City of Madera
2010 Urban Water Management Plan

Contact Sheet

Date plan submitted to the Department of Water Resources: October 7, 2011

Name of person(s) preparing this plan:

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The Water supplier is a: **City**

The Water supplier is a: **Retailer**

Utility services provided by the water supplier include: **Water, Wastewater**

Is This Agency a Bureau of Reclamation Contractor? **No**

Is This Agency a State Water Project Contractor? **No**

Engineers...Working Wonders With Water™

October 3, 2011
6451D00

City of Madera
1030 S. Gateway Drive
Madera, CA 93637

Attention: Mr. Marvin Ward

Subject: 2010 Urban Water Management Plan

Dear Mr. Ward:

We are pleased to submit for your use the City of Madera 2010 Urban Water Management Plan (UWMP). The 2010 UWMP document was prepared in accordance with the Urban Water Management Planning Act of 1983 and subsequent amendments, as well as other applicable regulations. The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, ensure that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions.

The report is organized according to the recommended format established by the California Department of Water Resources as follows:

- Chapter 1 – Introduction
- Chapter 2 – Service Area and Population
- Chapter 3 – Water Demands
- Chapter 4 – Water Supply
- Chapter 5 – Water Supply Reliability
- Chapter 6 – Demand Management Measures

We would like to extend our thanks to you and other City staff whose courtesy and cooperation were valuable components in completing this study and producing this report.

Sincerely,

CAROLLO ENGINEERS, INC.

Thomas A. Greci, P.E.
Project Manager

David L. Stringfield, P.E.
Vice President

Enclosures: 2010 Urban Water Management Plan

2010 URBAN WATER MANAGEMENT PLAN

September 2011

Prepared By

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CITY OF MADERA

2010 URBAN WATER MANAGEMENT PLAN

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LIST OF ABBREVIATIONS

Abbreviation	Description
AB	Assembly Bill
ADD	Average Day Demand
af	Acre Feet
afy	Acre Feet per Year
BMP	Best Management Practices
CDR	Center for Demographic Research
CIMIS	California Irrigation Management Information System
CRWQCB	California Regional Water Quality Control Board
CVP	Central Valley Project
DMMs	Demand Management Measures
DOF	Department of Finance
DPH	Department of Public Health
du/ac	Dwelling Units per Acre
DWR	Department of Water Resources
ETo	Evapotranspiration
FAR	Floor Area Ratio
FY	Fiscal Year
gpcd	Gallons per Capita per Day

Abbreviation	Description
gpm	Gallons per Minute
HGL	Hydraulic Grade Line
MAF	Million Acre Feet
MID	Madera Irrigation District
MFR	Multi-Family Residential
MG	Million Gallons
mgd	Million Gallons per Day
mg/l	Milligrams per Liter
PWSS	Public Water System Survey
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SFR	Single Family Residential
SWP	State Water Project
TDS	Total Dissolved Solids
ULF	Ultra Low Flush
USEPA	United States Environmental Protection Agency
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
WCS	Water Code Section
WMP	Water Master Plan
WSRP	Water Shortage Response Plan

Table I-2 Urban Water Management Plan checklist, organized by subject

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
PLAN PREPARATION				
4	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	10620(d)(2)		Section 1.3 Appendix B
6	Notify, at least 60 days prior to the public hearing on the plan required by Section 10642, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Any city or county receiving the notice may be consulted and provide comments.	10621(b)		Section 1.4 Appendix B
7	Provide supporting documentation that the UWMP or any amendments to, or changes in, have been adopted as described in Section 10640 et seq.	10621(c)		Appendix B
54	Provide supporting documentation that the urban water management plan has been or will be provided to any city or county within which it provides water, no later than 60 days after the submission of this urban water management plan.	10635(b)		Section 1.3 Appendix B
55	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan.	10642		Appendix B
56	Provide supporting documentation that the urban water supplier made the plan available for public inspection and held a public hearing about the plan. For public agencies, the hearing notice is to be provided pursuant to Section 6066 of the Government Code. The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water. Privately-owned water suppliers shall provide an equivalent notice within its service area.	10642		Section 1.4 Appendix B
57	Provide supporting documentation that the plan has been adopted as prepared or modified.	10642		Appendix B
58	Provide supporting documentation as to how the water supplier plans to implement its plan.	10643		Chapter 6

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
59	Provide supporting documentation that, in addition to submittal to DWR, the urban water supplier has submitted this UWMP to the California State Library and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. This also includes amendments or changes.	10644(a)		Section 1.3 Appendix B
60	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the urban water supplier has or will make the plan available for public review during normal business hours	10645		Section 1.3 Appendix B
SYSTEM DESCRIPTION				
8	Describe the water supplier service area.	10631(a)		Chapter 2 Figure 2.1
9	Describe the climate and other demographic factors of the service area of the supplier	10631(a)		Sections 2.3 and 2.4
10	Indicate the current population of the service area	10631(a)	Provide the most recent population data possible. Use the method described in "Baseline Daily Per Capita Water Use." See Section M.	Section 2.3
11	Provide population projections for 2015, 2020, 2025, and 2030, based on data from State, regional, or local service area population projections.	10631(a)	2035 and 2040 can also be provided to support consistency with Water Supply Assessments and Written Verification of Water Supply documents.	Section 2.3
12	Describe other demographic factors affecting the supplier's water management planning.	10631(a)		Section 2.2
SYSTEM DEMANDS				
1	Provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	10608.20(e)		Section 3.2 and 3.6
2	*Wholesalers:* Include an assessment of present and proposed future measures, programs, and policies to help achieve the water use reductions. *Retailers:* Conduct at least one public hearing that includes general discussion of the urban retail water supplier's implementation plan for complying with the Water Conservation Bill of 2009.	10608.36 10608.26(a)	Retailers and wholesalers have slightly different requirements	Section 1.4

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
3	Report progress in meeting urban water use targets using the standardized form.	10608.40		Not Applicable Until 2015
25	Quantify past, current, and projected water use, identifying the uses among water use sectors, for the following: (A) single-family residential, (B) multifamily, (C) commercial, (D) industrial, (E) institutional and governmental, (F) landscape, (G) sales to other agencies, (H) saline water intrusion barriers, groundwater recharge, conjunctive use, and (I) agriculture.	10631(e)(1)	Consider 'past' to be 2005, present to be 2010, and projected to be 2015, 2020, 2025, and 2030. Provide numbers for each category for each of these years.	Section 3.3 Table 3.3
33	Provide documentation that either the retail agency provided the wholesale agency with water use projections for at least 20 years, if the UWMP agency is a retail agency, OR, if a wholesale agency, it provided its urban retail customers with future planned and existing water source available to it from the wholesale agency during the required water-year types	10631(k)	Average year, single dry year, multiple dry years for 2015, 2020, 2025, and 2030.	Not Applicable
34	Include projected water use for single-family and multifamily residential housing needed for lower income households, as identified in the housing element of any city, county, or city and county in the service area of the supplier.	10631.1(a)		Table 3.5
SYSTEM SUPPLIES				
13	Identify and quantify the existing and planned sources of water available for 2015, 2020, 2025, and 2030.	10631(b)	The 'existing' water sources should be for the same year as the "current population" in line 10. 2035 and 2040 can also be provided.	Section 4.1 Table 4.1
14	Indicate whether groundwater is an existing or planned source of water available to the supplier. If yes, then complete 15 through 21 of the UWMP Checklist. If no, then indicate "not applicable" in lines 15 through 21 under the UWMP location column.	10631(b)	Source classifications are: surface water, groundwater, recycled water, storm water, desalinated sea water, desalinated brackish groundwater, and other.	Section 4.5
15	Indicate whether a groundwater management plan been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	10631(b)(1)		Section 4.5
16	Describe the groundwater basin.	10631(b)(2)		Section 4.5
17	Indicate whether the groundwater basin is adjudicated? Include a copy of the court order or decree.	10631(b)(2)		Section 4.5

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
18	Describe the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. If the basin is not adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 4.5 Appendix C
19	For groundwater basins that are not adjudicated, provide information as to whether DWR has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition. If the basin is adjudicated, indicate “not applicable” in the UWMP location column.	10631(b)(2)		Section 4.5
20	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	10631(b)(3)		Section 4.5
21	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	10631(b)(4)	Provide projections for 2015, 2020, 2025, and 2030.	Section 4.5
24	Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.	10631(d)		Section 5.6
30	Include a detailed description of all water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and multiple-dry years, excluding demand management programs addressed in (f)(1). Include specific projects, describe water supply impacts, and provide a timeline for each project.	10631(h)		Section 5.4
31	Describe desalinated water project opportunities for long-term supply, including, but not limited to, ocean water, brackish water, and groundwater.	10631(i)		Section 5.7
44	Provide information on recycled water and its potential for use as a water source in the service area of the urban water supplier. Coordinate with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area.	10633		Section 4.7
45	Describe the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.	10633(a)		Section 4.7.1

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
46	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	10633(b)		Section 4.7
47	Describe the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.	10633(c)		Section 4.7
48	Describe and quantify the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.	10633(d)		Section 4.7
49	The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	10633(e)		Section 4.7
50	Describe the actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.	10633(f)		Section 4.7
51	Provide a plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.	10633(g)		Not Applicable
WATER SHORTAGE RELIABILITY AND WATER SHORTAGE CONTINGENCY PLANNING [b]				
5	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	10620(f)		Section 5.4
22	Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage and provide data for (A) an average water year, (B) a single dry water year, and (C) multiple dry water years.	10631(c)(1)		Section 5.4
23	For any water source that may not be available at a consistent level of use - given specific legal, environmental, water quality, or climatic factors - describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.	10631(c)(2)		Section 5.3
35	Provide an urban water shortage contingency analysis that specifies stages of action, including up to a 50-percent water supply reduction, and an outline of specific water supply conditions at each stage	10632(a)		Section 5.9

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
36	Provide an estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.	10632(b)		Section 5.9
37	Identify actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.	10632(c)		Sections 5.13
38	Identify additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.	10632(d)		Section 5.11
39	Specify consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.	10632(e)		Section 5.11
40	Indicated penalties or charges for excessive use, where applicable.	10632(f)		Section 5.11
41	Provide an analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.	10632(g)		Section 5.12
42	Provide a draft water shortage contingency resolution or ordinance.	10632(h)		Section 5.10 Appendix E
43	Indicate a mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.	10632(i)		Section 5.14
52	Provide information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments, and the manner in which water quality affects water management strategies and supply reliability	10634	For years 2010, 2015, 2020, 2025, and 2030	Section 5.3

No.	UWMP requirement [a]	Calif. Water Code reference	Additional clarification	UWMP location
53	Assess the water supply reliability during normal, dry, and multiple dry water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. Base the assessment on the information compiled under Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.	10635(a)		Section 5.5
DEMAND MANAGEMENT MEASURES				
26	Describe how each water demand management measures is being implemented or scheduled for implementation. Use the list provided.	10631(f)(1)	Discuss each DMM, even if it is not currently or planned for implementation. Provide any appropriate schedules.	Chapter 6
27	Describe the methods the supplier uses to evaluate the effectiveness of DMMs implemented or described in the UWMP.	10631(f)(3)		Chapter 6
28	Provide an estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the ability to further reduce demand.	10631(f)(4)		Chapter 6
29	Evaluate each water demand management measure that is not currently being implemented or scheduled for implementation. The evaluation should include economic and non-economic factors, cost-benefit analysis, available funding, and the water suppliers' legal authority to implement the work.	10631(g)	See 10631(g) for additional wording.	Not Applicable
32	Include the annual reports submitted to meet the Section 6.2 requirements, if a member of the CUWCC and signer of the December 10, 2008 MOU.	10631(j)	Signers of the MOU that submit the annual reports are deemed compliant with Items 28 and 29.	Appendix F

a The UWMP Requirement descriptions are general summaries of what is provided in the legislation. Urban water suppliers should review the exact legislative wording prior to submitting its UWMP.

b The Subject classification is provided for clarification only. It is aligned with the organization presented in Part I of this guidebook. A water supplier is free to address the UWMP Requirement anywhere with its UWMP, but is urged to provide clarification to DWR to facilitate review.

Chapter 1

INTRODUCTION

1.1 PURPOSE

The California Water Code requires urban water suppliers within the state to prepare and adopt Urban Water Management Plans (UWMPs) for submission to the California Department of Water Resources (DWR). The UWMPs, which must be filed every five years, must satisfy the requirements of the Urban Water Management Planning Act (UWMPA) of 1983 including amendments that have been made to the Act. The UWMPA requires urban water suppliers servicing 3,000 or more connections, or supplying more than 3,000 acre-feet (af) of water annually, to prepare an UWMP.

The purpose of the UWMP is to maintain efficient use of urban water supplies, continue to promote conservation programs and policies, verify that sufficient water supplies are available for future beneficial use, and provide a mechanism for response during water drought conditions. This report, which was prepared in compliance with the California Water Code and as set forth in the guidelines and format established by the DWR, constitutes the City of Madera (City) 2010 UWMP.

1.2 BACKGROUND

1.2.1 Urban Water Management Planning Act

In 1983, State Assembly Bill (AB) 797 modified the California Water Code Division 6, by creating the UWMPA. Several amendments to the original UWMPA, which were introduced since 1983, have increased the data requirements and planning elements to be included in the 2005 and 2010 UWMPs.

Initial amendments to the UWMPA required that total projected water use be compared to water supply sources over the next 20 years, in 5-year increments. Recent DWR guidelines also suggest projecting through a 25-year planning horizon to maintain a 20-year timeframe until the next UWMP update has been completed and for use in developing Water Supply Assessments.

Other amendments require that UWMPs include provisions for recycled water use, demand management measures, and a water shortage contingency plan, set forth therein. Recycled water was added in the reporting requirements for water usage and figures prominently in the requirements for evaluation of alternative water supplies, when future projections predict the need for additional water supplies. Each urban water purveyor must coordinate the preparation of the water shortage contingency plan with other urban water purveyors in the area, to the extent practicable. Each water supplier must also describe their water demand management measures that are being implemented, or scheduled for implementation.

In addition to the UWMPA and its amendments, there are several other regulations that are related to the content of the UWMP. In summary, the key relevant regulations are:

- AB 1420: Requires implementation of demand management measures (DMMs)/best management practices (BMPs) and meeting the 20 percent reduction by 2020 targets (mandated by SBx7-7) to qualify for water management grants or loans.
- AB 1465: Requires water suppliers to describe opportunities related to recycled water use and stormwater recapture to offset potable water use.
- Amendments Senate Bill (SB) 610 (Costa, 2001), and SB 221 (Daucher, 2001), which became effective beginning January 1, 2002, require counties and cities to consider information relating to the availability of water to supply new large developments by mandating the preparation of further water supply planning (Daucher) and Water Supply Assessments (Costa).
- SB 1087: Requires water suppliers to report single family residential (SFR) and multi-family residential (MFR) projected water use for planned lower income units separately.
- Amendment SB 318 (Alpert, 2004) requires the UWMP to describe the opportunities for development of desalinated water, including but not limited to, ocean water, brackish water, and groundwater, as long-term supply.
- AB 105 (Wiggins, 2004) requires urban water suppliers to submit their UWMPs to the California State Library.
- SBx7-7: Requires development and use of new methodologies for reporting population growth estimates, base per capita use, and water conservation. This water bill also extended the 2010 UWMP adoption deadline for retail agencies to July 1, 2011.

The UWMPA is included for reference in Appendix C.

1.2.2 Previous Urban Water Management Plan

Pursuant to the UWMPA, the City previously prepared an UWMP in 2005, which was approved and adopted on December 7, 2005. This 2010 UWMP report serves as an update to the 2005 UWMP.

1.3 COORDINATION WITH APPROPRIATE AGENCIES

The UWMPA requires that the UWMP identify the water agency's coordination with appropriate nearby agencies.

> *10620 (d) (2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.*

The City is the sole water supplier and water management agency for the area. While preparing the 2010 UWMP, the City coordinated its efforts with relevant agencies to ensure that the data and issues discussed in the plan are presented accurately. Table 1.1 summarizes how the UWMP preparation was coordinated with different agencies in area.

Table 1.1 Coordination with Appropriate Agencies
2010 Urban Water Management Plan
City of Madera

Check at least one box on each row	Participated in Developing the Plan	Commented on the Draft	Attended Public Meetings	Was Contacted for Assistance	Was Sent a Copy of the Draft Plan	Was Sent a Notice of Intention to Adopt	Not Involved/ Not Informed
County of Madera					✓	✓	
Madera Irrigation District					✓	✓	
Madera County Farm Bureau					✓		
Madera Valley Water Company					✓		
Madera Unified School District					✓		
Madera District Chamber of Commerce					✓		
Madera Hispanic Chamber of Commerce					✓		

1.4 PUBLIC PARTICIPATION AND PLAN ADOPTION

The UWMPA requires that the UWMP show the water agency solicited public participation.

> *10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published … After the hearing, the plan shall be adopted as prepared or as modified after the hearing.*

In accordance with the UWMPA, the City adopted the 2010 UWMP on September 21, 2011. A copy of the adopting resolution and resolution of intent to adopt are included in Appendix B. A public hearing on September 7, 2011 provided an opportunity for the City's customers, residents, and employees to learn and ask questions about the current and future water supply.

A notice of the public hearing was published in the local newspaper on July 20, and August 17, 2011, notifying interested parties that the draft 2010 UWMP was under preparation. The notification included descriptions of the time and place of the public hearing. A copy of these notifications is included in Appendix B.

The Draft 2010 UWMP was presented to the City of Madera City Council as an information item on September 7, 2011. The 2010 UWMP was then adopted by resolution of the City of Madera City Council on September 21, 2011.

1.5 REPORT ORGANIZATION

The UWMP contains six chapters, followed by appendices that provide supporting documentation for the information presented in the report. The chapters are briefly described below:

Chapter 1 – Plan Preparation. This chapter presents the purpose of this UWMP, describes the efforts of the City to coordinate the preparation of the UWMP with appropriate nearby agencies, and discusses the measures used by the City to solicit public participation in the UWMP. This chapter also includes lists of abbreviations and references used in the report.

Chapter 2 – System Description. This chapter presents a description of the City's water service area and various aspects of the area served including location, climate, population, and other demographic factors.

Chapter 3 – System Demands. This chapter presents the quantity of water supplied to the City's customers including a breakdown by user classification, demand projections, a calculation of the baseline and targets associated with the Water Conservation Bill of 2009, and a discussion of the City's required water conservation and plans for reduction of water use to comply with the requirements of the Water Conservation Bill of 2009.

Chapter 4 – System Supplies. This chapter presets a description of the agency's existing and future water supply sources for the next 20 years. The description of water supplies includes information on the groundwater usage such as water rights, determination if the basin is in overdraft, adjudication decree, and other relevant information.

Chapter 5 – Water Supply Reliability and Water Shortage Contingency Planning. In this chapter, the UWMP seeks to address the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. In addition, there is an analysis of supply availability in a single dry year and in multiple dry years. This chapter also includes an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a discussion of the City's water shortage contingency ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction.

Chapter 6 – Demand Management Measures. This chapter provides a description of the City's water Demand Management Measures (DMMs). This includes programs which are currently implemented or scheduled for implementation, water survey programs, water system audits, plumbing retrofits, conservation and water efficiency rebate programs and incentives, information and education programs, water pricing and other waste water prohibitions, and residential ultra low flush toilet replacement programs.

Chapter 2

SERVICE AREA AND POPULATION

The UWMPA requires that the UWMP include a description of the water purveyor's service area and various aspects of the area served including climate and population.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631. (a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.*

2.1 LOCATION

The City of Madera (City), incorporated in 1907, is located on Highway 99 near the middle of the San Joaquin Valley in central California. The City covers 11 square miles or about 7,000 acres, as shown in Figure 2.1.

The City is mostly flat topography and lies within the San Joaquin Valley. The foothills of the Sierra Nevada mountains begin about 15 miles east of the City. The foothills of the Coastal Mountain Range are about 45 miles west of the City. As shown in Figure 2.1, the Fresno River flows through the City from the east. The river is dry for much of the year since the flow is dependent on water releases from upstream water agencies.

2.2 LAND USE

The City's land use is primarily agricultural, with residential land uses and smaller amounts of CII and governmental land uses. Agriculture contributes significantly to the local economy. However, agricultural land has been steadily being converted to other uses in the region. According to the General Plan (Madera, 2009), Madera County lost an average of 1,315 acres of agricultural and grazing land annually between 1984 and 2006, mostly through residential and commercial development.

As of 2008, the growth boundary of the City contained just over 40 percent agricultural, just over 20 percent residential, 10 percent roads, 10 percent vacant, and 15 percent Commercial/Industrial/Institutional (CII) and government, and about 5 percent other (Madera, 2009).

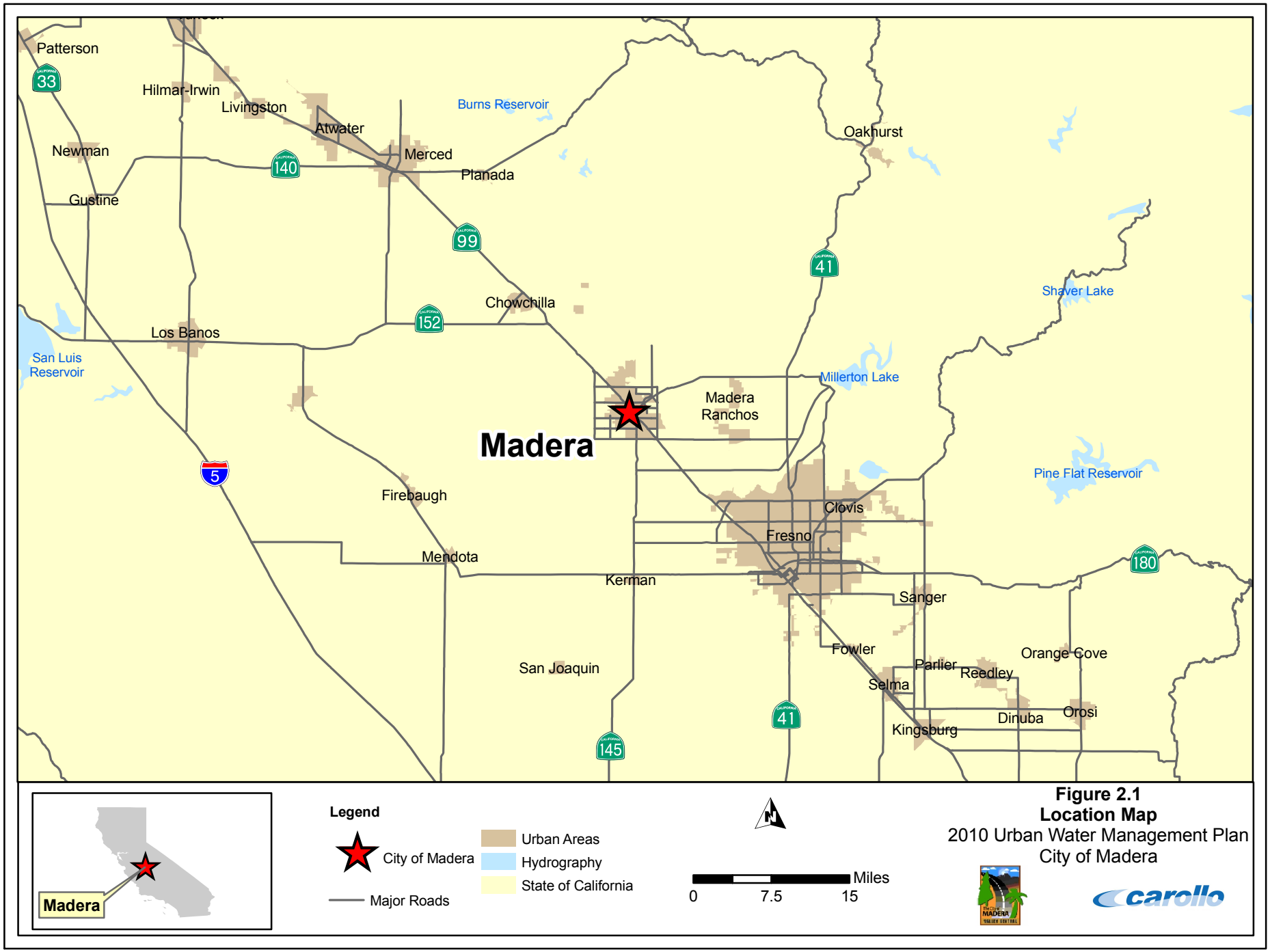

Figure 2.1
Location Map
2010 Urban Water Management Plan
City of Madera

carollo

2.3 POPULATION

Over the past 20 years, the City has experienced steady population growth, nearly doubling in size between 1990 and 2010. Since the 2005 UWMP, the City's population has increased by just over 6,000 people. Based on California Department of Finance (DOF) population estimates (DOF, 2010), the City's 2010 population is estimated to be approximately 58,243.

