000 afy for River Garden Farms, and on the order of 36,000 afy for the entire District.

Water Supplies

Practically all the water requirements in the District are met by diversions of surface water from the Sacramento River. River Garden Farms has a Contract Total Supply of 29,800 afy, of which almost all (29,300 afy) is Base Supply and the balance (500 afy) is CVP Project Water. The Base Supply and Project Water components of River Garden Farms' contract supply are limited to specific months; the entire amount is limited to the months of April through October, and is further limited to a total of 12,700 af in the critical months of July through September. Total surface water supply is also limited in Shasta critical years to 75 percent of total contract amount.

Most of the other land within the District is riparian to the Sacramento River and thus has water supply availability subject only to reasonable, beneficial use.

There are also three production wells in the District that are available to complement surface water supplies. Commonly known by names that denote their locations relative to the field numbering system, the wells have approximate capacities as follows:

<i>Well</i>	<i>Capacity (gpm)</i>
Field 71	1,700
Field 91	900 – 1,000
Field 98	2,500 – 3,000

At those capacities, the three wells have the capability to produce a combined total of about 5,000 to 5,700 gpm, which equates to a maximum of about 4,000 to 4,500 af over a six-month irrigation season.

The three production wells can be used for regular irrigation water supply, or can provide a substitute water supply for some of the Total Contract Supply from the Sacramento River. As the latter, they represent a water supply that has made possible the kind of water transfer that was completed in 2003, and that can make possible similar ground-water substitution based transfers in the future as envisioned in this Plan.

V. Elements of the Ground-Water Management Plan

Introduction

As developed in Section II above, the management objectives, or goals, for that portion of the ground-water basin beneath Reclamation District No. 787 include the following:

- Development of Local Ground-Water Supply
- Avoidance of Overdraft and Associated Undesirable Effects
- Preservation of Ground-Water Quality
- Protection of Interrelated Surface Water Resources

To accomplish those goals, this Plan incorporates a number of components, which are divided into six specific elements. These elements consist of existing and planned management activities that the District intends to undertake within its boundary, including assessment of the ongoing effectiveness of these activities. They also recognize the probability of additional ground-water development as part of conjunctive use activities within the District, including those planned as part of the Sacramento Valley Water Management Program (SVWMP). Collectively, they reflect the focus on local ground-water management actions the District can take to ensure that its activities do not compromise the long-term sustainable use of the portion of the Colusa Subbasin underlying the District, and thus the greater Colusa Subbasin.

Plan Elements

The six elements of the District's Ground-Water Management Plan include:

1. Ground-Water and Surface Water Monitoring
2. Management of Pumping and Avoidance of Overdraft
3. Development of Ground-Water Supply and Continued Participation in Conjunctive Use Programs
4. Preservation of Water Quality
5. Ground-Water Management Reports
6. Provisions to Update the Ground-Water Management Plan

Plan Element 1 – Ground-Water and Surface Water Monitoring

Plan Element 1 consists of monitoring ground-water levels, ground-water quality, production (pumping rates and volumes), land subsidence, and surface water flows. Planned locations for ongoing monitoring are shown in Figure V-1.

Because the primary water supply within the District has historically been surface water diversions from the Sacramento River, long-term records of ground-water levels and quality are limited. However, as discussed above in Section III of this Plan, available records for wells in the area are sufficiently extensive to indicate that no long-term change in ground-water levels or quality is evident. Recently, as part of a one-year conjunctive use project, local monitoring has been expanded. DWR has installed dedicated monitoring wells and an extensometer near the District, and plans to continue monitoring of ground-water levels, ground-water quality and subsidence. River Garden Farms and DWR are also cooperating on the installation of a dedicated multiple-completion monitoring well that, in addition to conventional ground-water level monitoring, will be used in combination with adjacent Sacramento River gaging to interpret River-aquifer connection and streambed leakage.