Historical population estimates from DOF will serve as the basis for the baseline calculations of water use associated with the Water Conservation Act of 2009, discussed in more detail in Chapter 3. This historical population estimates are provided in Figure 2.3.

Population projections will serve as the basis for future demand projections, as well as projections of mandated conservation goals associated with the Water Conservation Act of 2009.

Annual growth rates from two sources were considered as the basis for population projections:

- 3.6 percent, as used in the 2005 UWMP based on historic US Census Bureau data
- 3.2 percent, as used in the 1997 WMP

After evaluating the growth associated with each population projection, it was decided to use the annual growth rate from the 1997 WMP, as this was considered more realistic over a long term planning period, especially since the City's population growth may begin to taper off as the City becomes more built out. Population projections are based on an average annual growth rate of 3.2 percent, as used in the Water Master Plan (WMP) (MW, 1997).

The population projections are presented in Table 2.1 and depicted graphically along with historic population estimates in Figure 2.3.

Table 2.1 Population Projections
2010 Urban Water Management Plan
City of Madera

2010 UWMP Projected Years	2010[(1)]	2015	2020	2025	2030	2035
City of Madera Population[(2)]	58,243	68,178	79,807	93,420	109,335	128,008

Notes:
(1) 2010 is a population estimate rather than a projection.
(2) Annual rate of growth based on 3.2 percent from the 1997 WMP (MW, 1997). The annual growth rate was applied to the 2010 population estimate from the California DOF (DOF, 2010).

As shown in Table 2.1, it is anticipated that the City will grow by approximately 69,765 over the next 25 years, reaching 128,008 in 2035. It should be noted that the population projection shown here incorporate compound growth.

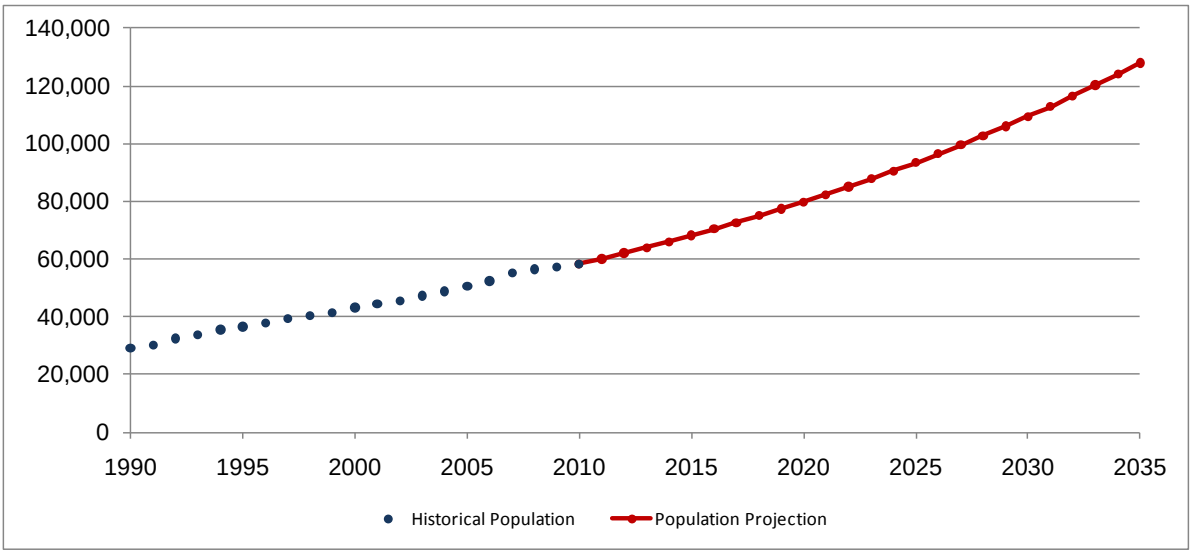

Figure 2.2 Historical and Projected Population

Note that US Census data from the 2010 Census was not used in preparation of this report since the DWR Guidelines request consistent basis of population between all of the water retailers in the state. For reference, the DOF population estimate incorporating results from the 2010 Census for the City is 61,879 for January 2011.

2.4 CLIMATE

The City's climate is generally dry and mild in the winter and hot during the summer. Historically, the daily maximum summer temperature has reached 115°F. During the summer relative humidity is typically around 15 percent, reaching as low as 8 percent. During winter months, relative humidity is typically around 90 percent with mild weather and some cold spells. Winds are generally from the northwest, following the layout of the San Joaquin Valley.

The standard monthly average evapotranspiration (ETo) rates, rainfall, and temperature are summarized in Table 2.2.

Table 2.2	Climate Characteristics 2010 Urban Water Management Plan City of Madera				
	Standard Monthly Average ETo[(1)]	Monthly Average Rainfall[(2)]	Monthly Average Temperature[(2)] (°F)		
Month	(inches)	(inches)	Average	Minimum	Maximum
January	1.5	2.0	44.9	35.9	53.9
February	2.4	1.9	50.2	39.1	61.2
March	4.2	1.8	54.5	41.7	67.2
April	5.8	1.1	60.1	45.4	74.8
May	7.8	0.4	67.7	51.4	83.9
June	8.7	0.1	74.2	56.7	91.7
July	9.6	0.0	79.8	61.4	98.2
August	8.5	0.0	78.1	59.8	96.4
September	6.4	0.1	73.1	55.2	90.9
October	4.2	0.6	64.0	47.7	80.3
November	2.2	1.2	52.9	39.6	66.1
December	1.3	1.8	45.4	35.7	55.1
Annual	**62.7**	**11.1**	**62.1**	**47.5**	**76.7**

Notes:
(1) Source: California Irrigation Management Information System (CIMIS) Station 145 - Madera (CIMIS, 2010). Represents monthly average ETo from May 1998 to April 2011.
(2) Source: Western Regional Climate Center (WRCC) Station 045233 - Madera (WRCC, 2010). Represents monthly average data from January 1928 to December 2010.

As shown in Table 2.2, the City's average monthly temperature ranges from approximately 45 to 80 degrees Fahrenheit (°F), with an annual average temperature of nearly 62°F. The average low and high monthly temperatures have been measured to be 35°F and 98°F, respectively.

ETo averages a total of 62.7 inches per year, while the average annual rainfall is approximately 11 inches. Most of the rainfall typically occurs during the period of November through April. Rainfall during the summer is minimal.

Chapter 3

WATER DEMANDS

3.1 GENERAL

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) identify the quantity of water supplied to the agency's customers including a breakdown by user classification.

UWMPA:

> 10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:
>
> 10631 (e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the- following uses:
>
> (A) Single-family residential; (B) Multifamily; (C) Commercial; (D) Industrial; (E) Institutional and governmental; (F) Landscape; (G) Sales to other agencies; (H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof; and (I) Agricultural.
>
> (2) The water use projections shall be in the same 5-year increments to 20 years or as far as data is available.

3.2 PAST, CURRENT, AND PROJECTED WATER USE

This section describes the historical, current, and projected water use through year 2035. It also describes the types of customer accounts in the City and the breakdown of accounts throughout the system.

3.2.1 Customer Accounts

As of 2009, the City maintains approximately 13,025 connections, including 549 connections billed as metered connections and 12,476 connections billed as unmetered connections. The City classified these connections into the following categories: 11,255 single family residential, 866 multi family residential, and 934 commercial/institutional. This account breakdown shows that about 93 percent of the accounts are classified as single or multi family residential, while commercial / institutional represent less than 7 percent of City's accounts. It should be noted that, although all single family residences constructed since 1992 have meters, all single family residences within the City are billed on an unmetered rate structure. The City is now in the process of installing meters on all customer connections and is slated for completion by July 1, 2012.

Figure 3.1 shows the breakdown of number accounts by account type, using an average of years 2006 and 2009, for which data was available from DWR PWSS submittals for those years. It should be noted that Landscape Irrigation accounts were included as a separate billing classification in 2006, but not listed as a separate classification in the data available for 2009.

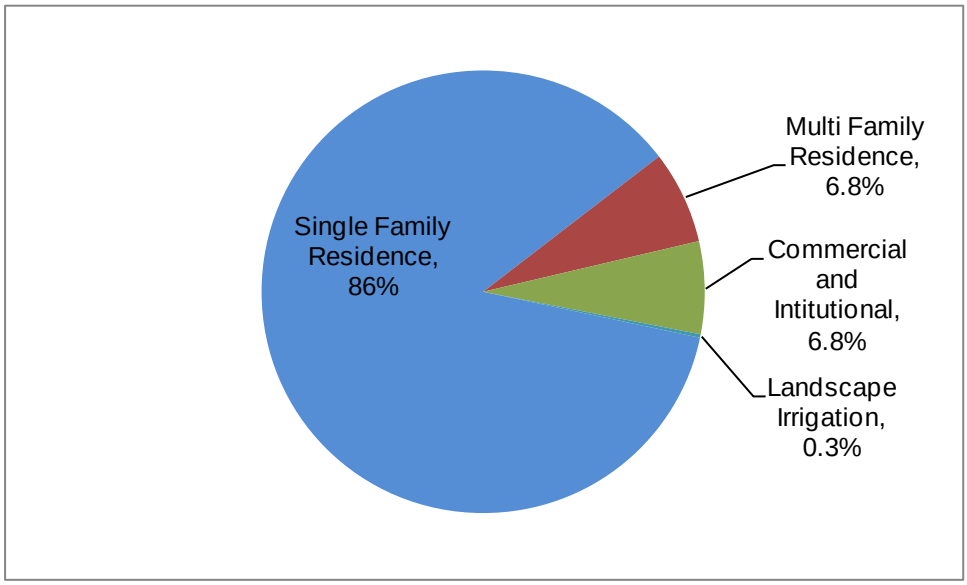

Figure 3.1 – Breakdown of Accounts by Account Type

3.2.2 Historical Water Use

The historical water use since 1990 is listed in Table 3.1 and shown in Figure 3.2. Yearly population estimates from the California Department of Finance (DOF), is included for the same time period.

Table 3.1 Historical Water Use
2010 Urban Water Management Plan
City of Madera

Year	Water Production (afy)	Population[(1)]	Per Capita Consumption (gpcd)
1990	9,811	29,283	299
1991	9,483	30,157	281
1992	9,517	32,504	261
1993	10,057	33,862	265
1994	10,990	35,504	276
1995	10,259	36,557	251

Table 3.1 Historical Water Use
2010 Urban Water Management Plan
City of Madera

Year	Water Production (afy)	Population[(1)]	Per Capita Consumption (gpcd)
1996	11,259	37,753	266
1997	11,662	39,276	265
1998	10,810	40,518	238
1999	12,157	41,424	262
2000	11,834	43,089	245
2001	11,834	44,404	238
2002	11,868	45,633	232
2003	12,473	47,210	236
2004	12,906	48,780	236
2005	12,818	50,581	226
2006	9,849	52,376	168
2007	10,431	55,254	169
2008	10,295	56,468	163
2009	13,114	57,227	205
Average	**11,535**	**45,753**	**230**

Notes:
(1) Source: DOF population estimates (DOF, 2010).

As shown in Table 3.1 and Figure 3.2, the historical water use has varied from year-to-year, with a general increasing trend through 2005. Water demands have dropped in the most recent years, most likely due to a combination of factors such as absence of hot summers, the economic downturn, and water conservation efforts.

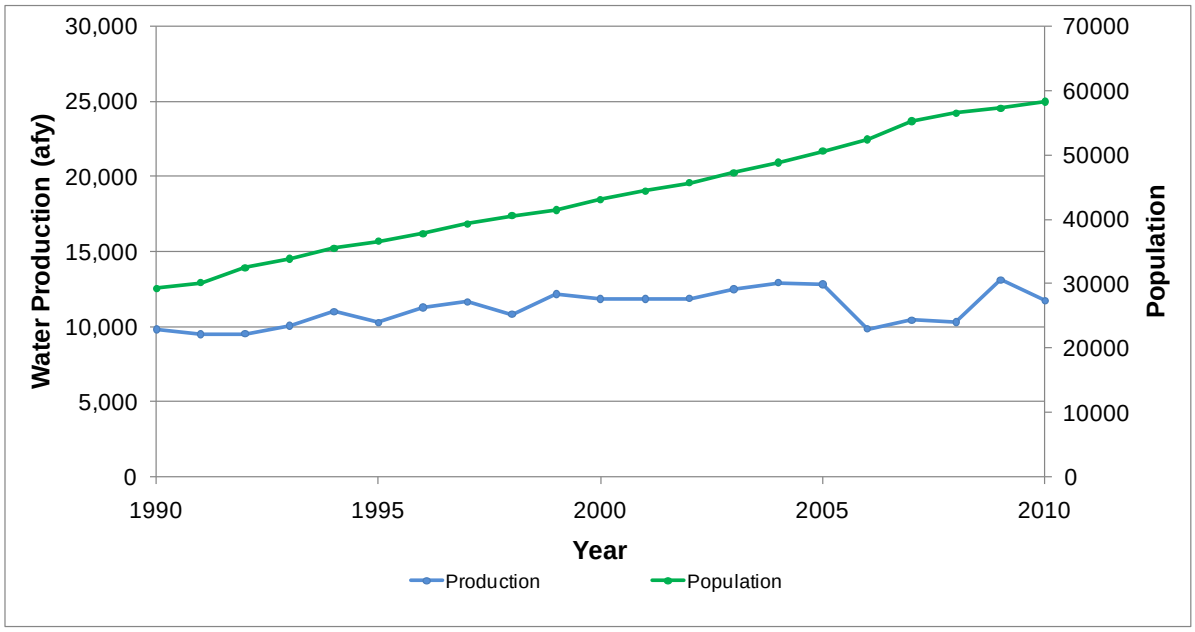

Figure 3.2 – Historical Production and Population

As shown in Figure 3.2, historical water use has varied from year-to-year, with a general increasing trend through 2005. Water demands have dropped in the most recent years, with a significant drop in 2006 through 2008.

3.2.3 Current Water Use

In 2009, the City supplied 13,114 afy or 11.7 million gallons per day (mgd). With a population of around 57,000, this water use equates to an average per capita consumption of 205 gallons per capita per day (gpcd).

While the water demand and population data in Table 3.1 show growth occurring within the City, of equal importance is the per capita consumption within the region. The per capita consumption is an indication of an average amount of water consumed per person per day for a calendar year.

The historical per capita consumption rate was used in combination with the population projections from Chapter 2 to estimate the City's future water demands.

As shown in Table 3.1 and Figure 3.2, population and water production show consistent growth. Overall, the population and water demand for City have both grown steadily since 1990, although demand has tapered slightly in more recent years. This contrasts with the City's per capita consumption, which has decreased over the 20 year period. This decrease indicates that, while growth within the region has been consistent, average yearly water consumption for each person living in the City service area has gone down.

Figure 3.2 further illustrates the long term behavior of population and water demand within City. It is important to note the interrelation between the two curves, and also how recent trends suggest a possible reduction in water use, but not necessarily in growth.

3.2.4 Projected Water Use

Based on the population projections from Chapter 2 and the established per capita water consumption rates further explained in Section 3.8.1 and Table 3.8, the City's demand projections are estimated and summarized in Table 3.2 and Figure 3.3. The per capita water consumption rates are determined by establishing consumption targets to meet future water conservation requirements throughout the state, and are discussed in further detail below.

Table 3.2 Demand Projections
2010 Urban Water Management Plan
City of Madera

Year	Demand (afy)	Population[(1)]	Per Capita Consumption (gpcd)
2010	16,111[(2)]	58,243	247
2015	16,974	68,178	222
2020	17,576	79,807	197
2025	20,573	93,420	197
2030	24,083	109,355	197
2035	28,191	128,008	197

Notes:

(1) Population Projections from Table 2.1.

(2) The 2010 demand shown is a projected, rather than historical value. It is shown in order to be consistent with the methodology used to develop other projected demand values.

Total projected demand is anticipated to decrease until the year 2020, and then resume increasing in a manner similar to the last 20 years. This demand projection is based on per capita consumption rates which have been specifically calculated to satisfy the water conservation targets laid out in the Water Conservation Act of 2009, based on a 20 percent reduction in water use in the 2020.

Put simply, reductions in per capita demands over the period 2010 through 2020 will limit growth in overall demands until 2020. More details regarding the per capita consumption rates presented in Table 3.2 can be found in the demand projections section of this chapter.

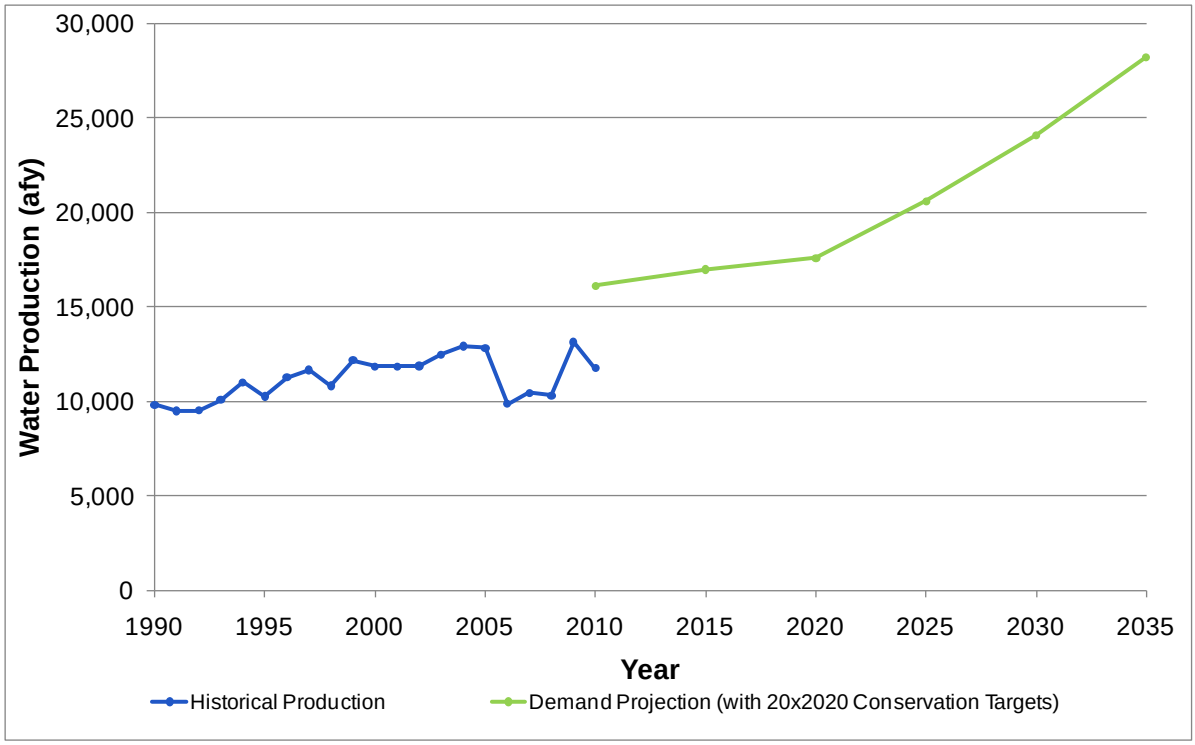

Figure 3.3 – Past, Current, and Projected Water Use

Another key assumption underlying future City demand values is the 2010 starting point for the projection. The year 2010 saw a decrease from 2009 in volume of water consumed by both the region as a whole, as well as in per capita rates. Demand for the City decreased to 11,724 af in 2010, as shown in Figure 3.3.

The demand projections were derived from the population projections presented in Chapter 2 and the per-capita consumption targets listed in Table 3.2 and further explained below, in the "Method 1" section. For consistency with the conservation targets, the baseline per-capita demand of 247 gpcd was multiplied by the projected population to calculate future demand projections. This is consistent with the water conservation target development as described in detail further below. Based on the per capita consumption value of 247 gpcd, the total 2010 consumption was estimated at 16,111 af.

3.3 WATER USAGE BY CLASSIFICATION

The current and projected water deliveries by sector are summarized in Table 3.3 along with estimated water deliveries for 2005. Projected demands shown in Table 3.3 incorporate water conservation targets associated with the Water Conservation Act of 2009.

Table 3.3 Water Demand Projections by Use Type

Use	2005		2010		2015		2020	
	No. of accounts(1)	Demand(2) (afy)	No. of accounts(3)	Demand(2) (afy)	No. of accounts(4)	Demand(2) (afy)	No. of accounts(4)	Demand(2) (afy)
SFR	10,683	8,763	11,255	11,014	13,659	11,604	15,989	12,015
MFR	854	1,004	866	1,262	1,071	1,329	1,254	1,376
Comm./Inst.	818	1,763	904	2,216	1,072	2,335	1,255	2,417
Industrial	0	0	0	0	0	0	0	0
Landscape Irr.	64	391	-	492	40	518	47	537
Other	0	0	0	0	0	0	0	0
System Losses(5)		897		1,128		1,188		1,230
Total	**12,419**	**12,818**	**13,025**	**16,111**	**15,842**	**16,974**	**18,544**	**17,576**

Notes:
(1) Account data for 2005 was not available. Data for 2006 is shown and assumed to be slightly higher than the actual number of accounts in 2006.
(2) Since the City's system includes unmetered accounts, demand breakdown is estimated as detailed in Section 3.3. Projections incorporate 20x2020 targets.
(3) Account data for 2010 was not available. Data for 2009 is shown and assumed to be slightly less than the actual number of accounts in 2010. Note that account data for 2009 did not include landscape irrigation accounts though landscape irrigation usage was included.
(4) Number of accounts and account type breakdown based on average percentage of account types in 2006 and 2009. Account numbers are based on total water usage for each projected year.
(5) Based on 7 percent water loss for all planning years.

Table 3.3 Water Demand Projections by Use Type (Continued)

Use	2025		2030		2035	
	No. of accounts(4)	Demand(2) (afy)	No. of accounts(4)	Demand(2) (afy)	No. of accounts(4)	Demand(2) (afy)
SFR	18,716	14,064	21,908	16,463	25,645	19,272
MFR	1,467	1,611	1,718	1,886	2,011	2,207
Comm./Inst.	1,469	2,830	1,720	3,312	2,013	3,877
Industrial	0	0	0	0	0	0
Landscape Irr.	55	628	64	735	75	861
Other	0	0	0	0	0	0
System Losses(2)		1,440		1,686		1,973
Total	**21,707**	**20,573**	**25,409**	**24,083**	**29,744**	**28,191**

As historical data is somewhat limited for the City's demands, the water usage by sector incorporates several assumptions:

- Demand by sector for metered accounts in 2009 was used as a basis for establishing per connection usage for metered multi-family residential and commercial accounts.
- Unmetered commercial and multi-family residential unmetered accounts were assumed to use 20 percent more water per connection than metered accounts.
- Water loss was estimated as 7 percent. This is average compared to the 5 to 10 percent water loss typically observed in most agencies.
- Single family residential unmetered accounts were assumed to use the balance of the supplied water in 2009 (after deducting the other uses – commercial, multi-family residential, landscape irrigation, and water loss)
- The percentage breakdown in 2009 based on the above usage was applied to demand projections in future years, thus assuming consistent growth in all sectors.

As shown in Table 3.3, the total number of accounts is anticipated to more than double, reaching over 29,000 by 2035.

3.4 EXPANSION PROJECTS

The California Water Code requires public water systems, as part of the water supply assessment process required by the California Environmental Quality Act (CEQA), to determine whether the water demand associated with a major development (or "project") is included in the agency's most recently adopted UWMP. Inclusion of any proposed development projects in the UWMP simplifies the water supply assessment process, because the UWMP can be referenced directly in the water supply assessment. Therefore, it benefits the City to incorporate any major developments in the UWMP that are considered "projects" by the California Water Code, as defined below.

CWC:

> *10910. (a) Any city or county that determines that a project, as defined in section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.*
>
> *10912. For the purpose of this part, the following terms have the following meanings:*
>
> *10912 (a) "Project" means any of the following:*
> *(1) A proposed residential development of more than 500 dwelling units.*
> *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
> *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
> *(4) A proposed hotel or motel, or both, having more than 500 rooms.*

(5) A proposed industrial, manufacturing or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
(6) A mixed-use project that includes one or more of the projects specified in this subdivision.
(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Based on the City's June 3, 2011 Residential Subdivision Development Activity report, two developments meet the criteria of major development projects, as defined by Section 10910 of the CWC, the Ventana and SMD developments.

3.5 LOW INCOME HOUSING

The UWMPA requires that the UWMP identify low income housing developments within the agency's service area and develop demand projections for those units.

10631.1(a). The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier

The City provides information on Regional Housing Needs Allocation Progress (RHNA) in the Housing Element of the 2009 General Plan (Madera, 2009). This element of the update contains plans to construct a total of 2,495 low income housing units in the future.

Assuming 2,495 dwelling units maintain the service area average of 3.4 people per dwelling unit, the future projected per capita water usage of 197 gpcd would result in a total of 1,872 afy of low income housing water consumption.

Table 3.4 Low Income Projected Water Demands
2010 Urban Water Management Plan
City of Madera

	Demand (afy)				
	2015	**2020**	**2025**	**2030**	**2035**
Low Income Housing	1,872	1,872	1,872	1,872	1,872

Notes:
(1) Based on planned low income housing development as described in the City's General Plan (Madera, 2009). The General Plan projects housing needs through 2014.

As shown in Table 3.4, water demands for planned low income housing units are 1,872 afy. The City's General Plan does not provide information on single family versus multi-family low income dwelling units, so the total average number of people per dwelling unit (3.4) for all of City is used. The data on 2,495 low income dwelling units are based on RHNA progress and do not account for any specific planned projects.

3.6 DEMAND PROJECTION WITH WATER CONSERVATION

The projected water demands with and without the water conservation are listed in Table 3.5 and are graphically depicted in Figure 3.. As explained above, while actual 2010 usage was 11,742 af, the year 2010 demand projections are simply based on a per-capita consumption of 247 gpcd.

Table 3.5 Demand Projections
2010 Urban Water Management Plan
City of Madera

Year	Population[1]	Water Demand without Conservation[2] (afy)	Water Demand with Conservation[3] (afy)
2010	58,243	16,111	16,111
2015	68,178	18,860	16,974
2020	79,807	22,077	17,576
2025	93,420	25,842	20,573
2030	109,355	30,250	24,083
2035	128,008	35,410	28,191

Notes:
(1) Population Projections from Table 2.2.
(2) Based on baseline per-capita demands from 1995 through 2004 as discussed in Chapter 6. Does not include 20x2020 conservation targets.
(3) Based on 20x2020 conservation targets.

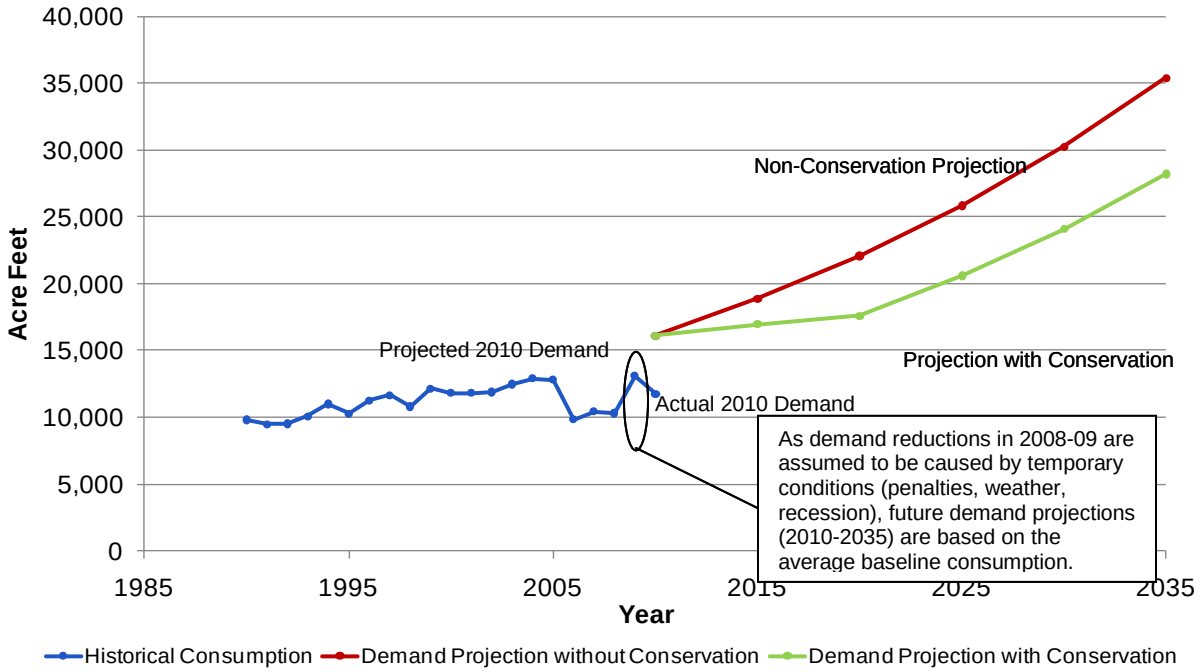

Figure 3.4 Projected Water Demands with and without Conservation

As shown in Figure 3., the water conservation requirements of the Water Conservation Act of 2009 reduce the projected water demand for year 2020 from 22,077 afy to 17,576 afy, an overall reduction of 4,501 af.

3.7 WATER CONSERVATION TARGET METHODS

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) address the requirements of the Water Conservation Act of 2009.

> *10608.20 (e) An urban retail water supplier shall include in its urban water management plan due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data*

Senate Bill x7-7, also known as the Water Conservation Act of 2009 (SBx7-7), is the new law governing water conservation in California that was enacted November 2009. This law requires that all water suppliers increase water use efficiency with the overall goal to decrease per-capita consumption within the state by 20 percent. The bill requires that the Department of Water Resources (DWR) develop certain criteria, methods, and standard reporting forms through a public process that can be used by water suppliers to establish their baseline water use and determine their water conservation goals. The DWR provided four different methods to establish water conservation targets. These four methods can be summarized as follows:

- **Method 1 – Baseline Reduction Method.** The 2020 water conservation target of this method is defined as a 20 percent reduction of average per-capita demand during a 10-year continuous baseline period that should end between 2004 and 2010.

- **Method 2 – Efficiency Standard Method.** The 2020 water conservation target of this method is based on calculating efficiency standards for indoor use separately from outdoor use for residential sectors and an overall reduction of 10 percent for commercial, industrial, and institutional (CII) sectors. The aggregated total of the efficiency standards in each area is then used to create a conservation target.

- **Method 3 – Hydrologic Region Method.** This method uses the ten regional urban water use targets for the state. Based on the water supplier's location within one of these regions, a static water use conservation target for both 2015 and 2020 is assigned.

- **Method 4 – BMP based Method.** This method uses previous Best Management Practices (BMP) of a supplier in order to establish a conservation target for 2020. Depending on how aggressively the water supplier has pursued water reduction and conservation in the past, a new conservation target for 2020 will be assigned.

The actual water conservation targets derived for the City of Madera (City) are described for each method in the following paragraphs. This section is concluded with a recommended method that has been used to adjust the projected water demands with the minimum water conservation requirement per SBx7-7. The demand projections with water conservation are used for the water reliability calculations under normal, dry, and multiple dry year conditions are presented in Chapter 5.

3.7.1 Method 1

Method 1 establishes a baseline water per-capita consumption based on historical population and historical demands. Any 10-year consecutive period between 1995 and 2010 can be selected to establish the baseline per-capita demand for the water supplier using the average per-capita consumption from that 10-year period. If an agency uses 10 percent or more recycled water in year 2008, the baseline value can also be determined with a 15-year consecutive period between 1990 and 2010. The City does not serve recycled water so the baseline is limited to 10 years in length.

Table 3.6 Base Period Ranges
2010 Urban Water Management Plan
City of Madera

Base	Parameter	Value	Units
Water Deliveries	2008 total water deliveries	10,295	af
	2008 total volume of delivered recycled water	0	af
	2008 recycled water as a percent of total deliveries	0%	%
10-year Base Period	Number of years in base period	10	years
	Year beginning base period range	1995	
	Year ending base period range	2004	
5-year Base Period	Number of years in base period	5	years
	Year beginning base period range	2003	
	Year ending base period range	2007	

Under Method 1, the baseline value is then reduced by twenty percent to determine the year 2020 conservation target. The intermediate target for year 2015 is the mid-point value between the baseline and year 2010 target values.

In addition to the 10-year baseline period, a 5-year period needs to be selected in any year ending no earlier than 2007 to determine the minimum required reduction in water use. The selected 10-year and 5-year base period ranges are summarized in Table 3.6.

Table 3.6 shows the characteristics of the 10 and 5 year period selected as the baselines for the City in meeting the Water Conservation Act of 2009.

The historical water consumption for the period 1995 through 2010 is shown in Figure 3.5, This figure also depicts the minimum, average, and maximum 10-year baseline values. As shown, the 10-year period with the highest baseline consumption starts in 1995 and ends in 2004.

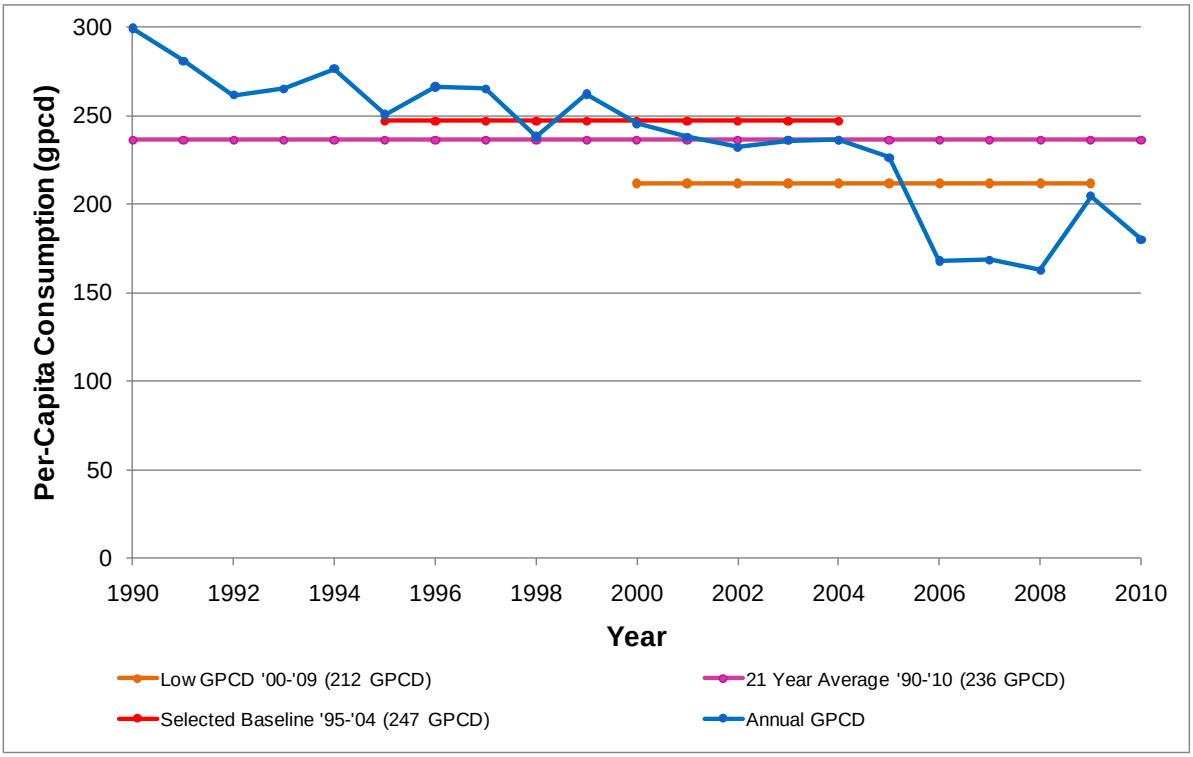

Figure 3.5 Historical Per-Capita Consumption

The population, total consumption, and the per-capita consumption of the 10-year baseline period is shown in Table 3.7. As shown, the average per-capita consumption during this period was 247 gpcd. Based on twenty percent reduction from this baseline period, the City's 2020 conservation target would be 198 gpcd, however the 5 year minimum conservation value, described below, lowers this value to 197.

Table 3.7 Base Daily Per Capita Water Use – 10-15 Year Range 2010 Urban Water Management Plan City of Madera				
Base Period Year		**Distribution System Population**	**Daily System Gross Water Use (mgd)**	**Annual Daily Per Capita Water Use (gpcd)**
Sequence Year	**Calendar Year**			
Year 1	1995	36,557	9.2	251
Year 2	1996	37,753	10.1	266
Year 3	1997	39,276	10.4	265
Year 4	1998	40,518	9.7	238
Year 5	1999	41,424	10.9	262
Year 6	2000	43,089	10.6	245
Year 7	2001	44,404	10.6	238
Year 8	2002	45,633	10.6	232
Year 9	2003	47,210	11.1	236
Year 10	2004	48,780	11.5	236
Average	**n/a**	**42,464**	**10**	**247**

Table 3.8 shows the population, total volume of consumption, and the per-capita consumption of the five year baseline period. The five year baseline value is used to determine the minimum required reduction by 2020.

Table 3.8 Base Daily Per Capita Water Use – 5 Year Range 2010 Urban Water Management Plan City of Madera				
Base Period Year		**Distribution System Population**	**Daily System Gross Water Use (mgd)**	**Annual Daily Per Capita Water Use (gpcd)**
Sequence Year	**Calendar Year**			
Year 1	2003	47,210	11.1	236
Year 2	2004	48,780	11.5	236
Year 3	2005	50,581	11.4	226
Year 4	2006	52,376	8.8	168
Year 5	2007	55,254	9.3	169
Average	**n/a**	**50,840**	**10.4**	**207**

As shown in Table 3.8, the average consumption in the period 2003-2007 was 207 gpcd. The minimum per-capita consumption for year 2020 is defined as 95 percent of this value, reflecting a minimum water conservation of five percent. This equates to a minimum water conservation target of 197 gpcd. As the water conservation target from the 10-year baseline

period (198 gpcd) is higher than the minimum water conservation target (197 gpcd), the City's water conservation targets using Method 1 are as follows:

- Year 2015 Target: 222 gpcd (10% reduction)
- Year 2020 Target: 197 gpcd (20% reduction)

3.7.2 Method 2

Method 2 uses performance standards for both indoor and outdoor usage to establish the supplier's 2020 water conservation target. Method 2 consists of a series of four steps and utilizes actual water use data and estimates from the water supplier. First, the method assumes a standard statewide indoor use target of 55 gpcd. Then, the landscaped area for the supplier's entire service area is determined. Commercial, institutional, and industrial water use is accounted for separately using historical billing data. The performance standards for outdoor landscape irrigation, based on acreage, and commercial, institution, and industrial use, based on demands, are then applied to those totals. Finally, the performance standards for all three sectors are added together to determine the Method 3 2020 conservation target.

There is insufficient data to calculate Method 2 for the City. Principally, the effort associated with digitizing or surveying the amount of irrigated landscape within the City's service area would represent a significant effort.

3.7.3 Method 3

The State's 20 by 2020 water conservation plan has identified specific urban water use targets for 2015 and 2020 for each of the ten hydrologic regions shown in Figure 3.6. The City falls in Hydrologic Region 6 (San Joaquin) which has a target use of 174 gpcd for year 2020.

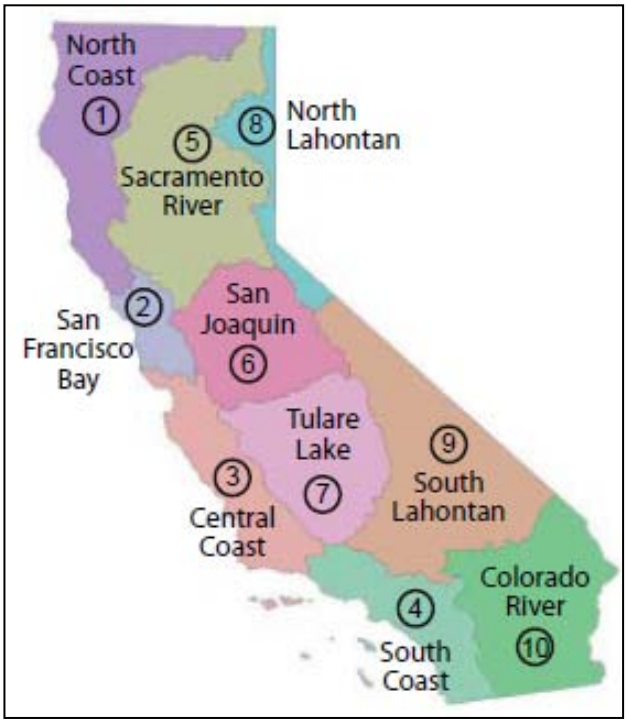

Figure 3.6 Hydrologic Regions

The City's water conservation targets using Method 3 are as follows:

- Year 2015 Target: 211 gpcd (27% reduction)
- Year 2020 Target: 174 gpcd (54% reduction)

3.7.4 Method 4

Method 4 uses the supplier's BMP reports as a guide to set the 2020 conservation target. The intent behind Method 4 is to use the BMP reports to account for what water conserving measures the supplier has already taken in order to set a more accurate and realistic target for the future and take into consideration the supplier's previous water conservation efforts. Sufficient information was not available to calculate the conservation target for this method for the City.

3.7.5 Recommended Method

The water conservation targets per method as developed with data provided by the City are summarized in Table 3.9. As shown, Method 1 results in the most feasible 2015 and 2020 conservation targets and will allow the City the greatest freedom in reaching these goals.

Table 3.9 Conservation Method Overview 2010 Urban Water Management Plan City of Madera				
	Conservation Target (gpcd)		Reduction by 2020 (%)	
Supply Source	Year 2015	Year 2020	From Baseline(1)	From 2010 Usage(2)
Method 1	222	197	20%	+9%
Method 2	n/a	n/a	n/a	n/a
Method 3	211	174	30%	3%
Method 4	n/a	n/a	n/a	n/a

Notes:
(1) Baseline consumption is 247 gpcd.
(2) 2009 consumption is 180 gpcd.

Based on an evaluation of each method as described above, Method 1 appears to provide the preferable conservation target for the 2010 UWMP. Chapter 6 discusses the various demand management measures (DMMs) that are available for the City to achieve this reduction in water use.

Chapter 4

WATER SUPPLY

The UWMPA requires that the UWMP include a description of the agency's existing and future water supply sources for the next 25 years. This section includes an overview of City's supplies along with projections of usage of each source of supply followed by a detailed discussion on each supply source. This detailed discussion includes information on imported water supplies, recycled water supplies, groundwater supply facilities, and the groundwater basin such as water rights, determination of whether the basin is in overdraft, adjudication decree, and other information from the groundwater management plan (as available).

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a) [to 20 years or as far as data is available]. If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:*
>
> *10631 (b) (1) A copy of any groundwater management plan adopted by the urban water supplier…*
>
> *10631 (b) (2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or board has adjudicated the rights to pump groundwater…For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted…*
>
> *10631 (b) (3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic records.*
>
> *10631 (b) (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonable available, including, but not limited to, historic use records.*

4.1 SUPPLY OVERVIEW

The City currently receives potable water supplies exclusively from groundwater through 19 active wells. These wells pump from the local groundwater supply (Madera Subbasin) directly into the distribution system to meet all of the City's demands. The City does not currently use surface or imported water to meet system demands. The City's projected water supplies are summarized in Table 4.1. These quantities are based on projected demands which include conservation targets, previously discussed in Chapter 3.

Table 4.1 Projected Water Supply 2010 Urban Water Management Plan City of Madera						
	Annual Supply (afy)					
Supply Source	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Groundwater	16,111	16,974	17,576	20,574	24,082	28,191
Total	**16,111**	**16,974**	**17,576**	**20,574**	**24,082**	**28,191**

Notes:
(1) Based on demand projections developed in Chapter 5. These demands incorporate water conservation targets associated with the Water Conservation Act of 2009.

The demands associated with the supply projection are discussed in Chapter 3. As shown in Table 4.1, groundwater is the City's sole source of water; this supply is increased, as needed, to meet total demands.

4.2 DISTRIBUTION SYSTEM AND STORAGE

The City's water distribution system consists of pipelines ranging from 2 to 14 inches in diameter forming a single pressure zone. The City's older pipelines are primarily asbestos-cement and steel, while more recently constructed pipelines are mainly polyvinyl chloride (PVC). The distribution system includes a single 1 million gallon elevated reservoir with a high water line of 122 feet above ground level (WMP, 1997).

4.3 IMPORTED WATER

10631 (k). Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that indentifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same 5 year increments, and during various water year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan information requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

The City does not currently utilize imported water as a source and does not plan to utilize imported water within the planning horizon of this report.

4.4 SURFACE WATER

Although the City does not utilize surface water supplies and does not plan to utilize surface water within the planning horizon of this report, it is receiving some groundwater recharge

benefits from the surface irrigation water brought in by the Madera Irrigation District (MID) through canal seepage. On an average, MID has about 30 percent of conveyance losses through its delivery system.

Alternative surface water supply and treatment should be investigated since it is readily available in most years from MID with a delivery system already in place for easy access.

4.5 GROUNDWATER

The City is located in the San Joaquin River hydrologic region and extracts its groundwater from the Madera Subbasin, one of nine subbasins in the San Joaquin Valley Groundwater Basin. Figure 4.1 shows the location of the City within the groundwater basin.

4.5.1 Basin Description

According to Madera County's Groundwater Management Plan, aquifers in the Madera Subbasin consists of alluvial sediments composed of "unconsolidated gravels, sands, silts, and clays." The subbasin is bounded by the San Joaquin River on the south and west, and by the Chowchilla River to the north. The east is bounded by the foothills of the Sierra Nevada mountains. DWR Bulletin 118 includes a detailed description of the Madera Subbasin and its characteristics and conditions. DWR Bulleting 118 and the Madera County Groundwater Management Plan are included in Appendix D.

4.5.2 Groundwater Quality

Groundwater within the Madera Subbasin has generally been of fairly high quality. While total dissolved solids (TDS) ranges from 100 to 6,400 milligrams per liter (mg/L) within the subbasin, average TDS is 215 mg/L (DWR, 2004).

According to the GWMP, groundwater is mainly of a bicarbonate type throughout most of the subbasin, transitioning from calcium- and calcium-magnesium-bicarbonate water in the east of the subbasin to sodium-bicarbonate water in the west of the subbasin. Sodium increases near the western edge of the subbasin along with increasing chloride, to produce poor quality sodium-chloride type water. Average TDS concentration increases in the western portion of the subbasin to 1,150 mg/L.

The GWMP lists nitrate, DBCP, iron and manganese as constituents of particular concern with the Madera Subbasin. The City currently treats groundwater at one well, Well 27, for DBCP and EDB, using granular activated carbon (GAC).

4.5.3 Groundwater Levels and Historical Trends

The Madera Subbasin, like the San Joaquin Valley Groundwater Basin in general, has been in a state of overdraft for several decades. The City, as well as DWR and Madera Irrigation District (MID), actively monitors groundwater levels. DWR Bulletin 118 estimates the decline in groundwater levels as averaging 40 feet between 1970 and 2000.