Ground-water data collection (water levels, water quality and production) within RD 787 has historically occurred in conjunction with planned activities, such as the 2003 RGF water transfer. Other than has been necessary to provide data related to the impacts of increased pumpage, a program of ongoing monitoring has not been implemented. However, as the District becomes more involved in developing its ground-water supply and participating in conjunctive use programs, collection and analysis of baseline data from existing wells will be key to accomplishing management goals. Monitored ground-water levels, quality, and pumping will collectively be the bases for defining conditions within the District and developing and managing ground water within the District to ensure the long-term sustainability of the resource.

The District is participating in the Sacramento Valley Water Management Program (SVWMP), which is a collaborative effort to coordinate water management and planning for the beneficial use of water resources while providing for the long-term sustainability of those resources and improving water quality and supplies for a variety of uses throughout California. As part of the SVWMP, dedicated monitoring programs are being developed for each area in the Valley (including RD 787) that might be involved in that Program or other similar activities. The monitoring programs include pumpage, ground-water levels, ground-water quality, subsidence, and surface water flows. Monitoring data collected as part of the SVWMP will be publicly

available, and will be evaluated in conjunction with numerical modeling to assess the effectiveness of the Program and any potential impact claims. RD 787's participation in the SVWMP, and consequent involvement in the implementation of a formal monitoring program for its area, will comprise its primary activities with regard to this Plan Element.

Additional monitoring will be undertaken as necessary for specific planned projects, as further described in Plan Element 3.

Plan Element 2 – Management of Pumping and Avoidance of Overdraft

In order to accomplish the management objectives described above, it will be essential to determine what yield can be developed within the District on both a regular and a short-term or intermittent basis. Such a determination of yield will be made to accomplish the main objective of sustainably operating within the yield of the basin, i.e. avoidance of overdraft.

Data are inadequate to analytically quantify the yield of the portion of the Colusa Subbasin underlying the District. Additionally, because the District overlies only a small portion of the Subbasin, any such formal effort would need to include other ground-water users on a more regional basis that is outside of the scope of this Plan. However, an operational yield for the District can be empirically developed on an ongoing basis by observing the effect of pumpage within the District on ground-water conditions (water levels, water quality), and establishing a level of pumpage that does not result in long-term adverse impacts to the ground-water resource.

Observations of this nature began during the 2003 RGF water transfer, which can be interpreted to indicate that at least 1,581 ac-ft of ground water can be pumped for use with surface water deliveries to collectively meet in-District water requirements without short-term or long-term impacts. Observations are expected to continue during future projects that include increases in ground-water pumpage. This type of operational understanding of basin yield will be adequate to accomplish the objectives of operating within the sustainable yield of the basin and avoiding overdraft.

Overall, ground-water levels in the area around RD 787 have remained fairly stable over the past 50 years, with temporary declines during dry periods, followed by ground-water level recovery in subsequent periods. Available data do not indicate any degradation of ground-water conditions that might be indicative of overdraft, i.e. decrease in ground-water levels or storage as a result of pumping in excess of the yield of the basin. Expansion of pumping within the District during future projects may result in greater ground-water level fluctuations; however, as long as

these fluctuations remain short-term and include subsequent recovery, and also as long as short-term fluctuations do not cause inelastic subsidence, pumpage can be considered to be within the operational yield of the basin.

Plan Element 3 - Development of Ground-Water Supply and Continued Participation in Conjunctive Use Programs

As previously described herein, the District's primary water supply has historically been diversions from the Sacramento River, with limited private ground-water use for domestic and irrigation purposes. In recent years, desire to engage in conjunctive use activities has driven increased ground-water development within the District, most notably by RGF. As also noted above, RD 787 is a participant in the SVWMP, which includes the conjunctive use of ground water and surface water for the primary goal of maintaining surface water flows to the Sacramento-San Joaquin Delta to achieve water quality objectives. RD 787 plans to continue to participate in the sustainable development of the ground-water resource, through conjunctive use and other activities. Such participation is anticipated to consist of District involvement in specific ground-water development projects, with associated monitoring programs to ensure that the projects do not result in long-term adverse impacts to ground-water or surface water resources.