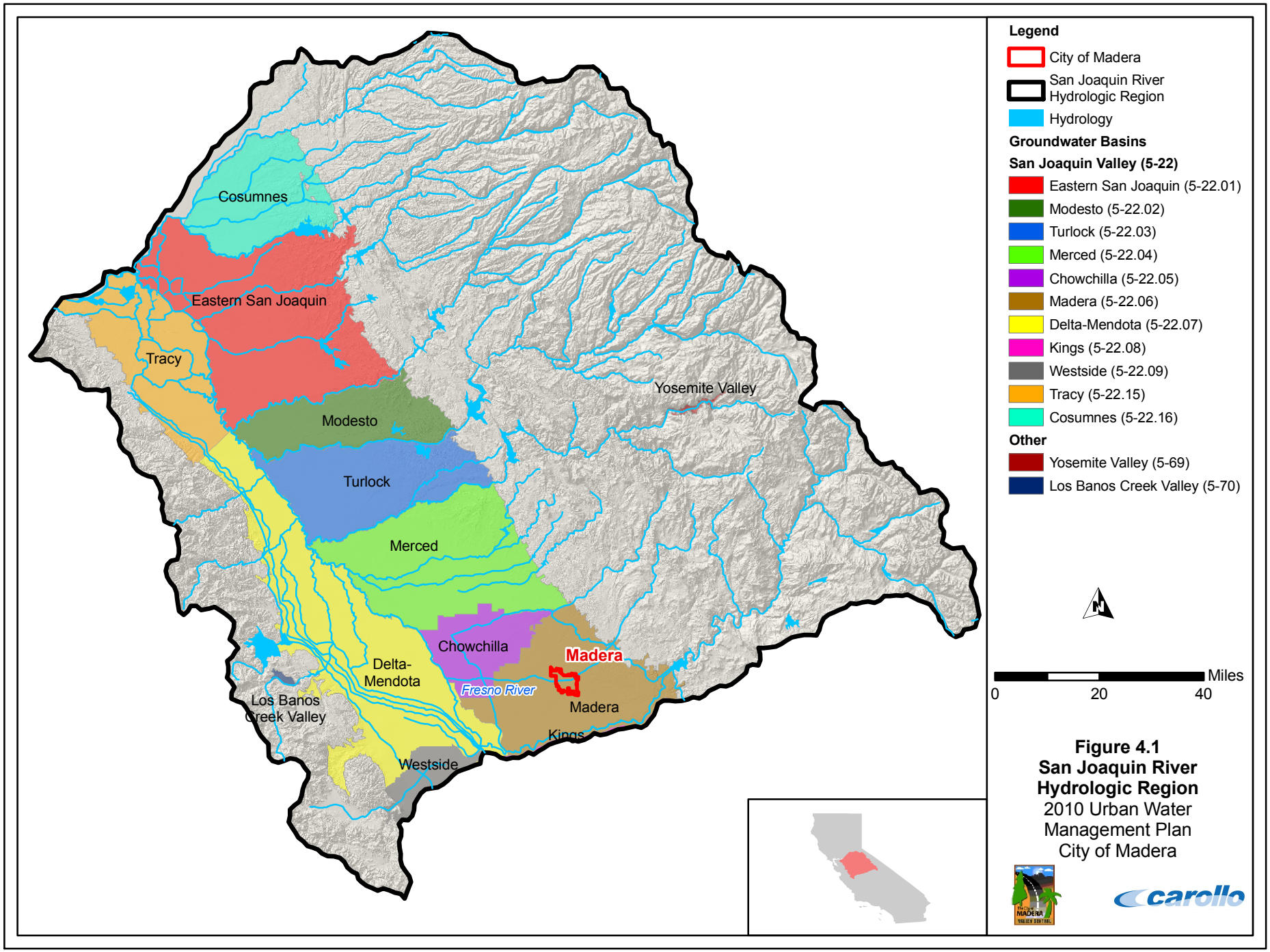

Figure 4.1
San Joaquin River Hydrologic Region
2010 Urban Water Management Plan
City of Madera

Analysis from the 1997 WMP concluded that groundwater levels were continuing to drop in recent years, declining approximately 0.7 feet per year before 1945, approximately 2.5 feet per year between 1946 and 1962, about 0.5 feet per year between 1962 and 1987, and about 4.2 feet per year from 1987 to 1995, averaging about 1.8 feet per year since 1946. The WMP estimated the corresponding quantity of overdraft as approximately 7,600 acre feet per year over the previous 50 years within the City and MID.

The 1997 WMP concluded that any recharge efforts would need to be coordinated with neighboring agencies as "even if this amount of water is recharged the groundwater levels beneath the study area would continue to decline unless groundwater overdraft in adjacent areas outside MID is also addressed" (MW, 1997).

The City worked with MID in development of the MID GWMP (TE, 2002), adopted in 1999, of which a goal is the "sustainable groundwater supply for the future." The GWMP identified several strategies to reduce overdraft of the basin, including:

- Maximizing Groundwater Recharge
- Limiting Export from the Madera Subbasin
- Limit Agricultural Land Conversion
- Develop Water Supply Standards (for Water Supply Assessments for urban development)
- Continued Study of Groundwater Quality (to limit spread of contamination through the subbasin)

In addition, the City's 1997 WMP evaluated the groundwater supply and made recommendations to assist in limiting overdraft, including:

- Percolation of water through ponds or the Fresno River
- Surface water supplies instead of pumping groundwater
- Conservation by installing residential water meters or implementing a tiered rate structure

The City will need to continue working with its neighboring agencies in the Madera Subbasin to reduce overdraft and thus sustainably manage the groundwater basin.

4.5.4 Sources of Recharge and Discharge

The 2002 GWMP listed the following components as sources of recharge and discharge to the subbasin (TE, 2002):

- Stream flow percolation from the San Joaquin River, Chowchilla River, Fresno River, and other creeks and sloughs

- Infiltration and precipitation that falls on the valley floor

- Subsurface inflow

- Seepage from unlined canals

- Return flows from agriculture

The GWMP estimated that percolation of streamflow contributed 184,000 afy to the subbasin in 1979 (based on DWR's analysis), precipitation contributes on average 44,851 afy based on a 10 percent infiltration rate, and subsurface inflow contributed about 69,000 af in 1979 (based on DWR's analysis). It is important to consider that this represents the total recharge to the Madera Subbasin, which is not only used by the City, but by agriculture in the region as well.

The City supplements the natural recharge to the Madera Subbasin by purchasing approximately 300 afy from MID to use as groundwater recharge.

It should be noted that flood waters from the rivers and creeks are also viable sources of recharge for the groundwater basin if they can be fully utilized through detention. Future planning and development of larger and/or higher number of detention/infiltration basins servings as dual-purpose facilities for flood control and groundwater recharge will be beneficial to the City's groundwater recharge program. In 2010, the City purchased 300 AF of water from MID for groundwater recharge.

4.5.5 Groundwater Pumping

The annual amount of groundwater pumped between 2006 and 2010 is presented in Table 4.2.

Table 4.2 Amount of Groundwater Pumped
2010 Urban Water Management Plan
City of Madera

	Historical Groundwater Pumped from Basin (afy)				
Basin Name	**2006**	**2007**	**2008**	**2009**	**2010**
Madera Subbasin	9,849	10,431	10,295	13,114	11,742
% of Total Water Supply	**100%**	**100%**	**100%**	**100%**	**100%**

As shown in Table 4.2, the City uses groundwater to meet all of its water demand. This value increased by 3,265 af between 2006 and 2009, dropping slightly in 2010.

Table 4.3 restates the groundwater supply projections presented in Table 4.1.

Table 4.3 Amount of Groundwater to be Pumped 2010 Urban Water Management Plan City of Madera						
	Annual Groundwater Pumped from Basin (afy)					
Basin Name	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Madera Subbasin	16,111	16,974	17,576	20,574	24,082	28,191
Total	**16,111**	**16,974**	**17,576**	**20,574**	**24,082**	**28,191**

Notes:
(1) Based on demand projections developed in Chapter 3. These demands incorporate water conservation targets associated with the Water Conservation Act of 2009.

The Madera Subbasin is the only source of groundwater in the region. As was shown in Table 4.1 and further discussed in Chapter 3, overall demand is met with groundwater.

4.5.6 Basin Overdraft

The San Joaquin Valley Groundwater Basin, and thus the Madera Subbasin, is not adjudicated and there are currently no limitations placed on groundwater pumping. As discussed previously, San Joaquin Valley Groundwater Basin and the Madera Subbasin have been in a state of overdraft for many years.

The WMP estimated the average annual overdraft within the City and MID as approximately 7,600 afy between 1946 and 1997. As discussed above, the City will need to continue working with its neighboring agencies in the Madera Subbasin to reduce overdraft and thus sustainably manage the groundwater basin.

4.6 DESALINATED WATER

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long term supply.*

The UWMPA requires that the UWMP address the opportunities for development of desalinated water, including ocean water, brackish water and groundwater. Table 4.4 summarizes City's current projects and future opportunities for desalinated water.

Table 4.4 Opportunities for Desalinated Water 2010 Urban Water Management Plan City of Madera		
Sources of Water	**Existing Desalinated Water**	**Opportunities for Desalinated Water**
Ocean Water	None	None
Brackish Ocean Water	None	None
Brackish Groundwater	None	None
Other	None	None

As summarized in Table 4.4, there is no opportunity for desalination of any kind by City.

4.6.1 Brackish Water and/or Groundwater Desalination

The groundwater basins located under or near the City are not brackish and do not require desalination. Therefore, there is no water of this nature available to City for direct use.

4.6.2 Seawater Desalination

Because City is not located in a coastal area, it is neither practical nor economically feasible for City to implement a seawater desalination program.

4.7 RECYCLED WATER

The City does not use recycled water for direct use. Treated effluent from the WWTP is disposed through percolation ponds and helps recharge the groundwater supply. This section describes the City's wastewater system and potential opportunities for recycled water.

UWMPA:

> *10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. To the extent practicable, the preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies and shall include all of the following:*
>
> *10633 (a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.*
>
> *10633 (b) A description of the recycled water currently being used in the supplier's service area, including but not limited to, the type, place and quantity of use.*
>
> *10633 (c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse determination with regard to the technical and economic feasibility*

of serving those uses, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

10633 (d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years.

10633 (e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

10633 (f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems and to promote recirculating uses.

4.7.1 Collection and Treatment Systems

According to the 1997 Sewer Master Plan, the City's wastewater collection system includes approximately 130 miles of sewer pipelines, ranging from 6-inches in diameter to 48-inches in diameter. The system also includes four lift stations.

Wastewater is treated at the City's Wastewater Treatment Plant (WWTP), located southwest of the City. The WWTP handles wastewater and sewage from residential, commercial and industrial accounts. The WWTP was constructed in 1972, provides primary and secondary treatment. A plant expansion and upgrade was completed in 2007 with technology to provide a treatment capacity of 10.1 mgd. The treatment process consists of screening, grit removal, sedimentation, activated sludge, and final clarification. Also included in the plant expansion were an odor control and a water reclamation system to provide water for plant purposes.

Table 4.5 presents the current and projected wastewater collected from the City along with the current and projected annual recycled water supplies.

Table 4.5 Wastewater Collection and Treatment
2010 Urban Water Management Plan
City of Madera

	Projected Annual Flow (afy)					
Type of Wastewater	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
Wastewater Collected and Treated in Service Area(1)	8,056	8,487	8,788	10,287	12,041	14,095
Volume that Meets Recycled Water Standard(2)	-	-	-	-	-	-

Notes:
(1) Wastewater collection and treatment data generated by assuming a 50 percent return to sewer ratio for water use within the City.
(2) The City is in the process of investigating recycled water use, but currently does not provide tertiary treatment to its wastewater.

The projections of wastewater flow shown in Table 4.5 are derived by assuming a return to sewer ratio of 50 percent. Much like projected demand, wastewater collection and treatment is projected to decrease in volume as the City decreases consumption to meet water conservation targets. Upon lowering per capita consumption to meet targets, wastewater volume will again begin to increase with population growth.

According to the 2005 UWMP, treated effluent is disposed of in fourteen 20-acre percolation/evaporation ponds and through agricultural irrigation of 40 acres of adjacent land (Boyle, 2006). Table 4.6 lists current and projected disposal flows for each of the discharge bodies discussed above.

Table 4.6 Disposal of Non-Recycled Wastewater
2010 Urban Water Management Plan
City of Madera

Method of Disposal	Treatment Level	Annual Discharge Flow (afy)					
		2010	2015	2020	2025	2030	2035
Percolation Ponds	Tertiary	8,056	8,487	8,788	10,287	12,041	14,095
Total		**8,056**	**8,487**	**8,788**	**10,287**	**12,041**	**14,095**

As shown in Table 4.6, all the City's wastewater is assumed to be disposed of through percolation ponds.

According to the 2005 UWMP, the 2007 planned expansion of the WWTP proposed several wells which would extract groundwater near the WWTP to be used for agricultural irrigation by Madera Irrigation District. According to the 2005 UWMP, the extracted groundwater would not be recycled water (Boyle, 2006).

4.7.2 Current Recycled Water Uses

While the City does not use recycled water directly, treated effluent from the WWTP is disposed of through percolation ponds which in turn help recharge the Madera Subbasin.

Also, as previously stated, the 2007 update included plans to provide groundwater to MID for agricultural uses. Although this water is not considered recycled, it is an effective method of water reuse by the City. In order to meet the water quality standards set by MID, the groundwater pumped from underneath the percolation ponds will need to be blended with MID's surface canal water. The water quality of the pumped groundwater and the mixed canal water will be monitored on a regular basis to assure that the water quality parameters do not exceed the limits agreed upon.

Table 4.7 summarizes projected versus actual recycled water use for 2010.

Table 4.7	2005 UWMP Projected 2010 Recycled Water Use Compared to 2010 2010 Urban Water Management Plan City of Madera		
User Type	**Treatment Level**	**Projected 2010 Recycled Water Demand[(1)] (afy)**	**Actual Recycled Water Demand FY2009/10 (afy)**
Land Use	Primary and Secondary	0	0
Total		**0**	**0**
Notes: (1) Projected 2010 RW from the 2005 UWMP.			

As shown in Table 4.7, the City did not supply recycled water in 2010, consistent with the projection of the 2005 UWMP.

4.7.3 Potential Uses and Projected Demand

The City does not currently use recycled water within its service area. This is reflected in Table 4.8. The City is currently studying the feasibility of recycled water as part of their Master Plan update.

Table 4.8	Recycled Water Uses – Actual and Potential 2010 Urban Water Management Plan City of Madera						
		Projected Recycled Water Demand (afy)					
User Type	**Treatment Level**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
All	Primary/Secondary	0	0	0	0	0	0
Total		**0**	**0**	**0**	**0**	**0**	**0**

As shown in Table 4.8, there is no projected demand for recycled water within the City.

4.7.4 Incentives and Planning

While the City currently has no plans to use recycled water within its service area, the City identified some potential uses of recycled water, including large landscape irrigation, dual plumbing, and groundwater recharge projects. The City plans to investigate the feasibility of water recycled water system and the potential markets when funding becomes available for such a study. According to the 2005 UWMP, the City will also provide assistance to industrial or commercial customers in developing recycling water on-site.

Chapter 5

WATER SUPPLY RELIABILITY

5.1 INTRODUCTION

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) address the reliability of the agency's water supplies. This includes supplies that are vulnerable to seasonal or climatic variations. The UWMPA also requires that the UWMP include information on the quality of water supplies and how this affects management strategies and supply reliability. In addition, an analysis must be included to address supply availability in a single dry year and in multiple dry years. The relevant sections of the UWMPA are presented below.

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable.*
>
> *10631 (c) For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.*
>
> *10631 (c) Provide data for each of the following: (1) An average water year, (2) A single dry water year, (3) Multiple dry water years.*
>
> *10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:*
>
> *10632 (b) An estimate of the minimum water supply available during each of the next three-water years based on the driest three-year historic sequence for the agency's water supply.*
>
> *10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631 and the manner in which water quality affects management strategies and supply reliability.*

This chapter addresses these UWMPA requirements as follows. First, the reliability of the City of Madera's (City) water supply sources is described. Secondly, planned and potential future supply projects and programs that would impact overall supply availability and reliability are discussed. Subsequently, factors impacting inconsistencies of supply are described. And this chapter is concluded with a comparison of supply and demand under normal, single dry year, and multiple dry years.

5.2 WATER SUPPLY RELIABILITY

The City faces the same ongoing water supply challenges as other water purveyors in the San Joaquin Valley. Increased groundwater pumping and water quality concerns resulted in a greater focus on pumping, overdraft, and reuse.

5.3 FACTORS IMPACTING SUPPLY RELIABILTY

There are a variety of factors that can impact water supply reliability. These factors impacting the City's supply sources are indicated with an "X" in Table 5.1. A brief discussion on each of these factors is provided below.

Table 5.1 Factors Resulting in Inconsistency of Supply
2010 Urban Water Management Plan
City of Madera

Water Supply Sources	Specific Source Name	Legal	Environmental	Water Quality	Climatic	Additional Information
Groundwater	Madera Subbasin	-	-	X	-	-

5.3.1 Water Quality

As discussed in Chapter 4, increasing concentrations of total dissolved solids (TDS) over time may indicate TDS sources from human activities such as wastewater percolation, agricultural drainage, or the migration of poorer quality water toward pumping depressions to the northeast. Given that the City has the ability to influence some of the activities that cause water quality issues, as well as alter the pumping regimes which then direct groundwater flow in the region, groundwater management practices should be adjusted to ensure a consistent groundwater supply.

5.4 WATER SUPPLY RELIABILITY

> *10635 (a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from the state, regional, or local agency population projections within the service area of the urban water supplier.*

There are two aspects of supply reliability that can be considered. The first relates to immediate service needs and is primarily a function of the availability and adequacy of the supply facilities. The second aspect is climate related, and involves the availability of water during mild or severe drought periods. This section compares water supplies and demands during three water scenarios: normal water year, single dry water year, and multiple dry water years. These scenarios are defined as follows.

- **Normal Year**
  The normal year is a year in the historical sequence that most closely represents median runoff levels and patterns. The supply quantities for this condition are derived from historical average yields.
- **Single Dry Year**
  This is defined as the year with the minimum useable supply. The supply quantities for this condition are derived from the minimum historical annual yield.
- **Multiple Dry Years**
  This is defined as the three consecutive years with the minimum useable supply. Water systems are more vulnerable to these droughts of long duration, because they deplete water storage reserves in local and state reservoirs and in groundwater basins. The supply quantities for this condition are derived from the minimum historical three consecutive years' annual average yields.

Drought years for the hydrologic region can be determined by referencing DWR's Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices 1901 to 2010 (WSIHIST) for the San Joaquin Valley from 1901 through 2010 (CDWR, 2010). The years where the San Joaquin Valley received the least runoff were determined from this data and are presented in Table 5.2. These years represent drought year conditions within the watershed.

Table 5.2 Basis of Water Year Data 2010 Urban Water Management Plan City of Madera	
Water Year Type	**Base Year(s)**
Average Water Year	1921
Single Dry Water Year	1977
Multiple Dry Water Years	1929 - 1931
Notes: Source: DWR Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices (WSIHIST) 1901 to 2010.	

As shown in Table 5.2, the year closest to the average runoff over the period evaluated was 1921. The lowest runoff year was 1977 and the lowest multiple-year period (of three years or greater) was the three year period between 1929 and 1931.

While using data from the San Joaquin Valley watershed can be used to demonstrate when previous drought events have occurred, analyzing the City's water usage from historical single and multiple dry years is not applicable to the City for two reasons. Foremost, there is no shift between supply sources depending on the year, as the City draws all of its supply from local groundwater no matter the climatic condition. Secondly, population within the City has increased so dramatically over the last few decades that looking at non-normalized demand values provides little insight into how demand will shift in drought conditions.

While looking at yearly supply makeup might not be applicable to the City, there is still a need to accurately simulate the affects of drought conditions on demand. During drought years, water use patterns will typically change. Outdoor water use will typically increase as irrigation is used as a replacement for decreased rainfall. To determine the impact of drought years on the City's annual demands, the City's historical per capita water usage was evaluated. By normalizing water consumption with population and thus determining per-capita demand, the increase in demands due to growth is eliminated. The historical per capita consumption in the period 1990 through 2010 is shown in Figure 5.1

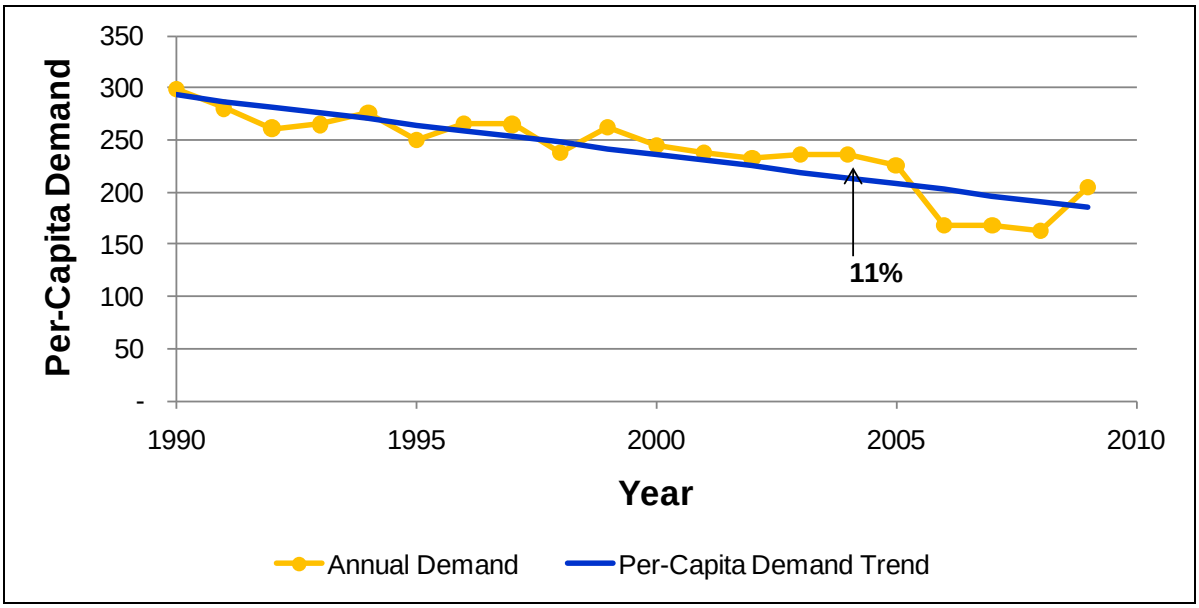

Figure 5.1 Historical Per-Capita Consumption Variation

As shown in Figure 5.1, the per-capita demand has trended downward, likely due to the City's conservation efforts. To account for this downward trend, a linear fit was used as the average to which the annual consumption was compared. For each year, the annual consumption was compared to the linear regression to obtain a percentage above average water use. As shown, the per capita consumption in 2004 was about 11 percent above the linear trend. While 2004 does not represent a significant drought year, it is indicative of the potential variation in water demands on an annual basis. For conservative planning purposes, the demands will be increased by this percentage for the single-dry hydrologic year.

5.5 SUPPLY AND DEMAND COMPARISON

5.5.1 Average Year

Normal year demand projections are presented in Chapter 3. Projections were generated by applying demands that incorporate conservation targets to projected population. In, Table 5.3, this normal year demand is compared to projected supplies.

Table 5.3 Normal Year Supply and Demand Comparison
2010 Urban Water Management Plan
City of Madera

	Projected Flow (afy)				
Supply Source	**2015**	**2020**	**2025**	**2030**	**2035**
Groundwater[(1)]	16,111	16,974	17,576	20,574	24,082
Total Supply	**16,111**	**16,974**	**17,576**	**20,574**	**24,082**
Total Demand	**16,111**	**16,974**	**17,576**	**20,574**	**24,082**
Difference	**0**	**0**	**0**	**0**	**0**
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

Notes:
(1) Since the City does not have multiple supply sources, it is necessary for the City to pump groundwater to meet all projected demands.

As shown in Table 5.3, current water supplies are anticipated to be sufficient to meet demands in normal year conditions through year 2035.

5.5.2 Dry Year

Dry year effects are simulated through a methodology which assumes that dry year demand will increase by approximately 11 percent above normal year demands. Projected supplies were compared to the increased demands for dry years and are presented in Table 5.4.

Table 5.4 Single Dry Year and Multiple Dry Year Supply and Demand Comparison
2010 Urban Water Management Plan
City of Madera

	Projected Flow (afy)				
Supply Source	**2015**	**2020**	**2025**	**2030**	**2035**
Groundwater(1)	18,765	19,430	22,744	26,624	31,165
Total Supply	**18,765**	**19,430**	**22,744**	**26,624**	**31,165**
Total Demand	**18,765**	**19,430**	**22,744**	**26,624**	**31,165**
Difference	**0**	**0**	**0**	**0**	**0**
Difference as % of Supply	0%	0%	0%	0%	0%
Difference as % of Demand	0%	0%	0%	0%	0%

Notes:
(1) Since the City does not have multiple supply sources, it is necessary for the City to pump groundwater to meet all projected demands.
(2) This table is reflective of both single-dry year and multiple dry year scenarios, since the City's supply source is not anticipated to be reduced differently in the two scenarios, and demands are anticipated to increase by the same amount in each scenario.

As shown in Table 5.4, anticipated supplies groundwater are sufficient to meet all demands through year 2035 even under drought conditions.

It is important to consider that the Madera Subbasin has historically been in a state of critical overdraft. The data in Table 5.3 and Table 5.4 assume that the supply is equal to demand only because there is currently a sufficient volume of water within the subbasin to meet the projected demand. In order to continue to utilize groundwater, it is essential that the City continue its current efforts towards conservation, groundwater recharge, and groundwater management. Reducing per capita water use, groundwater recharge with Madera Irrigation District, water metering, and recycled water are all important components of ensuring future usage of the Madera Subbasin. Groundwater banking for drought years is also recommended, so that years with low surface runoff do not further harm the subbasin. The City will need to continually develop additional water management strategies to meet projected demand on a long term basis.

5.6 TRANSFER AND EXCHANGE OPPORTUNITIES

Beginning in 2010 and 2011, the City began purchasing 300 afy from the Madera Irrigation District (from the District's Pre 1914 water sources) for use in recharging the Madera Subbasin.

5.7 OPPORTUNITIES FOR DESALINATED WATER

> *10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:*
>
> *10631 (i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long term supply.*

The UWMPA requires that the UWMP address the opportunities for development of desalinated water, including ocean water, brackish water and groundwater. Due to the City's inland location, there are no opportunities for seawater desalination.

While the City makes extensive use of their groundwater supply, the groundwater quality issues can not be addressed through the use of groundwater desalination, therefore there are no opportunities for groundwater desalination either.

5.8 CLIMATE CHANGE IMPACTS ON SUPPLY RELIABILITY

Climate change may add many new uncertainties to the challenges of planning, and irrespective of the debate associated with the sources and cause of increasing concentrations of greenhouse gasses, changes in weather could significantly affect water supply planning. Since climatic pressures could potentially affect supply reliability, continual attention to this issue will be necessary in the future.

5.9 WATER SHORTAGE CONTINGENCY PLAN

The Urban Water Management Planning Act (UWMPA) requires that the Urban Water Management Plan (UWMP) include an urban water shortage contingency analysis that includes stages of action to be undertaken in the event of water supply shortages; a draft water shortage contingency resolution or ordinance; prohibitions, consumption reduction methods and penalties; an analysis of revenue and expenditure impacts and measures to overcome these impacts; actions to be taken during a catastrophic interruption; and a mechanism for measuring water use reduction.

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses specified issues.

10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:

10632 (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply and an outline of specific water supply conditions which are applicable to each stage.

5.9.1 Water Shortage Stages and Reduction Objectives

As part of the preparation of the City's 1995 UWMP, the City Council adopted Resolution Number 95-52, Adoption of a Water Shortage Contingency Plan. The plan identifies four shortage stages and accompanying water supply conditions.

Stage 1 - defined as currently existing conditions, where there is a continuous decrease of the water table due to weather conditions and overdraft pumping. The following prohibitions are in effect during Stage 1:

- Outside irrigation limited to 3 days per week based on street address.

- No hosing of paved surfaces.

- No irrigation between 11 a.m. and 7 p.m.

- No water is allowed to run into street or gutter.

- Water leaks must be repaired within 5 days of citation.

- Evaporative coolers must be equipped with water recirculation devices.

- No washing down of buildings other than for painting or other maintenance.

- No continuous flow for recreational purposes.

- Require recirculation of water in new commercial car washes.

Stage 2 - defined as potential moderate shortage, where weather forecasts predict a long period of drought conditions accompanied by deteriorating groundwater conditions. The target reduction in water consumption for this stage is five to ten percent. The following prohibitions are in affect during Stage 2:

- Stage 1 prohibitions

- Voluntary reduction of water consumption by stricter adherence to Water Use Regulations.

Stage 3 - defined as serious shortage, where, in addition to continuing drought conditions, standing groundwater level has decreased to the point where City wells are in jeopardy of breaking suction. The target reduction in water consumption for this stage is 10 to 35 percent. The following prohibitions are in affect during Stage 3:

- Stage 2 prohibitions

- Stricter adherence to Water Use Regulations and outside watering is limited to two days a week.

- Water served to restaurant customers only upon request to promote conservation and public awareness of drought conditions.

- Existing commercial carwashes required to install water recirculation equipment.

Stage 4 - defined as critical emergency shortage, where customer demands and system pressure requirements cannot be met. The target reduction in water consumption for this stage is 35 to 50 percent. The following prohibitions are in affect during Stage 4:

- Stage 3 prohibitions, and

- Installing low-flow showerheads and toilet tank displacement devices.

- Outside watering limited to one day per week.

5.9.2 Triggers for Water Shortage Stages

As listed in Section 5.9.1, the water shortage contingency plan includes supply conditions that would initiate each water shortage stage.

Water shortage stages are declared by the City Administrator as advised by the Water Shortage Response Team, chaired by the Water Division Supervisor.

In addition, it is recommended that the declaration of a water shortage stage be based on the following factors:

- Reduced average static ground water levels
- Local factors such as degradation of water
- Regional factors such as increased groundwater extraction by other users
- Failure of equipment within the City's water system

Table 5.5 lists the initiating conditions for each stage, along with suggested triggering groundwater levels based on historic groundwater data.

The suggested groundwater level triggers for each shortage stage were calculated based on the overall reduction in the area of well screens as a result of reduced groundwater levels. It was assumed that as groundwater levels fall, the reduction in available well screen area corresponds to a reduction in supply from the City's groundwater wells. The suggested groundwater level triggers were based on the level at which the reduction in supply equates to the minimum demand reduction for that shortage stage. A drawdown of 50 feet was assumed based on the historical difference between static and pumping levels.

Table 5.5 Triggers for Water Shortage Stages 2010 Urban Water Management Plan City of Madera		
Stage	**Initiating Conditions**	**Suggested Associated Groundwater Level[1,2]**
1	Continued decrease of water table due to weather conditions and overdraft pumping	-
2	Weather forecasts predict a continuing trend of drier than normal conditions with a further deterioration of groundwater levels	245’
3	Ground water levels have decreased to the point that City wells are in jeopardy of breaking suction[3]	260’
4	Customer demands and system pressure criteria requirements cannot be met	330’

Notes:
(1) Associated Groundwater Level is calculated as the capacity weighted average groundwater level for all the City’s wells.
(2) The suggested groundwater level is based on the assumption that the overall reduction of well screening area will result in a corresponding reduction in supply from groundwater wells. The suggested groundwater level is the level at which the percentage reduction of capacity weighted average screen range available equals the minimum demand reduction for the water shortage stage. The current lowest capacity weighted average static groundwater level observed in data available between approximately 1980 and 2010 for the City’s wells is 215 feet. Note that bowl setting was not considered in this recommendation as it was assumed these could be adjusted.
(3) Four of the City’s wells have bowl settings above 300 feet, including Well 21 at 230 feet and Well 27 at 240 feet. However, it was assumed that the City will adjust the bowl settings for these wells as groundwater levels fall.

5.9.3 Administration of Water Shortage Program

Through the use of the following channels and media, the City staff will realize timely and appropriate communications with City Directors, customers, residential homeowners associations, business chambers, inter-governmental bodies, essential facilities (schools, hospitals, fire), and other stakeholders.

- Public information campaign with regular media stories, public service announcements, paid announcements, and direct mail
- Part time employees to assist in coordinating the conservation program
- Distributing landscape conservation, gardening, and efficient irrigation information
- Highlight visibility of City conservation programs such as the ULF toilet program
- Implement the City of Madera Water Quality Emergency Notification Plan, including boil water notifications and chlorination of water distribution system due to low pressure

5.10 WATER SHORTAGE CONTINGENCY ORDINANCE/ RESOLUTION

According to the UWMPA, the UWMP is required to include an urban water shortage contingency analysis that includes a draft water shortage contingency resolution or ordinance.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (h) A draft water shortage contingency resolution or ordinance.*

The City adopted its Water Shortage Response Plan on April 5, 1995. Copies of the relevant ordinances are included in Appendix F. Table 5.6 provides a summary of other ordinances and resolutions related to water conservation.

Table 5.6 City of Madera Ordinances and Resolutions for Water Shortage Measures
2010 Urban Water Management Plan
City of Madera

Ordinance or Resolution Number	Date	Legislation
Resolution 95-52	April 5, 1995	Adopts the City's Water Conservation Plan

Notes:
(1) A copy of the resolution can be found in Appendix F.

5.11 PROHIBITIONS, CONSUMPTION REDUCTION METHODS, AND PENALTIES

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses methods to reduce consumption.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.*
>
> *10632 (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.*
>
> *10632 (f) Penalties or charges for excessive use, where applicable*.

5.11.1 Prohibitions and Excessive Use Penalties

The Water Shortage Contingency Plan identifies penalties in addition to basic use violations, to be associated with each stage of action.

Stage 1 Violations

Violation 1 - written warning issued

Violation 2 - $50 surcharge on next water bill

Violation 3 - $100 surcharge on next water bill

Violation 4 - $150 surcharge on next water bill

Stage 2 Violations

Penalties will be the same as Stage 1, but a follow up letter will be sent after the second violation and an education visit and warning will be issued after the third violation. Further violation concerns will be met with staff contact to resolve violations, with water service shutoff as a potential consequence. A reconnection fee will be issued in the event of a shutoff.

Stage 3 Violations

Penalties will be the same as stage 2, but violation 2 will be accompanied by an additional surcharge and educational visit from City Staff. Violation 3 will be accompanied by a second additional surcharge, possible installation of a water meter, a flow restriction devise on connection or discontinuation of service of situation I not resolved.

Stage 4 Violations

Penalties will be the same as stage 3, and City Council will consider increasing surcharges for violation of Water Use Regulations.

5.12 REVENUE AND EXPENDITURE IMPACTS/MEASURES TO OVERCOME IMPACTS

According to the UWMPA, the UWMP is required to include an urban water shortage contingency analysis that addresses the financial impacts from reduced water sales.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.*

10632 (g) An analysis of the impacts of each of the proposed measures to overcome those revenue and expenditure impacts, such as the development of reserves and rate adjustments.

It is anticipated that water shortages would result in a reduction in revenue. However, the City's single-family residential accounts are billed as unmetered connections. Since the unmetered connections are charged a flat rate, revenue impacts would not result from reduced supplies for unmetered accounts.

The City will need to determine the extent of any revenue and expenditure imbalance as well as proposed measures to overcome impacts to City revenues and expenditure imbalances at the time the water shortage has started.

The revenue impacts of a water shortage for metered accounts are expected to parallel the consumption reductions of 5 to 10 percent in Stage 2, 10 to 35 percent in Stage 3, and 35 to 50 percent in Stage 4.

Stage 2 expenditure impacts include hiring an additional Water Patrol officer, distribution of water conservation kits, and media and public education campaigns. Stage 3 involves further public education, and Stage 4 is accompanied by further noticing, enforcement, education, and hiring of another part time seasonal compliance officer.

Finally, the City is in the process of installing water meters on all customer connections. This project is scheduled to be complete by July 1, 2012. The ability to implement a use based rate structure will allow the City to implement more effective drought pricing. When the installation of water meters is complete, the Water Patrol will be transitioned to meter reading and monitoring. Further details on the City's rate structure are available in Section 6.4.

5.13 ACTIONS DURING A CATASTROPHIC INTERRUPTION

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses a catastrophic interruption of water supplies.

10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:

10632 (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

During declared shortages, or when a shortage declaration appears imminent, the City will activate water shortage response measures, including a Stage 4 water shortage. It is anticipated that a major or long-term disaster would deplete City reserves and that restoration of the water distribution system would depend upon outside emergency funding.

5.14 REDUCTION MEASURING MECHANISM

The UWMPA requires that the UWMP include an urban water shortage contingency analysis that addresses a catastrophic interruption of water supplies.

> *10632. The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements, which are within the authority of the urban water supplier:*
>
> *10632 (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.*

With the upgrade of the Water Department's Supervisory Control and Data Acquisition equipment, precise and detailed reports can be easily generated for water production at any or all of the City's groundwater wells. Under all water supply conditions, production is measured by the Control and Data Acquisition system every 20 seconds and is recorded perpetually first at the control station hard drive, then periodically at secondary electronic storage media. Regulation reports are printed monthly and kept on file.

Under normal Stage 1 conditions, the Water Department Operations Manager reviews the Daily Water Production Report before it goes to file.

In the event of a Stage 2 water shortage, the Operations Manager will review daily production figures every week and check them against a previous three years average to ensure compliance with the 5 to 10 percent Stage 2 reduction goal.

During a Stage 3 water shortage, production figures are reviewed daily by the Water Division Operations Manager and the Public Works Director. The City Administrator and the City Council will be kept informed weekly of production levels, particularly of non-attainment of the 10 to 35 percent Stage 3 reduction goal.

When a Stage 4 water shortage is declared, a production report will be provided to the Operations Manager twice daily, and daily to the Public Works Director. If the 35 to 50 percent reduction goal is not being met, the City Administrator and City Council will be immediately informed.

As discussed above, the City is now in the process of installing meters on all customer connections which is slated for completion by July 1, 2012. The use of water meters on all customer connections will allow City staff to closely monitor exact changes in water use.

Chapter 6

DEMAND MANAGEMENT MEASURES

In 1991, a Memorandum of Understanding (MOU) regarding urban water conservation in California formed the California Urban Water Conservation Council (CUWCC). Council members can submit their most recent BMP Report with their UWMP to address the urban water conservation issues in the UWMPA.

However, the City is not currently a signatory of the MOU, and is therefore not a member of the CUWCC. While the City is not a member of CUWCC, the City realizes the importance of the BMPs to ensure a reliable future water supply. The City is committed to implementing water conservation and water recycling programs to maximize sustainability in meeting future water needs for its customers.

This chapter addresses the following requirements of the UWMPA.

> *10631 (f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:*
>
> *(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:*
>
> *(A) Water survey programs for single-family residential and multifamily residential customers.*
>
> *(B) Residential plumbing retrofit.*
>
> *(C) System water audits, leak detection, and repair.*
>
> *(D) Metering with commodity rates for all new connections and retrofit of existing connections.*
>
> *(E) Large landscape conservation programs and incentives.*
>
> *(F) High-efficiency washing machine rebate programs.*
>
> *(G) Public information programs.*
>
> *(H) School education programs.*
>
> *(I) Conservation programs for commercial, industrial, and institutional accounts.*
>
> *(J) Wholesale agency programs.*
>
> *(K) Conservation pricing.*
>
> *(L) Water conservation coordinator.*
>
> *(M) Water waste prohibitions.*
>
> *(N) Residential ultra-low-flush toilet replacement programs.*

DWR has assigned an enhanced terminology to the BMPs. Accordingly, this chapter will refer to them as DMMs. The current implementation status of the City's DMMs is summarized in Table 6.1. As shown, the City has started the implementation of all DMMs

with the exception of DMM 10, which only applies to wholesalers. A more detailed description of each DMM is provided in the following paragraphs.

Table 6.1 Demand Management Measures 2010 Urban Water Management Plan City of Madera

Demand Management Measure	Implemented	Planned for Implementation	Not Applicable
DMM 1 - Water Survey Programs	✓		
DMM 2 - Residential Plumbing Retrofit	✓		
DMM 3 - Water System Audits	✓		
DMM 4 - Metering with Commodity Rates		✓	
DMM 5 - Landscape Irrigation Programs	✓		
DMM 6 - Washing Machine Rebate Program	✓		
DMM 7 - Public Information Program	✓		
DMM 8 - School Education Program	✓		
DMM 9 - Commercial, Industrial, and Institutional Conservation Programs	✓		
DMM 10 - Wholesale Agency Programs			✓
DMM 11 - Conservation Pricing	✓		
DMM 12 - Water Conservation Coordinator	✓		
DMM 13 - Water Waste Prohibition	✓		
DMM 14 - Ultra Low Flush Toilet Replacement	✓		

6.1 DMM 1 - WATER SURVEY PROGRAMS FOR SINGLE-FAMILY RESIDENTIAL AND MULTI-FAMILY RESIDENTIAL CUSTOMERS

The City offers water audits to residential customers when requested. Audits include reviewing water usage history with the customer, identifying leaks inside and outside the home, and recommending improvements.

As a part of the audit, the City will also provide a water-conservation kit which typically includes educational materials, faucet and shower aerators, toilet tank volume displacer, and leak detection tablets as available.

The City does not currently track the number of water audits performed or record budget information for water audits separately. The City will need to begin tracking the number of audits and associated effort in the future in order to determine the overall effectiveness.

6.2 DMM 2 - RESIDENTIAL PLUMBING RETROFIT

While new construction requires low-flow water fixtures, there is no requirement to retrofit existing plumbing fixtures with low-flow water fixtures. The City's plan does mandate appropriate retrofitting of low-flow fixtures during remodeling.

As a part of its public information program, the City distributes educational material describing the importance of plumbing retrofits as an integral part of water conservation.

Several studies suggest that water use savings resulting from miscellaneous interior retrofit fixtures can range between 25 and 65 gpd per housing unit. The studies also suggest that installation of retrofit fixtures in older single-family homes tend to produce more savings, while newer multi-family homes tend to produce fewer saving per housing unit.

6.3 DMM 3 - SYSTEM WATER AUDITS

The City operates a detection and repair program of its entire water distribution system. In addition, the City's distribution system includes a SCADA system to accurately record production quantities. However, the majority of the City's connections are not metered, and thus a complete system water audit is not possible.

System audits to determine system losses will be performed once meters are installed.

6.4 DMM 4 - METERING WITH COMMODITY RATES

In accordance with Senate Bill 229, the City has required installation of water meters on all new or replaced services installed since 1992. The City meters about 67 percent of commercial connections and 27 percent of multifamily connections.

The majority of residential water services are not currently metered, and, therefore, the water rates for residential customers are based on average use of all residents. As noted in Chapter 5, the City applies unmetered rates to all single family residential accounts, whether or not an actual meter is installed.

According to the 2005 UWMP, the City revised its rates in 2005 to raise sufficient funds to allow the City to complete its water meter replacement program, which would allow metering with commodity rates. The City is now in the process of installing meters on all customer connections and is slated for completion by July 1, 2012. The City adopted revised rates in June 2010, which include annual water rate increases and a revised rate structure to be implemented in Fiscal Year (FY) 2012 / 2013. The revised rates are shown in Table 6.2.

Table 6.2 Water Rate Structure 2010 Urban Water Management Plan City of Madera						
Component	**FY0910**	**FY1011**	**FY1112**	**FY1213**	**FY1314**	**FY1415**
Single Family Residential						
Service Charge	$16.73	$17.40	$18.10	$9.18	$9.54	$9.93
Irrigation Rate ($ per 100 sq ft of parcel size above 5,000 sq ft)	$0.24	$0.25	$0.26	-	-	-
Volume charge ($ per ccf)	-	-	-	$0.79	$0.83	$0.86
Other Customers						
Service Charge(1)	$2.82	$2.93	$3.05	$6.57 - $143.88	$6.83 - $149.64	$7.11 - $155.62
Volume charge ($ per ccf)	$0.69	$0.72	$0.75	$0.79	$0.83	$0.86

Notes:
(1) For FY1213 through FY1415, the service charge for customers other than Single Family Residential varies by meter size. Service charges shown are range from 5/8" meter to 8" meter.

As shown in Table 6.1, after implementation of the City's metering program, all rates will be based on commodity pricing.

6.5 DMM 5 - LARGE LANDSCAPE CONSERVATION PROGRAMS

According to the 2005 UWMP, all the City's large landscape accounts are metered. The City offers water audits to large landscape customers when requested. Audits include reviewing water usage history with the customer, identifying leaks in the customers system, and recommending improvements. In addition, the City will assist large landscape customers with programming of irrigation timers to promote water efficiency through irrigation scheduling.

6.6 DMM 6 - HIGH-EFFICIENCY WASHING MACHINE REBATE PROGRAM

This program generally provides financial incentives (rebate offers) to qualifying customers who install high-efficiency washing machines in their homes.

The City offers rebates for high-efficiency clothes washing machine (HECW) which are purchased and installed by City customers. These machines typically use 15 to 25 gallons less water per load than typical washers, with savings of up to 7,000 gallons per year (assuming 1 load per day).

The City has distributed 17 High Efficiency Clothes Washers (HEW), processed 33 applications and paid $1,700 in rebates.

6.7 DMM 7 - PUBLIC INFORMATION PROGRAMS

The City utilizes mass mailings and the City internet site to distribute information to all water service customers. Walk in customers are also provided with information at City Hall and at the Public Works Department Water Division. When called upon to distribute time sensitive notices and information, local print media is also used.

Mass mailings with information on regulations and Consumer Confidence Reports are performed every March. The City will also provide additional information on conservation measures at this time. Display cases and public bulletin boards are also utilized to display information that is also mailed out.

The City staffs information booths at the annual Madera District Fair in September. The booths provide written information and promotional or educational materials.

The City monthly water bill distributed to all water service customers also presents information regarding previous year water usage, conservation measures, and other updates.

6.8 DMM 8 - SCHOOL EDUCATION PROGRAM

The City makes staff available for guidance and educational tours of water system facilities. The City has also developed a plan to enhance existing school education wherein students tour facilities and also receive formal presentations at their schools. The City encourages local educators to include demand management education in their curriculum where appropriate.

6.9 DMM 9 - CONSERVATION PROGRAMS FOR COMMERCIAL, INDUSTRIAL, AND INSTITUTIONAL ACCOUNTS

DMM 5 outlines of one the programs available to CII accounts, wherein the City offers water audits to large landscape customers when requested. Audits include reviewing water usage history with the customer, identifying leaks in the customers system, and recommending improvements.

Another program which the City makes available to commercial, industrial and institutional accounts is the Conservation Water Patrol. This group has the responsibility to educate commercial and industrial users that overuse water for irrigation purposes. The patrol can provide a variety of resources to help a commercial or industrial consumer conserve, including staff expertise, written materials, and the City's demonstration water conservation garden.

As of 2010, 50 smart irrigation controllers have been installed in medians in order to further encourage conservation for large CII accounts.

6.10 DMM 10 - WHOLESALE AGENCY PROGRAMS

This DMM applies to wholesale agencies and defines a wholesaler's role in terms of financial, technical, and programmatic assistance to its retail agencies implementing DMMs.

The City is not a wholesale agency, so this DMM does not apply.

6.11 DMM 11 - CONSERVATION PRICING

Where metering available, the City encourages water conservation through its water and sewer service rate structure. The City approved the new water and sewer service rates in 2005. As mentioned previously, the City is in the process of installing meters for every customer connection. Using these meters, the City will implement a use based rate structure, which will incorporate conservation.

6.12 DMM 12 - WATER CONSERVATION COORDINATOR

The City's Water Divisions Operations Manager has also served as the City's Water Conservation Coordinator since 1986. Water Conservation Coordinator duties include interdepartmental coordination, monitoring the practice and application of DMMs, supervision of the Conservation Water Patrol, and planning of community water conservation education projects.

6.13 DMM 13 - WATER WASTE PROHIBITION

City Resolution No. 95-52 specifies the City's Water Shortage Contingency Plan. In this plan, the following penalties for violating water conservation protocols are outlined:

Violation #1: Written warning issued.

Violation #2: $50.00 surcharge on next water bill.

Violation #3: $100.00 surcharge on next water bill.

Violation #4: $150.00 surcharge on next water bill.

Subsequent violations: $150.00 surcharge on next water bill.

Further details on prohibitions and penalties are explored in Chapter 8, the Water Shortage Contingency Plan.