Plan Element 4 - Preservation of Water Quality

This plan element reflects a goal of maintaining the utility of the basin, primarily for irrigation supply, and for all other beneficial uses as well, and to avoid any significant loss of ground-water storage or availability due to degradation of ground-water quality. Water quality will be maintained in part through the avoidance of overdraft, as described in Plan Element 2. An additional consideration will be the distribution of pumpage within the District as it relates to ground-water gradients and potential contamination sources. Part of the SVWMP planning has identified and analyzed the occurrence of poorer quality ground water and the potential for its movement in response to periodically increased pumping. While that is not expected to result in any adverse impacts, this Plan includes plans to operate generally consistent with the SVWMP concepts such that ground-water movement does not result in movement of poorer ground-water quality to degrade water quality beneath the District.

Plan Element 5 – Ground-Water Management Reports

Because of the limited historic ground-water use within the District, there has been no regular historical analysis and reporting on ground-water conditions within the District. Effective management of the portion of the Colusa Subbasin underlying the District, as described in this Plan, is based on planning and evaluation of projects that would represent an increase or expansion of ground-water pumpage within the District.

It is intended that future reporting will be related to these types of planned projects within the District, and their associated monitoring programs. Additional reporting will be done as part of the District's participation in the SVWMP, and by other entities within the Sacramento Valley Ground-Water Basin for various studies. RD 787 plans to make monitoring data available to other entities to facilitate the preparation of studies and reports that cover the District area.

Plan Element 6 – Provisions to Update the Ground-Water Management Plan

The elements of this Plan reflect the current understanding of the occurrence of ground water in the portion of the Colusa Subbasin underlying RD 787. The Plan elements are designed to achieve specified objectives to develop local ground water and engage in conjunctive use and other activities in a manner that ensures the long-term sustainability of the ground-water and surface water resources. While the Ground-Water Management Plan provides a framework for present and future actions, new data will be developed as a result of implementing the Plan. That new data could define conditions that will require modifications to current management actions. As a result, this Plan is intended to be a flexible document which can be updated to modify existing elements and/or incorporate new elements as appropriate in order to recognize and respond to future ground-water and surface water conditions. Although not intended to be a rigid schedule, review and updating of this Plan will initially be conducted in five years, with subsequent future updates scheduled as appropriate.

Legend

SVWMP Proposed Monitoring Network

- LWRH Domestic Well
- DWR Irrigation Well
- DWR Observation Well
- ⊕ SVWMP New Extensometer
- SVWMP New Monitoring Well
- ┆ Stream Gage
- Surface Subsidence
- ⊕ Zamora Extensometer
- ▨ Reclamation District No. 787
- Knights Landing C.S.D.
- ▨ River Garden Farms
- ▩ Colusa Drain M.W.C.