6.14 DMM 14 - RESIDENTIAL ULTRA-LOW-FLUSH TOILET REPLACEMENT PROGRAMS

State legislation requires the installation of efficient plumbing in new construction and, effective in 1994, requires that only ultra low flow toilets (ULFTs) be sold in California.

The City offers a rebate program to customers who replace a 5 or 3.5 gallon per flush with a 1.28 gallon per flush high efficiency toilet. This program is similar to the high efficiency clothes washer machine rebate program explained in DMM 6.

Since beginning their High Efficiency Toilet (HET) rebate program, the City has distributed 36 HET's, processed 41 applications and paid out $3,600 in rebates.

6.15 WATER CONSERVATION IMPLEMENTATION PLAN

The DMM's currently implemented by the City have been effective in reducing water consumption, but further efforts will need to be made to reach the 2020 water conservation target. The City's historic per-capita and future projections are shown in Figure 6.1.

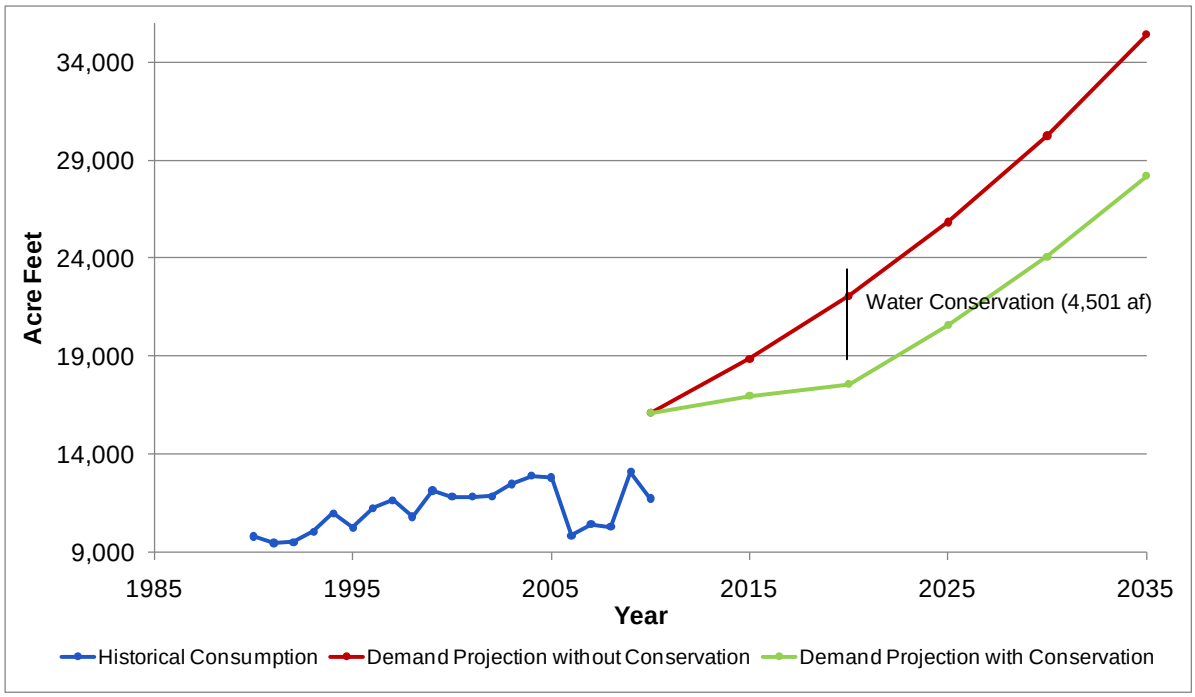

Figure 6.1 Projected Water Demands with and without Conservation

The conservation and non-conservation projections diverge rapidly after 2010, revealing the conservation that the City will need to account for by year 2020. Two values are shown for 2010, the lower of which is the historic value while the other was generated using the demand projection methodology. In total, the City will need to reduce water use by 4,501 af in the year 2020 to account for the difference between demand projections.

The City is already in the process of pursuing various water conservation strategies. The water metering program, planned for completion in 2012, will make a substantial difference in allowing the City to implement a conservation rate structure for its customers. Also the City is currently studying the feasibility of recycled water use, which would also prove effective in meeting future conservation targets. Finally, the City's DMM program will continue to reduce consumption.

The City should prioritize its efforts towards expanding its large scale DMM programs to result in large conservation gains. Continued support of residential retrofits is also essential because of the City's largely residential customer base. Finally, although some DMMs do not result in quantifiable conservation, school and public education programs will provide much needed support as the City strives to meet its 2020 conservation target.

APPENDIX A
REFERENCES

(Boyle, 2006) Boyle Engineering Corporation. *City of Madera 2005 Urban Water Management Plan.* December 2005. Amended June 2006.

(CDWR, 2010) California Department of Water Resources. *Chronological Reconstructed Sacramento and San Joaquin Valley Water Year Hydrologic Classification Indices (WSIHIST)*. Data from 1901 to 2010. [http://cdec.water.ca.gov/cgi-progs/iodir/wsihist].

(DOF, 2010) California Department of Finance. "E-4 Population Estimates for Cities, Counties and the State, 2001–2010, with 2000 Benchmark". Accessed 6 May 2011. [http://www.dof.ca.gov/research/demographic/reports/]

(Madera, 2009) City of Madera. *General Plan*. 7 October 2009.

(MW, 1997) Montgomery Watson. *City of Madera Draft Report Water System Master Plan.* January 1997.

(MW, 1997b) Montgomery Watson. *City of Madera Draft Report Sewer System Master Plan.* February 1997.

(TE, 2002) Todd Engineers. AB3030 *Groundwater Management Plan Madera County.* Final Draft. January 2002.

(WRCC, 2010) Western Regional Climate Center. *Station 045233 - Madera.* Period January 1928 to December 2010. [http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?cacano].

APPENDIX B

PUBLIC REVIEW AND ADOPTION MATERIALS

Commitment to Distribute the 2010 Urban Water Management Plan

The documentation currently included in these appendices satisfies California Water Code parts 10621(b) and 10642.

Two other sections of the California Water Code specify UWMP documentation that must take place after the submission of the supplier's UWMP to the DWR. These parts are as follows:

- Part 10644(a), requiring documentation that within 30 days of submitting the UWMP to DWR, the adopted UWMP has been or will be submitted to the California State Library and any city or county to which the supplier provides water.
- Part 10645, requiring documentation that the supplier will make the UWMP available for public review no later than 30 days after submission to DWR.

In order to satisfy these requirements, the City will perform the following actions:

- The City will submit its 2010 UWMP to the California DWR on or before **October 7, 2011**.
- The City will send a printed or electronic copy of its 2010 UWMP to the California State Library and to the cities and counties within which it provides water. The City will do this no later than **November 6, 2011** (30 days from filing with the DWR).
- The City will make their 2010 UWMP available for public review no later than **November 6, 2011** (30 days from filing with the DWR).

Proof of Publication

(2015.5 C.C.P.)

NOTICE OF AVAILABILITY

OF INFORMATION RE:

CITY OF MADERA UWMP

STATE OF CALIFORNIA)
) ss.
County of Madera)

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 principal clerk of the printer of the Madera Tribune, a newspaper of general circulation, published in the City of Madera, County of Madera, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Madera, State of California, under the date of November 9, 1966, Case Number 4875 that the notice, of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates, to wit:

JULY 20, AUGUST 17, 2011

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

Ellen Beach

Signature

Date: August 17, 2011

City of Madera
Notice of Availability of Information

City of Madera Urban Water Management Plan (UWMP)

Notice Issue Date: July 20, 2011

Pursuant to the California Water Code section 10642 and 10608, the City Council of the City of Madera will conduct a Public Hearing to take testimony regarding the adoption of the updated 2010 Urban Water Management Plan for the City of Madera.

The public hearing is scheduled for the following public meeting:

Madera City Council Meeting
6:30 p.m. Wednesday, September 7, 2011
City Council Chambers, 205 West Fourth Street, Madera, California

Any interested person may present written comments concerning the proposed UWMP up to the date of the hearing.

Any inquiries concerning the proposed UWMP should be directed to Danny Martin, Public Works Operations Manager at (559) 661-5466 ext. 331.

The draft report may be reviewed during regular business hours at:

Office of the City Clerk
205 West Fourth Street
Madera, Ca. 93637
No. 17621 - July 20, Aug. 17, 2011

Proof of Publication - The Madera Tribune, P.O. Box 269, Madera, CA 93639 - (559) 674-2424
Adjudged a newspaper of general circulation by court decree No. 4875 dated November 9, 1966
The Madera Tribune

Advertising Invoice

Madera Tribune
P.O. Box 269
Madera, CA 93639-0269
Phone: (559) 674-2424
Fax: (559) 673-6526

CITY OF MADERA/LEGAL
205 W 4TH STREET
MADERA, CA 93637

RECEIVED
AUG 22 2011
By

Cust#: 08100027-000
Phone: (559)661-5405
Date: 08/17/11
Due Date: 09/30/11

Jason- PW

Ad#	Text	Start	Stop	Days	Amount	Prepaid	Due
09548520-001	#17621 UWMP AVA	07/20/11	08/17/11	2	70.98	0.00	70.98
09548784-001	#17757 888U C.S	08/17/11	08/17/11	1	445.50	0.00	445.50

APPROVED
Desc. UWMP Public Notice
Acct.# 2995-3011
P. O. #
☐ P.O. Partial Payment
☐ P.O. Final Payment
Date 8-25-11
Signature

If you desire to charge this amount to your credit card, please complete the following information and return to the address above: [ ] VISA [ ] Mastercard [ ] Discover

Acct# _____ Exp Date _____

Signature _____

Please return a copy with payment **Total Due** **516.48**

TERMS: A finance charge of 1.5% per month or 18% per annum will be charged on outstanding balances. Customers will be responsible for the cost of collections and attorney's fees.

RESOLUTION NO. 11-196

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MADERA, CALIFORNIA ADOPTING THE 2010 CITY OF MADERA URBAN WATER MANAGEMENT PLAN

WHEREAS, California Water Code Sections 10620 et seq. require the adoption of a Urban Water Management Plan (the "Plan"); and

WHEREAS, such legislation requires that once adopted that a copy of the Plan be filed with the California Department of Water Resources; and

WHEREAS, the City of Madera in compliance with such legislation has drafted a proposed Plan and circulated it for public review and held a duly noticed public hearing on such proposed Plan; and

WHEREAS, public hearings on the Plan were duly noticed and held on September 7, 2011; and

NOW, THEREFORE, THE COUNCIL OF THE CITY OF MADERA, hereby finds, orders, and determines as follows:

1. The Urban Water Management Plan, a copy of which is on file in the office of the City Clerk and referred to for more particulars, is hereby adopted.

2. The Director of Public Works is hereby authorized and directed to file this Plan with the California Department of Water Resources.

3. This Resolution is effective immediately upon adoption.

* * * * * * *

PASSED AND ADOPTED by the City Council of the City of Madera this 21st day of September, 2011 by the following vote:

AYES: Council Members Poythress, Frazier, Bomprezzi, Svanda, Medellin.

NOES: None.

ABSTENTIONS: None.

ABSENT: None.

ROBERT L. POYTHRESS, Mayor

ATTEST:

SONIA ALVAREZ, City Clerk

CITY OF MADERA INCORPORATED March 27, 1907 CALIFORNIA

APPROVED AS TO LEGAL FORM:
INTERIM CITY ATTORNEY

By: BRENT RICHARDSON

APPENDIX C

URBAN WATER MANAGEMENT PLAN ACT

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384, Costa, 2002
SB 1518, Torlakson, 2002
AB 105, Wiggins, 2004
SB 318, Alpert, 2004
SB 1087, Florez, 2005
SBX7 7, Steinberg, 2009

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS
Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the

past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.

(M) Water waste prohibition.

(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the ‘‘Memorandum of Understanding Regarding Urban Water Conservation in California,’’ dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

(k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5 Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled

pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water

supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

Senate Bill No. 7

CHAPTER 4

An act to amend and repeal Section 10631.5 of, to add Part 2.55 (commencing with Section 10608) to Division 6 of, and to repeal and add Part 2.8 (commencing with Section 10800) of Division 6 of, the Water Code, relating to water.

[Approved by Governor November 10, 2009. Filed with Secretary of State November 10, 2009.]

LEGISLATIVE COUNSEL'S DIGEST

SB 7, Steinberg. Water conservation.

(1) Existing law requires the Department of Water Resources to convene an independent technical panel to provide information to the department and the Legislature on new demand management measures, technologies, and approaches. "Demand management measures" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

This bill would require the state to achieve a 20% reduction in urban per capita water use in California by December 31, 2020. The state would be required to make incremental progress towards this goal by reducing per capita water use by at least 10% on or before December 31, 2015. The bill would require each urban retail water supplier to develop urban water use targets and an interim urban water use target, in accordance with specified requirements. The bill would require agricultural water suppliers to implement efficient water management practices. The bill would require the department, in consultation with other state agencies, to develop a single standardized water use reporting form. The bill, with certain exceptions, would provide that urban retail water suppliers, on and after July 1, 2016, and agricultural water suppliers, on and after July 1, 2013, are not eligible for state water grants or loans unless they comply with the water conservation requirements established by the bill. The bill would repeal, on July 1, 2016, an existing requirement that conditions eligibility for certain water management grants or loans to an urban water supplier on the implementation of certain water demand management measures.

(2) Existing law, until January 1, 1993, and thereafter only as specified, requires certain agricultural water suppliers to prepare and adopt water management plans.

This bill would revise existing law relating to agricultural water management planning to require agricultural water suppliers to prepare and adopt agricultural water management plans with specified components on or before December 31, 2012, and update those plans on or before December

31, 2015, and on or before December 31 every 5 years thereafter. An agricultural water supplier that becomes an agricultural water supplier after December 31, 2012, would be required to prepare and adopt an agricultural water management plan within one year after becoming an agricultural water supplier. The agricultural water supplier would be required to notify each city or county within which the supplier provides water supplies with regard to the preparation or review of the plan. The bill would require the agricultural water supplier to submit copies of the plan to the department and other specified entities. The bill would provide that an agricultural water supplier is not eligible for state water grants or loans unless the supplier complies with the water management planning requirements established by the bill.

(3) The bill would take effect only if SB 1 and SB 6 of the 2009–10 7th Extraordinary Session of the Legislature are enacted and become effective.

The people of the State of California do enact as follows:

SECTION 1. Part 2.55 (commencing with Section 10608) is added to Division 6 of the Water Code, to read:

PART 2.55. SUSTAINABLE WATER USE AND DEMAND REDUCTION

Chapter 1. General Declarations and Policy

10608. The Legislature finds and declares all of the following:

(a) Water is a public resource that the California Constitution protects against waste and unreasonable use.

(b) Growing population, climate change, and the need to protect and grow California's economy while protecting and restoring our fish and wildlife habitats make it essential that the state manage its water resources as efficiently as possible.

(c) Diverse regional water supply portfolios will increase water supply reliability and reduce dependence on the Delta.

(d) Reduced water use through conservation provides significant energy and environmental benefits, and can help protect water quality, improve streamflows, and reduce greenhouse gas emissions.

(e) The success of state and local water conservation programs to increase efficiency of water use is best determined on the basis of measurable outcomes related to water use or efficiency.

(f) Improvements in technology and management practices offer the potential for increasing water efficiency in California over time, providing an essential water management tool to meet the need for water for urban, agricultural, and environmental uses.

(g) The Governor has called for a 20 percent per capita reduction in urban water use statewide by 2020.

(h) The factors used to formulate water use efficiency targets can vary significantly from location to location based on factors including weather, patterns of urban and suburban development, and past efforts to enhance water use efficiency.

(i) Per capita water use is a valid measure of a water provider's efforts to reduce urban water use within its service area. However, per capita water use is less useful for measuring relative water use efficiency between different water providers. Differences in weather, historical patterns of urban and suburban development, and density of housing in a particular location need to be considered when assessing per capita water use as a measure of efficiency.

10608.4. It is the intent of the Legislature, by the enactment of this part, to do all of the following:

(a) Require all water suppliers to increase the efficiency of use of this essential resource.

(b) Establish a framework to meet the state targets for urban water conservation identified in this part and called for by the Governor.

(c) Measure increased efficiency of urban water use on a per capita basis.

(d) Establish a method or methods for urban retail water suppliers to determine targets for achieving increased water use efficiency by the year 2020, in accordance with the Governor's goal of a 20-percent reduction.

(e) Establish consistent water use efficiency planning and implementation standards for urban water suppliers and agricultural water suppliers.

(f) Promote urban water conservation standards that are consistent with the California Urban Water Conservation Council's adopted best management practices and the requirements for demand management in Section 10631.

(g) Establish standards that recognize and provide credit to water suppliers that made substantial capital investments in urban water conservation since the drought of the early 1990s.

(h) Recognize and account for the investment of urban retail water suppliers in providing recycled water for beneficial uses.

(i) Require implementation of specified efficient water management practices for agricultural water suppliers.

(j) Support the economic productivity of California's agricultural, commercial, and industrial sectors.

(k) Advance regional water resources management.

10608.8. (a) (1) Water use efficiency measures adopted and implemented pursuant to this part or Part 2.8 (commencing with Section 10800) are water conservation measures subject to the protections provided under Section 1011.

(2) Because an urban agency is not required to meet its urban water use target until 2020 pursuant to subdivision (b) of Section 10608.24, an urban retail water supplier's failure to meet those targets shall not establish a violation of law for purposes of any state administrative or judicial proceeding prior to January 1, 2021. Nothing in this paragraph limits the use of data reported to the department or the board in litigation or an

administrative proceeding. This paragraph shall become inoperative on January 1, 2021.

(3) To the extent feasible, the department and the board shall provide for the use of water conservation reports required under this part to meet the requirements of Section 1011 for water conservation reporting.

(b) This part does not limit or otherwise affect the application of Chapter 3.5 (commencing with Section 11340), Chapter 4 (commencing with Section 11370), Chapter 4.5 (commencing with Section 11400), and Chapter 5 (commencing with Section 11500) of Part 1 of Division 3 of Title 2 of the Government Code.

(c) This part does not require a reduction in the total water used in the agricultural or urban sectors, because other factors, including, but not limited to, changes in agricultural economics or population growth may have greater effects on water use. This part does not limit the economic productivity of California's agricultural, commercial, or industrial sectors.

(d) The requirements of this part do not apply to an agricultural water supplier that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect. After the expiration of the Quantification Settlement Agreement, to the extent conservation water projects implemented as part of the Quantification Settlement Agreement remain in effect, the conserved water created as part of those projects shall be credited against the obligations of the agricultural water supplier pursuant to this part.

Chapter 2. Definitions

10608.12. Unless the context otherwise requires, the following definitions govern the construction of this part:

(a) "Agricultural water supplier" means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right, that distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include the department.

(b) "Base daily per capita water use" means any of the following:

(1) The urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous 10-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(2) For an urban retail water supplier that meets at least 10 percent of its 2008 measured retail water demand through recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier, the urban retail water supplier may extend the calculation described in paragraph (1) up to an additional five years to a maximum of

a continuous 15-year period ending no earlier than December 31, 2004, and no later than December 31, 2010.

(3) For the purposes of Section 10608.22, the urban retail water supplier's estimate of its average gross water use, reported in gallons per capita per day and calculated over a continuous five-year period ending no earlier than December 31, 2007, and no later than December 31, 2010.

(c) "Baseline commercial, industrial, and institutional water use" means an urban retail water supplier's base daily per capita water use for commercial, industrial, and institutional users.

(d) "Commercial water user" means a water user that provides or distributes a product or service.

(e) "Compliance daily per capita water use" means the gross water use during the final year of the reporting period, reported in gallons per capita per day.

(f) "Disadvantaged community" means a community with an annual median household income that is less than 80 percent of the statewide annual median household income.

(g) "Gross water use" means the total volume of water, whether treated or untreated, entering the distribution system of an urban retail water supplier, excluding all of the following:

(1) Recycled water that is delivered within the service area of an urban retail water supplier or its urban wholesale water supplier.

(2) The net volume of water that the urban retail water supplier places into long-term storage.

(3) The volume of water the urban retail water supplier conveys for use by another urban water supplier.

(4) The volume of water delivered for agricultural use, except as otherwise provided in subdivision (f) of Section 10608.24.

(h) "Industrial water user" means a water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.

(i) "Institutional water user" means a water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.

(j) "Interim urban water use target" means the midpoint between the urban retail water supplier's base daily per capita water use and the urban retail water supplier's urban water use target for 2020.

(k) "Locally cost effective" means that the present value of the local benefits of implementing an agricultural efficiency water management practice is greater than or equal to the present value of the local cost of implementing that measure.

(*l*) "Process water" means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and

water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry.

(m) "Recycled water" means recycled water, as defined in subdivision (n) of Section 13050, that is used to offset potable demand, including recycled water supplied for direct use and indirect potable reuse, that meets the following requirements, where applicable:

(1) For groundwater recharge, including recharge through spreading basins, water supplies that are all of the following:

(A) Metered.

(B) Developed through planned investment by the urban water supplier or a wastewater treatment agency.

(C) Treated to a minimum tertiary level.

(D) Delivered within the service area of an urban retail water supplier or its urban wholesale water supplier that helps an urban retail water supplier meet its urban water use target.

(2) For reservoir augmentation, water supplies that meet the criteria of paragraph (1) and are conveyed through a distribution system constructed specifically for recycled water.

(n) "Regional water resources management" means sources of supply resulting from watershed-based planning for sustainable local water reliability or any of the following alternative sources of water:

(1) The capture and reuse of stormwater or rainwater.

(2) The use of recycled water.

(3) The desalination of brackish groundwater.

(4) The conjunctive use of surface water and groundwater in a manner that is consistent with the safe yield of the groundwater basin.

(o) "Reporting period" means the years for which an urban retail water supplier reports compliance with the urban water use targets.

(p) "Urban retail water supplier" means a water supplier, either publicly or privately owned, that directly provides potable municipal water to more than 3,000 end users or that supplies more than 3,000 acre-feet of potable water annually at retail for municipal purposes.

(q) "Urban water use target" means the urban retail water supplier's targeted future daily per capita water use.

(r) "Urban wholesale water supplier," means a water supplier, either publicly or privately owned, that provides more than 3,000 acre-feet of water annually at wholesale for potable municipal purposes.

Chapter 3. Urban Retail Water Suppliers

10608.16. (a) The state shall achieve a 20-percent reduction in urban per capita water use in California on or before December 31, 2020.

(b) The state shall make incremental progress towards the state target specified in subdivision (a) by reducing urban per capita water use by at least 10 percent on or before December 31, 2015.

10608.20. (a) (1) Each urban retail water supplier shall develop urban water use targets and an interim urban water use target by July 1, 2011. Urban retail water suppliers may elect to determine and report progress toward achieving these targets on an individual or regional basis, as provided in subdivision (a) of Section 10608.28, and may determine the targets on a fiscal year or calendar year basis.

(2) It is the intent of the Legislature that the urban water use targets described in subdivision (a) cumulatively result in a 20-percent reduction from the baseline daily per capita water use by December 31, 2020.

(b) An urban retail water supplier shall adopt one of the following methods for determining its urban water use target pursuant to subdivision (a):

(1) Eighty percent of the urban retail water supplier's baseline per capita daily water use.

(2) The per capita daily water use that is estimated using the sum of the following performance standards:

(A) For indoor residential water use, 55 gallons per capita daily water use as a provisional standard. Upon completion of the department's 2016 report to the Legislature pursuant to Section 10608.42, this standard may be adjusted by the Legislature by statute.

(B) For landscape irrigated through dedicated or residential meters or connections, water efficiency equivalent to the standards of the Model Water Efficient Landscape Ordinance set forth in Chapter 2.7 (commencing with Section 490) of Division 2 of Title 23 of the California Code of Regulations, as in effect the later of the year of the landscape's installation or 1992. An urban retail water supplier using the approach specified in this subparagraph shall use satellite imagery, site visits, or other best available technology to develop an accurate estimate of landscaped areas.

(C) For commercial, industrial, and institutional uses, a 10-percent reduction in water use from the baseline commercial, industrial, and institutional water use by 2020.