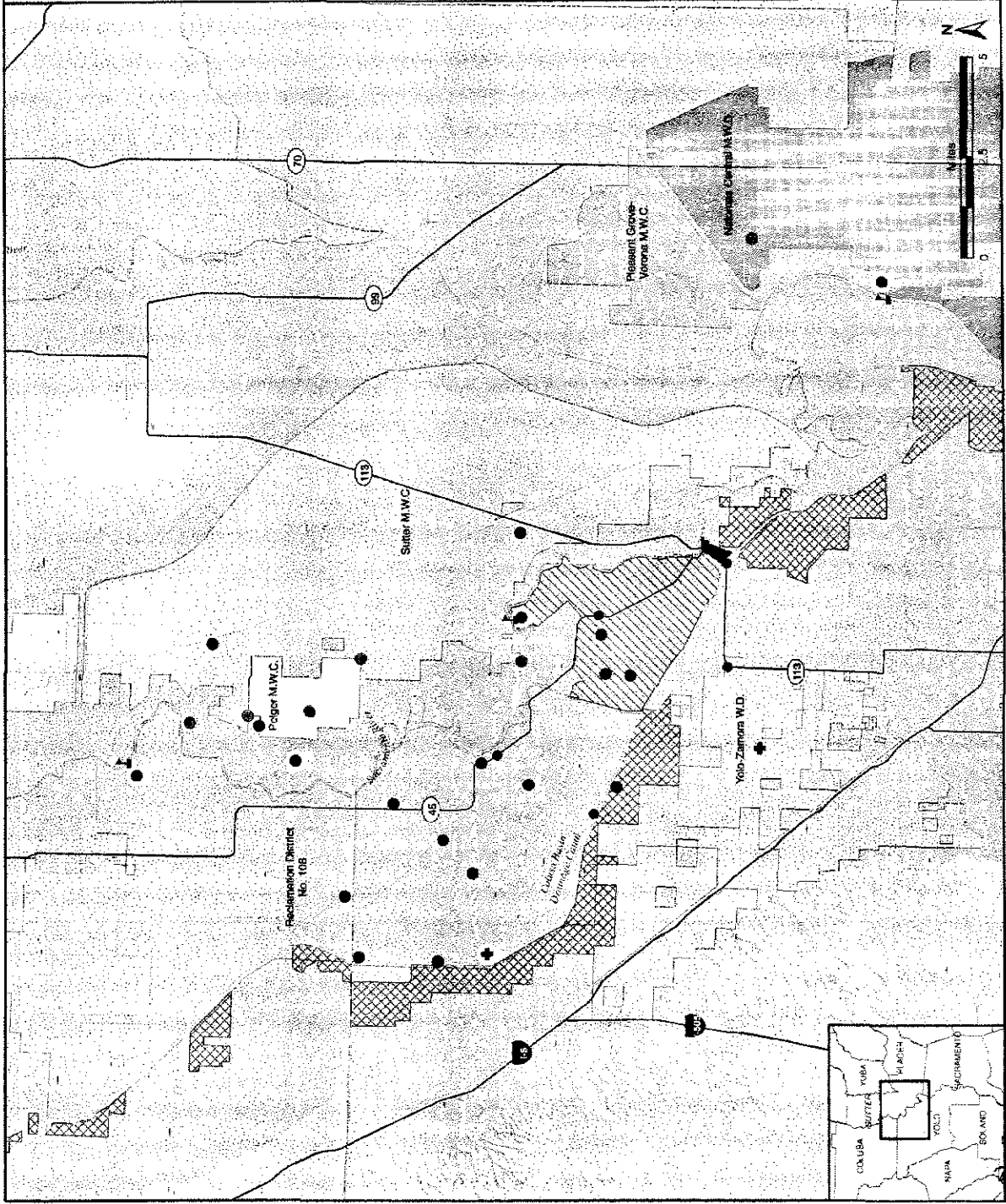
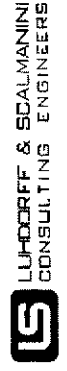


Figure V-1
Planned Ongoing Monitoring Locations
in and Near RD 787



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February 25, 1997

RECLAMATION DISTRICT NO. 787. **GROUNDWATER MANAGEMENT PLAN**

INTRODUCTION:

Reclamation District No. 787 was formed under the general reclamation district laws of 1908 for the purposes of providing drainage and reclamation of the lands within its boundary. The District is located in Yolo County along the Sacramento River to the west of Knights Landing in the southwestern portion of the Sacramento Valley.

The gross land area within the District is approximately 9,453 acres most of which is under irrigation. The majority of the irrigation water in the study area is diverted from the Sacramento River. There is also a small amount of water imported from Reclamation District No. 108, a number of wells are used, and some drain water reuse exists within the District.

The District is relatively flat, sloping generally in a southeasterly direction, the lowest elevation being near the southeasterly boundary. Slopes vary from 0.05% in the westerly portion of the District to 0.50% in places along the Sacramento River.

The District adopted a Resolution of Intention to draft a Groundwater Management Plan pursuant to Water Code Section 10753 for the purpose of conducting a program for coordinating the collection of data necessary to develop and implement a plan to efficiently manage and monitor the groundwater resources within the District.

BASIN RESOURCES:

Reclamation District No. 787 enjoys an adequate supply of surface water from the Sacramento River available through riparian and appropriative water rights as well as secured water under contracts with the U. S. Bureau of Reclamation. There are also three deep wells which supply water to River Garden Farms, the major landowner in the District. Groundwater has historically been used intermittently during drought years when surface diversions from the River were reduced.

February 25, 1997

In recent years the Department of Water Resources (DWR) has initiated a groundwater monitoring program in the lower Colusa Basin (Reclamation District No. 108 and Yolo Zamora Water District) collecting well level data, evaluating the nature of the interconnection of groundwater with the Sacramento River to determine if groundwater could be used conjunctively with surface water to enhance the availability of the irrigation supply during times of deficiency. The District will utilize the information gathered along with data from well monitoring within the District to determine the potential of relying on the groundwater to a greater extent than utilized in the past.

The District plans to work with State and Federal agencies and adjoining districts to evaluate variations of groundwater levels over time, quantify safe yield to protect the groundwater basin and to promote development of guidelines to preserve the resource.

The County of Yolo has adopted a County-wide groundwater ordinance at the request of the Board of Supervisors to regulate the extraction and exportation of groundwater from Yolo County. The stated goal is to promote a program for building a consensus on water policy. The ordinance further recognizes the need for other public entities to manage groundwater in accordance with the Groundwater Management Act and other applicable laws.

PLAN COMPONENTS:

The objective of the District is to monitor and analyze the groundwater resource and develop a complete inventory of known and potential sources and areas of groundwater. Primary components of the District's Plan include the following:

1. Compile water level measurements within the groundwater basin and evaluate the data to determine variations of groundwater levels over time.

February 25, 1997

Currently the DWR in cooperation with Reclamation District No. 108 and the Yolo Zamora Water District is developing monitoring wells in southern Colusa and northern Yolo Counties within the groundwater basin to develop information to provide a reliable basis for water resource management in the area.

2. Sample and test groundwater for chemical constituents to determine background data on water quality.

Presently DWR is completing an inventory on areas of potential contamination within the groundwater basin and defining poor or unacceptable water quality. A sampling program is also being formulated to establish baseline conditions and provide hydrogeochemical data for use in assessing historic groundwater recharge and movement as well as evaluating potential changes in quality. The monitoring network should also be suitable to provide reliable water level information in various aquifer zones that may be present.

3. Provide recommendations on conjunctive use of groundwater and limitations, if any, on commingling with surface water supplies.

The District currently performs conjunctive use of surface water supply through use of drain water and until the results of the monitoring program are known, there will be no immediate plans to implement a conjunctive use project utilizing the groundwater supply.

COMPONENTS NOT INCLUDED IN THE PLAN:

Specific components identified in Water Code Section 10753.7 but excluded from the plan include; identification and management of wellhead protection areas and recharge areas; the administration of a well abandonment and well destruction program; identification of well construction policies; and the construction and operation of groundwater contamination cleanup, recharge, storage and extraction projects.

February 25, 1997

PLAN IMPLEMENTATION:

The District will continue to compile data on water level measurements, water quality and groundwater basin features. Most of the information is being developed by DWR and will be available in the near future. The District will evaluate the data collection program and analysis and consider such further action as may be deemed appropriate to implement the plan.

COORDINATION WITH OTHER AGENCIES:

The District will meet, at least annually, with other local agencies within the same groundwater basin conducting groundwater management programs within the basin and with Yolo County, which has an ordinance relating to groundwater, in order to coordinate the respective programs pursuant to Water Code Section 10755.3.