(3) Ninety-five percent of the applicable state hydrologic region target, as set forth in the state's draft 20x2020 Water Conservation Plan (dated April 30, 2009). If the service area of an urban water supplier includes more than one hydrologic region, the supplier shall apportion its service area to each region based on population or area.

(4) A method that shall be identified and developed by the department, through a public process, and reported to the Legislature no later than December 31, 2010. The method developed by the department shall identify per capita targets that cumulatively result in a statewide 20-percent reduction in urban daily per capita water use by December 31, 2020. In developing urban daily per capita water use targets, the department shall do all of the following:

(A) Consider climatic differences within the state.

(B) Consider population density differences within the state.

(C) Provide flexibility to communities and regions in meeting the targets.

(D) Consider different levels of per capita water use according to plant water needs in different regions.

(E) Consider different levels of commercial, industrial, and institutional water use in different regions of the state.

(F) Avoid placing an undue hardship on communities that have implemented conservation measures or taken actions to keep per capita water use low.

(c) If the department adopts a regulation pursuant to paragraph (4) of subdivision (b) that results in a requirement that an urban retail water supplier achieve a reduction in daily per capita water use that is greater than 20 percent by December 31, 2020, an urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may limit its urban water use target to a reduction of not more than 20 percent by December 31, 2020, by adopting the method described in paragraph (1) of subdivision (b).

(d) The department shall update the method described in paragraph (4) of subdivision (b) and report to the Legislature by December 31, 2014. An urban retail water supplier that adopted the method described in paragraph (4) of subdivision (b) may adopt a new urban daily per capita water use target pursuant to this updated method.

(e) An urban retail water supplier shall include in its urban water management plan required pursuant to Part 2.6 (commencing with Section 10610) due in 2010 the baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.

(f) When calculating per capita values for the purposes of this chapter, an urban retail water supplier shall determine population using federal, state, and local population reports and projections.

(g) An urban retail water supplier may update its 2020 urban water use target in its 2015 urban water management plan required pursuant to Part 2.6 (commencing with Section 10610).

(h) (1) The department, through a public process and in consultation with the California Urban Water Conservation Council, shall develop technical methodologies and criteria for the consistent implementation of this part, including, but not limited to, both of the following:

(A) Methodologies for calculating base daily per capita water use, baseline commercial, industrial, and institutional water use, compliance daily per capita water use, gross water use, service area population, indoor residential water use, and landscaped area water use.

(B) Criteria for adjustments pursuant to subdivisions (d) and (e) of Section 10608.24.

(2) The department shall post the methodologies and criteria developed pursuant to this subdivision on its Internet Web site, and make written copies

available, by October 1, 2010. An urban retail water supplier shall use the methods developed by the department in compliance with this part.

(i) (1) The department shall adopt regulations for implementation of the provisions relating to process water in accordance with subdivision (*l*) of Section 10608.12, subdivision (e) of Section 10608.24, and subdivision (d) of Section 10608.26.

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

(j) An urban retail water supplier shall be granted an extension to July 1, 2011, for adoption of an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) due in 2010 to allow use of technical methodologies developed by the department pursuant to paragraph (4) of subdivision (b) and subdivision (h). An urban retail water supplier that adopts an urban water management plan due in 2010 that does not use the methodologies developed by the department pursuant to subdivision (h) shall amend the plan by July 1, 2011, to comply with this part.

10608.22. Notwithstanding the method adopted by an urban retail water supplier pursuant to Section 10608.20, an urban retail water supplier's per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use as defined in paragraph (3) of subdivision (b) of Section 10608.12. This section does not apply to an urban retail water supplier with a base daily per capita water use at or below 100 gallons per capita per day.

10608.24. (a) Each urban retail water supplier shall meet its interim urban water use target by December 31, 2015.

(b) Each urban retail water supplier shall meet its urban water use target by December 31, 2020.

(c) An urban retail water supplier's compliance daily per capita water use shall be the measure of progress toward achievement of its urban water use target.

(d) (1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors:

(A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period.

(B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period.

(C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period.

(2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40.

(e) When developing the urban water use target pursuant to Section 10608.20, an urban retail water supplier that has a substantial percentage of industrial water use in its service area, may exclude process water from the calculation of gross water use to avoid a disproportionate burden on another customer sector.

(f) (1) An urban retail water supplier that includes agricultural water use in an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) may include the agricultural water use in determining gross water use. An urban retail water supplier that includes agricultural water use in determining gross water use and develops its urban water use target pursuant to paragraph (2) of subdivision (b) of Section 10608.20 shall use a water efficient standard for agricultural irrigation of 100 percent of reference evapotranspiration multiplied by the crop coefficient for irrigated acres.

(2) An urban retail water supplier, that is also an agricultural water supplier, is not subject to the requirements of Chapter 4 (commencing with Section 10608.48), if the agricultural water use is incorporated into its urban water use target pursuant to paragraph (1).

10608.26. (a) In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following:

(1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part.

(2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part.

(3) Adopt a method, pursuant to subdivision (b) of Section 10608.20, for determining its urban water use target.

(b) In complying with this part, an urban retail water supplier may meet its urban water use target through efficiency improvements in any combination among its customer sectors. An urban retail water supplier shall avoid placing a disproportionate burden on any customer sector.

(c) For an urban retail water supplier that supplies water to a United States Department of Defense military installation, the urban retail water supplier's implementation plan for complying with this part shall consider the United States Department of Defense military installation's requirements under federal Executive Order 13423.

(d) (1) Any ordinance or resolution adopted by an urban retail water supplier after the effective date of this section shall not require existing customers as of the effective date of this section, to undertake changes in product formulation, operations, or equipment that would reduce process water use, but may provide technical assistance and financial incentives to those customers to implement efficiency measures for process water. This section shall not limit an ordinance or resolution adopted pursuant to a declaration of drought emergency by an urban retail water supplier.

(2) This part shall not be construed or enforced so as to interfere with the requirements of Chapter 4 (commencing with Section 113980) to Chapter 13 (commencing with Section 114380), inclusive, of Part 7 of Division 104 of the Health and Safety Code, or any requirement or standard for the protection of public health, public safety, or worker safety established by federal, state, or local government or recommended by recognized standard setting organizations or trade associations.

10608.28. (a) An urban retail water supplier may meet its urban water use target within its retail service area, or through mutual agreement, by any of the following:

(1) Through an urban wholesale water supplier.

(2) Through a regional agency authorized to plan and implement water conservation, including, but not limited to, an agency established under the Bay Area Water Supply and Conservation Agency Act (Division 31 (commencing with Section 81300)).

(3) Through a regional water management group as defined in Section 10537.

(4) By an integrated regional water management funding area.

(5) By hydrologic region.

(6) Through other appropriate geographic scales for which computation methods have been developed by the department.

(b) A regional water management group, with the written consent of its member agencies, may undertake any or all planning, reporting, and implementation functions under this chapter for the member agencies that consent to those activities. Any data or reports shall provide information both for the regional water management group and separately for each consenting urban retail water supplier and urban wholesale water supplier.

10608.32. All costs incurred pursuant to this part by a water utility regulated by the Public Utilities Commission may be recoverable in rates subject to review and approval by the Public Utilities Commission, and may be recorded in a memorandum account and reviewed for reasonableness by the Public Utilities Commission.

10608.36. Urban wholesale water suppliers shall include in the urban water management plans required pursuant to Part 2.6 (commencing with Section 10610) an assessment of their present and proposed future measures, programs, and policies to help achieve the water use reductions required by this part.

10608.40. Urban water retail suppliers shall report to the department on their progress in meeting their urban water use targets as part of their urban water management plans submitted pursuant to Section 10631. The data shall be reported using a standardized form developed pursuant to Section 10608.52.

10608.42. The department shall review the 2015 urban water management plans and report to the Legislature by December 31, 2016, on progress towards achieving a 20-percent reduction in urban water use by December 31, 2020. The report shall include recommendations on changes to water efficiency standards or urban water use targets in order to achieve

the 20-percent reduction and to reflect updated efficiency information and technology changes.

10608.43. The department, in conjunction with the California Urban Water Conservation Council, by April 1, 2010, shall convene a representative task force consisting of academic experts, urban retail water suppliers, environmental organizations, commercial water users, industrial water users, and institutional water users to develop alternative best management practices for commercial, industrial, and institutional users and an assessment of the potential statewide water use efficiency improvement in the commercial, industrial, and institutional sectors that would result from implementation of these best management practices. The taskforce, in conjunction with the department, shall submit a report to the Legislature by April 1, 2012, that shall include a review of multiple sectors within commercial, industrial, and institutional users and that shall recommend water use efficiency standards for commercial, industrial, and institutional users among various sectors of water use. The report shall include, but not be limited to, the following:

(a) Appropriate metrics for evaluating commercial, industrial, and institutional water use.

(b) Evaluation of water demands for manufacturing processes, goods, and cooling.

(c) Evaluation of public infrastructure necessary for delivery of recycled water to the commercial, industrial, and institutional sectors.

(d) Evaluation of institutional and economic barriers to increased recycled water use within the commercial, industrial, and institutional sectors.

(e) Identification of technical feasibility and cost of the best management practices to achieve more efficient water use statewide in the commercial, industrial, and institutional sectors that is consistent with the public interest and reflects past investments in water use efficiency.

10608.44. Each state agency shall reduce water use on facilities it operates to support urban retail water suppliers in meeting the target identified in Section 10608.16.

Chapter 4. Agricultural Water Suppliers

10608.48. (a) On or before July 31, 2012, an agricultural water supplier shall implement efficient water management practices pursuant to subdivisions (b) and (c).

(b) Agricultural water suppliers shall implement all of the following critical efficient management practices:

(1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).

(2) Adopt a pricing structure for water customers based at least in part on quantity delivered.

(c) Agricultural water suppliers shall implement additional efficient management practices, including, but not limited to, practices to accomplish all of the following, if the measures are locally cost effective and technically feasible:

(1) Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage.

(2) Facilitate use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not harm crops or soils.

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

(4) Implement an incentive pricing structure that promotes one or more of the following goals:

(A) More efficient water use at the farm level.

(B) Conjunctive use of groundwater.

(C) Appropriate increase of groundwater recharge.

(D) Reduction in problem drainage.

(E) Improved management of environmental resources.

(F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.

(5) Expand line or pipe distribution systems, and construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage.

(6) Increase flexibility in water ordering by, and delivery to, water customers within operational limits.

(7) Construct and operate supplier spill and tailwater recovery systems.

(8) Increase planned conjunctive use of surface water and groundwater within the supplier service area.

(9) Automate canal control structures.

(10) Facilitate or promote customer pump testing and evaluation.

(11) Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.

(12) Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following:

(A) On-farm irrigation and drainage system evaluations.

(B) Normal year and real-time irrigation scheduling and crop evapotranspiration information.

(C) Surface water, groundwater, and drainage water quantity and quality data.

(D) Agricultural water management educational programs and materials for farmers, staff, and the public.

(13) Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional changes to allow more flexible water deliveries and storage.

(14) Evaluate and improve the efficiencies of the supplier's pumps.

(d) Agricultural water suppliers shall include in the agricultural water management plans required pursuant to Part 2.8 (commencing with Section 10800) a report on which efficient water management practices have been implemented and are planned to be implemented, an estimate of the water use efficiency improvements that have occurred since the last report, and an estimate of the water use efficiency improvements estimated to occur five and 10 years in the future. If an agricultural water supplier determines that an efficient water management practice is not locally cost effective or technically feasible, the supplier shall submit information documenting that determination.

(e) The data shall be reported using a standardized form developed pursuant to Section 10608.52.

(f) An agricultural water supplier may meet the requirements of subdivisions (d) and (e) by submitting to the department a water conservation plan submitted to the United States Bureau of Reclamation that meets the requirements described in Section 10828.

(g) On or before December 31, 2013, December 31, 2016, and December 31, 2021, the department, in consultation with the board, shall submit to the Legislature a report on the agricultural efficient water management practices that have been implemented and are planned to be implemented and an assessment of the manner in which the implementation of those efficient water management practices has affected and will affect agricultural operations, including estimated water use efficiency improvements, if any.

(h) The department may update the efficient water management practices required pursuant to subdivision (c), in consultation with the Agricultural Water Management Council, the United States Bureau of Reclamation, and the board. All efficient water management practices for agricultural water use pursuant to this chapter shall be adopted or revised by the department only after the department conducts public hearings to allow participation of the diverse geographical areas and interests of the state.

(i) (1) The department shall adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirement in paragraph (1) of subdivision (b).

(2) The initial adoption of a regulation authorized by this subdivision is deemed to address an emergency, for purposes of Sections 11346.1 and 11349.6 of the Government Code, and the department is hereby exempted for that purpose from the requirements of subdivision (b) of Section 11346.1 of the Government Code. After the initial adoption of an emergency regulation pursuant to this subdivision, the department shall not request approval from the Office of Administrative Law to readopt the regulation as an emergency regulation pursuant to Section 11346.1 of the Government Code.

Chapter 5. Sustainable Water Management

10608.50. (a) The department, in consultation with the board, shall promote implementation of regional water resources management practices through increased incentives and removal of barriers consistent with state and federal law. Potential changes may include, but are not limited to, all of the following:

(1) Revisions to the requirements for urban and agricultural water management plans.

(2) Revisions to the requirements for integrated regional water management plans.

(3) Revisions to the eligibility for state water management grants and loans.

(4) Revisions to state or local permitting requirements that increase water supply opportunities, but do not weaken water quality protection under state and federal law.

(5) Increased funding for research, feasibility studies, and project construction.

(6) Expanding technical and educational support for local land use and water management agencies.

(b) No later than January 1, 2011, and updated as part of the California Water Plan, the department, in consultation with the board, and with public input, shall propose new statewide targets, or review and update existing statewide targets, for regional water resources management practices, including, but not limited to, recycled water, brackish groundwater desalination, and infiltration and direct use of urban stormwater runoff.

Chapter 6. Standardized Data Collection

10608.52. (a) The department, in consultation with the board, the California Bay-Delta Authority or its successor agency, the State Department of Public Health, and the Public Utilities Commission, shall develop a single standardized water use reporting form to meet the water use information needs of each agency, including the needs of urban water suppliers that elect to determine and report progress toward achieving targets on a regional basis as provided in subdivision (a) of Section 10608.28.

(b) At a minimum, the form shall be developed to accommodate information sufficient to assess an urban water supplier's compliance with conservation targets pursuant to Section 10608.24 and an agricultural water supplier's compliance with implementation of efficient water management practices pursuant to subdivision (a) of Section 10608.48. The form shall accommodate reporting by urban water suppliers on an individual or regional basis as provided in subdivision (a) of Section 10608.28.

Chapter 7. Funding Provisions

10608.56. (a) On and after July 1, 2016, an urban retail water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

(b) On and after July 1, 2013, an agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

(c) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for achieving the per capita reductions. The supplier may request grant or loan funds to achieve the per capita reductions to the extent the request is consistent with the eligibility requirements applicable to the water funds.

(d) Notwithstanding subdivision (b), the department shall determine that an agricultural water supplier is eligible for a water grant or loan even though the supplier is not implementing all of the efficient water management practices described in Section 10608.48, if the agricultural water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the efficient water management practices. The supplier may request grant or loan funds to implement the efficient water management practices to the extent the request is consistent with the eligibility requirements applicable to the water funds.

(e) Notwithstanding subdivision (a), the department shall determine that an urban retail water supplier is eligible for a water grant or loan even though the supplier has not met the per capita reductions required pursuant to Section 10608.24, if the urban retail water supplier has submitted to the department for approval documentation demonstrating that its entire service area qualifies as a disadvantaged community.

(f) The department shall not deny eligibility to an urban retail water supplier or agricultural water supplier in compliance with the requirements of this part and Part 2.8 (commencing with Section 10800), that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the requirements of this part or Part 2.8 (commencing with Section 10800).

10608.60. (a) It is the intent of the Legislature that funds made available by Section 75026 of the Public Resources Code should be expended, consistent with Division 43 (commencing with Section 75001) of the Public Resources Code and upon appropriation by the Legislature, for grants to implement this part. In the allocation of funding, it is the intent of the

Legislature that the department give consideration to disadvantaged communities to assist in implementing the requirements of this part.

(b) It is the intent of the Legislature that funds made available by Section 75041 of the Public Resources Code, should be expended, consistent with Division 43 (commencing with Section 75001) of the Public Resources Code and upon appropriation by the Legislature, for direct expenditures to implement this part.

Chapter 8. Quantifying Agricultural Water Use Efficiency

10608.64. The department, in consultation with the Agricultural Water Management Council, academic experts, and other stakeholders, shall develop a methodology for quantifying the efficiency of agricultural water use. Alternatives to be assessed shall include, but not be limited to, determination of efficiency levels based on crop type or irrigation system distribution uniformity. On or before December 31, 2011, the department shall report to the Legislature on a proposed methodology and a plan for implementation. The plan shall include the estimated implementation costs and the types of data needed to support the methodology. Nothing in this section authorizes the department to implement a methodology established pursuant to this section.

SEC. 2. Section 10631.5 of the Water Code is amended to read:

10631.5. (a) (1) Beginning January 1, 2009, the terms of, and eligibility for, a water management grant or loan made to an urban water supplier and awarded or administered by the department, state board, or California Bay-Delta Authority or its successor agency shall be conditioned on the implementation of the water demand management measures described in Section 10631, as determined by the department pursuant to subdivision (b).

(2) For the purposes of this section, water management grants and loans include funding for programs and projects for surface water or groundwater storage, recycling, desalination, water conservation, water supply reliability, and water supply augmentation. This section does not apply to water management projects funded by the federal American Recovery and Reinvestment Act of 2009 (Public Law 111-5).

(3) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if the urban water supplier has submitted to the department for approval a schedule, financing plan, and budget, to be included in the grant or loan agreement, for implementation of the water demand management measures. The supplier may request grant or loan funds to implement the water demand management measures to the extent the request is consistent with the eligibility requirements applicable to the water management funds.

(4) (A) Notwithstanding paragraph (1), the department shall determine that an urban water supplier is eligible for a water management grant or loan even though the supplier is not implementing all of the water demand management measures described in Section 10631, if an urban water supplier submits to the department for approval documentation demonstrating that a water demand management measure is not locally cost effective. If the department determines that the documentation submitted by the urban water supplier fails to demonstrate that a water demand management measure is not locally cost effective, the department shall notify the urban water supplier and the agency administering the grant or loan program within 120 days that the documentation does not satisfy the requirements for an exemption, and include in that notification a detailed statement to support the determination.

(B) For purposes of this paragraph, "not locally cost effective" means that the present value of the local benefits of implementing a water demand management measure is less than the present value of the local costs of implementing that measure.

(b) (1) The department, in consultation with the state board and the California Bay-Delta Authority or its successor agency, and after soliciting public comment regarding eligibility requirements, shall develop eligibility requirements to implement the requirement of paragraph (1) of subdivision (a). In establishing these eligibility requirements, the department shall do both of the following:

(A) Consider the conservation measures described in the Memorandum of Understanding Regarding Urban Water Conservation in California, and alternative conservation approaches that provide equal or greater water savings.

(B) Recognize the different legal, technical, fiscal, and practical roles and responsibilities of wholesale water suppliers and retail water suppliers.

(2) (A) For the purposes of this section, the department shall determine whether an urban water supplier is implementing all of the water demand management measures described in Section 10631 based on either, or a combination, of the following:

(i) Compliance on an individual basis.

(ii) Compliance on a regional basis. Regional compliance shall require participation in a regional conservation program consisting of two or more urban water suppliers that achieves the level of conservation or water efficiency savings equivalent to the amount of conservation or savings achieved if each of the participating urban water suppliers implemented the water demand management measures. The urban water supplier administering the regional program shall provide participating urban water suppliers and the department with data to demonstrate that the regional program is consistent with this clause. The department shall review the data to determine whether the urban water suppliers in the regional program are meeting the eligibility requirements.

(B) The department may require additional information for any determination pursuant to this section.

(3) The department shall not deny eligibility to an urban water supplier in compliance with the requirements of this section that is participating in a multiagency water project, or an integrated regional water management plan, developed pursuant to Section 75026 of the Public Resources Code, solely on the basis that one or more of the agencies participating in the project or plan is not implementing all of the water demand management measures described in Section 10631.

(c) In establishing guidelines pursuant to the specific funding authorization for any water management grant or loan program subject to this section, the agency administering the grant or loan program shall include in the guidelines the eligibility requirements developed by the department pursuant to subdivision (b).

(d) Upon receipt of a water management grant or loan application by an agency administering a grant and loan program subject to this section, the agency shall request an eligibility determination from the department with respect to the requirements of this section. The department shall respond to the request within 60 days of the request.

(e) The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities. In addition, for urban water suppliers that are signatories to the Memorandum of Understanding Regarding Urban Water Conservation in California and submit biennial reports to the California Urban Water Conservation Council in accordance with the memorandum, the department may use these reports to assist in tracking the implementation of water demand management measures.

(f) This section shall remain in effect only until July 1, 2016, and as of that date is repealed, unless a later enacted statute, that is enacted before July 1, 2016, deletes or extends that date.

SEC. 3. Part 2.8 (commencing with Section 10800) of Division 6 of the Water Code is repealed.

SEC. 4. Part 2.8 (commencing with Section 10800) is added to Division 6 of the Water Code, to read:

PART 2.8. AGRICULTURAL WATER MANAGEMENT PLANNING

Chapter 1. General Declarations and Policy

10800. This part shall be known and may be cited as the Agricultural Water Management Planning Act.

10801. The Legislature finds and declares all of the following:

(a) The waters of the state are a limited and renewable resource.

(b) The California Constitution requires that water in the state be used in a reasonable and beneficial manner.

(c) Urban water districts are required to adopt water management plans.

(d) The conservation of agricultural water supplies is of great statewide concern.

(e) There is a great amount of reuse of delivered water, both inside and outside the water service areas.

(f) Significant noncrop beneficial uses are associated with agricultural water use, including streamflows and wildlife habitat.

(g) Significant opportunities exist in some areas, through improved irrigation water management, to conserve water or to reduce the quantity of highly saline or toxic drainage water.

(h) Changes in water management practices should be carefully planned and implemented to minimize adverse effects on other beneficial uses currently being served.

(i) Agricultural water suppliers that receive water from the federal Central Valley Project are required by federal law to prepare and implement water conservation plans.

(j) Agricultural water users applying for a permit to appropriate water from the board are required to prepare and implement water conservation plans.

10802. The Legislature finds and declares that all of the following are the policies of the state:

(a) The conservation of water shall be pursued actively to protect both the people of the state and the state's water resources.

(b) The conservation of agricultural water supplies shall be an important criterion in public decisions with regard to water.

(c) Agricultural water suppliers shall be required to prepare water management plans to achieve conservation of water.

Chapter 2. Definitions

10810. Unless the context otherwise requires, the definitions set forth in this chapter govern the construction of this part.

10811. "Agricultural water management plan" or "plan" means an agricultural water management plan prepared pursuant to this part.

10812. "Agricultural water supplier" has the same meaning as defined in Section 10608.12.

10813. "Customer" means a purchaser of water from a water supplier who uses water for agricultural purposes.

10814. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of that entity.

10815. "Public agency" means any city, county, city and county, special district, or other public entity.

10816. "Urban water supplier" has the same meaning as set forth in Section 10617.

10817. "Water conservation" means the efficient management of water resources for beneficial uses, preventing waste, or accomplishing additional benefits with the same amount of water.

Chapter 3. Agricultural Water Management Plans

Article 1. General Provisions

10820. (a) An agricultural water supplier shall prepare and adopt an agricultural water management plan in the manner set forth in this chapter on or before December 31, 2012, and shall update that plan on December 31, 2015, and on or before December 31 every five years thereafter.

(b) Every supplier that becomes an agricultural water supplier after December 31, 2012, shall prepare and adopt an agricultural water management plan within one year after the date it has become an agricultural water supplier.

(c) A water supplier that indirectly provides water to customers for agricultural purposes shall not prepare a plan pursuant to this part without the consent of each agricultural water supplier that directly provides that water to its customers.

10821. (a) An agricultural water supplier required to prepare a plan pursuant to this part shall notify each city or county within which the supplier provides water supplies that the agricultural water supplier will be preparing the plan or reviewing the plan and considering amendments or changes to the plan. The agricultural water supplier may consult with, and obtain comments from, each city or county that receives notice pursuant to this subdivision.

(b) The amendments to, or changes in, the plan shall be adopted and submitted in the manner set forth in Article 3 (commencing with Section 10840).

Article 2. Contents of Plans

10825. (a) It is the intent of the Legislature in enacting this part to allow levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

(b) This part does not require the implementation of water conservation programs or practices that are not locally cost effective.

10826. An agricultural water management plan shall be adopted in accordance with this chapter. The plan shall do all of the following:

(a) Describe the agricultural water supplier and the service area, including all of the following:

(1) Size of the service area.

(2) Location of the service area and its water management facilities.

(3) Terrain and soils.

(4) Climate.

(5) Operating rules and regulations.
(6) Water delivery measurements or calculations.
(7) Water rate schedules and billing.
(8) Water shortage allocation policies.

(b) Describe the quantity and quality of water resources of the agricultural water supplier, including all of the following:
(1) Surface water supply.
(2) Groundwater supply.
(3) Other water supplies.
(4) Source water quality monitoring practices.
(5) Water uses within the agricultural water supplier's service area, including all of the following:
(A) Agricultural.
(B) Environmental.
(C) Recreational.
(D) Municipal and industrial.
(E) Groundwater recharge.
(F) Transfers and exchanges.
(G) Other water uses.
(6) Drainage from the water supplier's service area.
(7) Water accounting, including all of the following:
(A) Quantifying the water supplier's water supplies.
(B) Tabulating water uses.
(C) Overall water budget.
(8) Water supply reliability.

(c) Include an analysis, based on available information, of the effect of climate change on future water supplies.

(d) Describe previous water management activities.

(e) Include in the plan the water use efficiency information required pursuant to Section 10608.48.

10827. Agricultural water suppliers that are members of the Agricultural Water Management Council, and that submit water management plans to that council in accordance with the "Memorandum of Understanding Regarding Efficient Water Management Practices By Agricultural Water Suppliers In California," dated January 1, 1999, may submit the water management plans identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of Section 10826.

10828. (a) Agricultural water suppliers that are required to submit water conservation plans to the United States Bureau of Reclamation pursuant to either the Central Valley Project Improvement Act (Public Law 102-575) or the Reclamation Reform Act of 1982, or both, may submit those water conservation plans to satisfy the requirements of Section 10826, if both of the following apply:

(1) The agricultural water supplier has adopted and submitted the water conservation plan to the United States Bureau of Reclamation within the previous four years.

(2) The United States Bureau of Reclamation has accepted the water conservation plan as adequate.

(b) This part does not require agricultural water suppliers that are required to submit water conservation plans to the United States Bureau of Reclamation pursuant to either the Central Valley Project Improvement Act (Public Law 102-575) or the Reclamation Reform Act of 1982, or both, to prepare and adopt water conservation plans according to a schedule that is different from that required by the United States Bureau of Reclamation.

10829. An agricultural water supplier may satisfy the requirements of this part by adopting an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) or by participation in areawide, regional, watershed, or basinwide water management planning if those plans meet or exceed the requirements of this part.

Article 3. Adoption and Implementation of Plans

10840. Every agricultural water supplier shall prepare its plan pursuant to Article 2 (commencing with Section 10825).

10841. Prior to adopting a plan, the agricultural water supplier shall make the proposed plan available for public inspection, and shall hold a public hearing on the plan. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned agricultural water supplier pursuant to Section 6066 of the Government Code. A privately owned agricultural water supplier shall provide an equivalent notice within its service area and shall provide a reasonably equivalent opportunity that would otherwise be afforded through a public hearing process for interested parties to provide input on the plan. After the hearing, the plan shall be adopted as prepared or as modified during or after the hearing.

10842. An agricultural water supplier shall implement the plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan, as determined by the governing body of the agricultural water supplier.

10843. (a) An agricultural water supplier shall submit to the entities identified in subdivision (b) a copy of its plan no later than 30 days after the adoption of the plan. Copies of amendments or changes to the plans shall be submitted to the entities identified in subdivision (b) within 30 days after the adoption of the amendments or changes.

(b) An agricultural water supplier shall submit a copy of its plan and amendments or changes to the plan to each of the following entities:

(1) The department.

(2) Any city, county, or city and county within which the agricultural water supplier provides water supplies.

(3) Any groundwater management entity within which jurisdiction the agricultural water supplier extracts or provides water supplies.

(4) Any urban water supplier within which jurisdiction the agricultural water supplier provides water supplies.

(5) Any city or county library within which jurisdiction the agricultural water supplier provides water supplies.

(6) The California State Library.

(7) Any local agency formation commission serving a county within which the agricultural water supplier provides water supplies.

10844. (a) Not later than 30 days after the date of adopting its plan, the agricultural water supplier shall make the plan available for public review on the agricultural water supplier's Internet Web site.

(b) An agricultural water supplier that does not have an Internet Web site shall submit to the department, not later than 30 days after the date of adopting its plan, a copy of the adopted plan in an electronic format. The department shall make the plan available for public review on the department's Internet Web site.

10845. (a) The department shall prepare and submit to the Legislature, on or before December 31, 2013, and thereafter in the years ending in six and years ending in one, a report summarizing the status of the plans adopted pursuant to this part.

(b) The report prepared by the department shall identify the outstanding elements of any plan adopted pursuant to this part. The report shall include an evaluation of the effectiveness of this part in promoting efficient agricultural water management practices and recommendations relating to proposed changes to this part, as appropriate.

(c) The department shall provide a copy of the report to each agricultural water supplier that has submitted its plan to the department. The department shall also prepare reports and provide data for any legislative hearing designed to consider the effectiveness of plans submitted pursuant to this part.

(d) This section does not authorize the department, in preparing the report, to approve, disapprove, or critique individual plans submitted pursuant to this part.

Chapter 4. Miscellaneous Provisions

10850. (a) Any action or proceeding to attack, review, set aside, void, or annul the acts or decisions of an agricultural water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(1) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(2) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 120 days after submitting the plan or amendments to the plan to entities in accordance with Section 10844 or the taking of that action.

(b) In an action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an agricultural water supplier, on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse

of discretion is established if the agricultural water supplier has not proceeded in a manner required by law, or if the action by the agricultural water supplier is not supported by substantial evidence.

10851. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part. This part does not exempt projects for implementation of the plan or for expanded or additional water supplies from the California Environmental Quality Act.

10852. An agricultural water supplier is not eligible for a water grant or loan awarded or administered by the state unless the supplier complies with this part.

10853. No agricultural water supplier that provides water to less than 25,000 irrigated acres, excluding recycled water, shall be required to implement the requirements of this part or Part 2.55 (commencing with Section 10608) unless sufficient funding has specifically been provided to that water supplier for these purposes.

SEC. 5. This act shall take effect only if Senate Bill 1 and Senate Bill 6 of the 2009–10 Seventh Extraordinary Session of the Legislature are enacted and become effective.

O

APPENDIX D

GROUNDWATER BASIN INFORMATION

County of Madera
Engineering and General Services
Madera, CA

AB3030

Groundwater Management Plan

Madera County

Final Draft

January 2002

Prepared by:

Todd Engineers
Emeryville, CA

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AB3030 GROUNDWATER MANAGEMENT PLAN

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1. INTRODUCTION

Highly productive groundwater basins of the San Joaquin Valley underlie the western one-third of Madera County including more than 500,000 acres (Figure 1-1). The County of Madera recognizes the importance of groundwater to the economy and well-being of its residents. More than one-half of the County's water supply for agriculture, municipal, and domestic use is provided by groundwater. In addition, almost 100 percent of the county's drinking water is supplied from groundwater. Because of the reliance on groundwater, water levels beneath the County have been declining for decades, increasing the cost of pumping and jeopardizing the groundwater basin's yield in terms of quantity and quality.

1.1 Purpose

The County has adopted several ordinances for the protection of groundwater including a recent requirement for a permit application and public review process of any activity that results in importing, banking, or exporting groundwater from the County. Cities and other local agencies in the County have also adopted groundwater management practices in their service areas. In this AB3030 plan, the County desires to:

- study the current condition of the groundwater basins
- document current groundwater management practices, and
- explore techniques to cooperatively manage one of the County's most important resources.

1.2 Authority

The law that we generally refer to as AB3030 is contained in the California Water Code beginning with Section 10750. The authority of the County to adopt a groundwater management plan is set forth in Water Code Section 10753 (a) and (b) as follows:

> (a) Any local agency, whose service area includes a groundwater basin, or a portion of a groundwater basin, that is not subject to groundwater management pursuant to other provisions of law or a court order, judgment, or decree, may, by ordinance, or by resolution if the local agency is not authorized to act by ordinance, adopt and implement a groundwater management plan pursuant to this part within all or a portion of its service area.
>
> (b) Notwithstanding subdivision (a), a local public agency, other than an agency defined in subdivision (g) of Section 10752, that provides flood control, groundwater management, or groundwater replenishment, or a local agency formed pursuant to this code for the principal purpose of providing water service that has not yet provided that service, may exercise the authority of this part within a groundwater basin that is located within its boundaries within areas that are either of the following: (1) Not served by a local agency, (2) Served by a local agency whose governing body, by a majority vote, declines to exercise the authority of this part and enters into an agreement with the local public agency pursuant to Section 10750.7 to 10750.8.

The County provides water service to its residents and conducts groundwater management, and therefore has authority under both of these provisions to prepare an

AB3030 Groundwater Management Plan (Plan). The County adopted a resolution to prepare a Groundwater Management Plan in accordance with AB3030 (Appendix A).

1.3 Madera County Groundwater Basins

AB3030 plans can be prepared for any groundwater basin in the State as defined by the California Department of Water Resources (DWR). Three groundwater basins as defined by DWR underlie Madera County (Figure 1-2) (DWR, 1975; 1980; 1995c). These basins, Chowchilla Groundwater Basin, Madera Groundwater Basin, and Delta-Mendota Groundwater Basin, are subbasins of the larger San Joaquin Basin and are hydraulically connected. Basin boundaries were originally defined by DWR in Bulletin 118 and based predominantly on natural geologic and hydrogeologic boundaries such as the edge of alluvial sediments or natural groundwater divides. Some basin boundaries were also defined by institutional conditions such as a water district service area boundary (personal communication, A. Steele, July 13, 2001). Even though conditions such as natural groundwater divides have changed over time, historical basin boundaries are maintained for consistency. This Plan uses updated boundaries from recently-available basin maps published on the Internet by DWR (DWR, 1995c) (Figure 1-2).

During the 1980 update of Bulletin 118, DWR conducted an assessment of overdraft conditions in California's groundwater basins. (Overdraft refers to the condition where more water is being removed from a groundwater basin than is being replenished). Although all of the Madera County groundwater basins were determined to be in an overdraft condition, two of the basins were designated as being in a state of "critical overdraft," a loosely defined term that has been abandoned in recent versions of Bulletin 118 (Kenneth Fransen, personal communication, September 18, 2001). Because AB3030 uses the "critically overdrafted" designation as a criterion for the type of agency that can prepare an AB3030 plan, the 1980 designations are retained in this document. The following table summarizes the size and overdraft designation of Madera County groundwater basins.

Groundwater Basin	*Area in Madera County*[1]	*Overdraft Designation*[2]
Madera Basin	372,000 acres	Critically Overdrafted
Chowchilla Basin	120,000 acres	Critically Overdrafted
Delta-Mendota Basin	15,746 acres	Not Critically Overdrafted
TOTAL	**507,746 acres**	

[1] *All acres in this Plan are approximate*
[2] *DWR, 1980*

As shown above, the portion of the County that overlies groundwater basins covers approximately 507,746 acres and is referred to as the Study Area in this report.

1.4 Plan Area

Seven AB3030 Groundwater Management Plans have been prepared for portions of Madera County as summarized below. The service area for each agency is shown on Figure 1-3.

Water Agency	AB3030 Plan	Groundwater Basin	Madera Co. Plan Area[1]	Ave. Water Delivery[2]
Chowchilla WD-Red Top RCD-City of Chowchilla JPA[3]	1997	Chowchilla	103,220 acres	156,000 AFY[4]
San Joaquin Exchange Contr. (Columbia Canal Company)	1997	Delta-Mendota	15,746 acres	58,500 AFY
Madera Irrigation District	1999	Madera	128,294 acres	95,557 AFY
Gravelly Ford Water District	1998	Madera	8,300 acres	14,801 AFY
Madera Water District	1997	Madera	3,740 acres	10,084 AFY[5]
Aliso Water District	1996	Madera	25,723 acres[6]	0 AFY
Root Creek Water District	1997	Madera	9,234 acres	0 AFY
Total Acreage Covered by AB3030 Plans			294,257 acres	

[1] *Approximate Acreage in Madera County covered by an AB3030 Plan*
[2] *Average deliveries reported in AB3030 Plans*
[3] *JPA amended to include City of Chowchilla after initial AB3030 Plan prepared*
[4] *Includes some delivery outside Madera County*
[5] *Includes surface water purchased from MID and groundwater*
[6] *Includes 5,575 acres annexed since original AB3030 Plan*

The County's AB3030 Plan may not cover the service area of local agencies that provide water service as defined by AB3030. As shown on the table above, two water districts (Aliso Water District, and Root Creek Water District) do not currently deliver water. In addition, Red Top Resource Conservation District (RCD) does not deliver water, although the district participates in the AB3030 process with two agencies that do deliver water (Chowchilla Water District and the City of Chowchilla). According to AB3030, the County could have included these service areas in the County's Plan, but has chosen to exclude areas covered by an existing AB3030 plan and to work cooperatively with all water agencies to manage the County's groundwater.

The Chowchilla-Red Top RCD-City of Chowchilla AB3030 plan excluded service areas for Sierra Water District (approximately 6,200 acres), Progressive Water District (approximately 7,440 acres), and Clayton Water District (approximately 3,140 acres) (Figure 1-3). Sierra Water District is no longer active and has apparently been dissolved (Richard Harman, personal communication, July 30, 2001). No contact has been identified for Clayton Water District, Progressive Water District, or New Stone Water District (approximately 2,100 acres, a portion of which is apparently in the Progressive WD service area). A person familiar with water districts in Madera County believes that these three districts are inactive (Franklin Secara, personal communication, October 9, 2001). For the purposes of this Plan, it is assumed that Sierra Water District, Clayton Water District, Progressive Water District, and New Stone Water District are

inactive and their former service areas are included in the County's Plan area (total 16,780 acres in the Chowchilla Groundwater Basin).

The County's plan will also exclude the incorporated cities of Chowchilla and Madera. The City of Chowchilla has been included in the Chowchilla Water District – Red Top RCD AB3030 Plan through an amended Joint Powers Authority (JPA). With the exception of approximately 800 acres, the city limits of Madera were included in the MID AB3030. Accordingly, only an additional 800 acres in the City of Madera needs to be excluded for the purposes of defining the area covered by the County's Plan. In light of these exclusions, the County Plan will cover approximately 212,689 acres or approximately 42 percent of the valley area as summarized below:

Total Area of Groundwater Basins	**507,746 acres**
Less Area Covered by Existing AB3030 Plans	**-294,257 acres**
Less Additional Incorporated Area	**- 800 acres**
Approximate Area of County AB3030 Plan	**212,689 acres**

The Plan area covers portions of the Madera Groundwater Basin and the Chowchilla Groundwater Basin. Since the Madera County portion of the Delta-Mendota Groundwater Basin is already covered by an AB3030 Plan, the County Plan area does not include portions of that basin. In the Madera Groundwater Basin, the Plan area includes the gray portions on Figure 1-3 that are not within water district, irrigation district, or city boundaries. In the Chowchilla Groundwater Basin, the Plan area covers the former service areas of Sierra Water District, Clayton Water District, and Progressive Water District (Figure 1-3).

By necessity, all of Madera County that is underlain by groundwater basins (approximately 507,746 acres) is designated as the Study Area, providing a technical basis for cooperative/coordinated management.

1.5 Plan Components

AB3030 provides a checklist of 12 groundwater management components that may be considered in the planning process (Section 10753.7). These components are listed below preserving the order and wording from the AB3030 code. Most of these components are applicable to Madera County and are considered in the assessment of current hydrogeologic conditions and plan development.

1. The control of saline water intrusion
2. Identification and management of wellhead protection and recharge areas
3. Regulation of the migration of contaminated groundwater
4. The administration of a well abandonment and well destruction program
5. Mitigation of conditions of overdraft
6. Replenishment of groundwater extracted by water producers
7. Monitoring of groundwater levels and storage
8. Facilitating conjunctive use operations

9. Identification of well construction policies
10. The construction and operation of groundwater contamination cleanup, recharge, storage, conservation, water recycling, and extraction projects
11. The development of relationships with state and federal regulatory agencies
12. The review of land use plans and coordination with land use planning agencies to assess activities which create a reasonable risk of groundwater contamination

1.6 Plan Acknowledgements

This Plan was prepared by Phyllis Stanin of Todd Engineers under the direction of the Madera County Water Oversight Committee. This committee is composed of representatives from 12 water agencies, cities, and stakeholders in the County and represents a cooperative effort in county-wide groundwater management. A list of Committee members is included on Table 1-1.

Numerous committee members as well as many County employees were instrumental in providing assistance to this Plan. The AB3030 Subcommittee, including Denis Prosperi, Michele Lasgoity, Loren Freeman, and Dr. Claude Rust, provided overall direction, selection of plan goals, and review of draft documents. Michael Kirn, County Engineer, coordinated the project, furnished data sets, and provided access to key personnel and data from DWR and the County. Kenneth Fransen, attorney for Bolen, Fransen & Russell, representing the County, provided valuable review of the AB3030 Plan. Joe Beck, County Facilities Engineer, provided data on County-operated water systems. Wayne Fox, Senior REHS of the County's Environmental Health Water Program, provided water quality data, answered numerous questions, and facilitated access to data from the California Department of Health Services (DHS). Other personnel in Environmental Health, including Jill Nishi and Ruthanne Harbison, also offered valuable information. Robert Rolan, County Agricultural Commissioner, provided information on crop acreage and agricultural activities in the County. Randy Houk, Manager of Columbia Canal Company, provided numerous technical reports, documents, and data sets for the western portion of the County, as well as valuable insights on technical details in the basin. Don Roberts, Chief Engineer for the Madera Irrigation District, provided District data and helpful information. Leon Lancaster, City Engineer for the City of Madera, answered numerous questions, furnished city maps, and provided access to the City's Draft Water Master Plan. Robert Acree and Douglas Lackey of the Chowchilla City Water Department answered questions and provided data from city wells.

Additional contacts from other water districts and water companies provided information on district activities and data including Doug Welch of Chowchilla Water District, Steve Varner of Sierra Foothills Utility District, Jerry Bryant of the Madera Water District, Roy Jones of Madera Valley Water Company, Richard Harman of the former Sierra Water District, Franklin Secara of Gravelly Ford Water District, Philip Pierre of Root Creek Water District, and Denis Prosperi of Aliso Water District. Carol Matts at DHS provided water quality data, and Jarrod Ramsey-Lewis of the California Regional Water Quality Control Board (RWQCB) facilitated water quality file reviews.

The Department of Water Resources, San Joaquin Division provided historical water level contour maps, well logs, and other valuable data. Additional Todd Engineers staff provided technical assistance, document review, and computer graphics.

2. HYDROGEOLOGIC CONDITIONS

One of the benefits of a groundwater management plan is to provide a review of existing hydrogeologic conditions in the basin and document current groundwater levels, quantity, and quality. This section provides this overview and describes specific hydrogeologic analyses conducted for the County Plan.

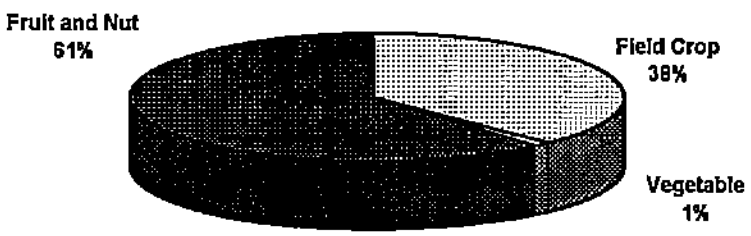
2.1 Physical Setting

Madera County covers approximately 2,147 square miles (1.4 million acres) in the geographic center of California (Madera County General Plan, 1995). The county consists of three geographic regions, the valley floor in the west, the foothills in the center of the County, and the mountains in the east, with each area covering approximately one-third of the County. The Study Area covers the valley floor, which is a portion of the larger San Joaquin Valley. The valley floor slopes at a rate of approximately nine feet per mile from an approximate elevation of more than 400 feet above mean sea level (msl) near the groundwater basin boundary in the east to approximately 130 feet msl in the northwestern corner.

The 1998 population of Madera County was estimated at 114,349 persons (EDC, 2001). About 44 percent of the County's population resides in the cities of Madera (1998 population of 36,291) and Chowchilla (1998 population of 13,498). All of the land outside of these two cities is unincorporated. By 2005, the population is projected to grow to 152,726 persons. This growth on the valley floor is targeted for current urban areas and areas designated as new growth areas south and east of the City of Madera (Madera County General Plan, 1995). The current mix of urban and agricultural land uses is shown on a 1995 land use map in Figure 2-1 (DWR, 1995b).

Agriculture has supported Madera County since the late 1800s when much of the valley floor was developed for farming and ranching (Madera County Agricultural Crop Report, 2001). The focus of agriculture in Madera County has shifted over the years from rangeland and livestock to wheat to the mix of crops grown today. Over the last 20 years, fruit and nut crop acreage has more than doubled while field crop acreage has declined by almost one-half. A recent shift to permanent plantings has increased the need for a reliable water supply.

Currently, crops are harvested from about 308,850 acres in Madera County, covering more than 60 percent of the Study Area (Madera County Agricultural Crop Report, 2001). The general distribution of crop types and other land uses in 1995 is shown on the DWR Land Use map on Figure 2-1. Harvested acres of each crop type are tabulated each year by the County Department of Agriculture (Madera County Agricultural Crop Report, 2001). Fruit and nut crops cover the largest area (188,090 acres), followed by field crops (116,620 acres excluding un-irrigated rangeland), and vegetables (3,400 acres) as shown graphically below. Additional agricultural acreage includes 740 acres of nursery stock



Grapes represent more than one-half of the fruit and nut acreage followed by almonds and pistachios. Field crops consist predominantly of alfalfa, cotton, wheat, and corn. More than 15 types of vegetables are represented by the one percent of harvested acreage for vegetables shown above.

Irrigation requirements vary with crop type. Acreage for specific crops and corresponding irrigation water requirements are provided on Table 2-1. As shown on the table, irrigation amounts (applied water) average approximately 3.1 AF/acre and total approximately 939,955 AFY, based on DWR estimates of irrigation requirements per crop. Actual irrigation amounts can vary considerably with soil types and are used here only as a general indicator of irrigation demand in the Study Area.

Since a portion of the applied water percolates back down to the water table, the total amount of irrigation is not lost from the groundwater system. The amount of percolating groundwater returned to the aquifer, referred to as return flows, is dependent predominantly on the efficiency of irrigation systems and soil types. If an average irrigation efficiency of 80 percent can be assumed across the Study Area, then approximately 751,964 AFY (2.4 AF/acre) of the 939,955 AFY of applied water is consumed by crops in the Study Area. Additional agricultural water uses include dairies (50 in Study Area) and cattle (more than 70,000 head in Madera County).

The Study Area climate is arid to semi-arid with hot summers and mild winters. Relatively small amounts of precipitation occur on the valley floor as shown by annual precipitation over the last 70 years (Figure 2-2). As shown on Figure 2-2, annual precipitation is highly variable, ranging from less than five inches (4.73 inches in 1932) to more than 22 inches (22.13 inches in 1983). The precipitation record demonstrates drought and wet cycles with the wettest periods of record occurring in the last twenty years (1978-1983, 1996, and 1998). Prolonged periods of below normal precipitation (drought cycles) have occurred in the early 1960s, the early to mid-1970s, and the mid- to late 1980s. Mean annual precipitation at the City of Madera is approximately 10.6 inches per year (NOAA, 2001; DWR, 2001). Because more than 80 percent of the precipitation occurs from October through March on an average basis, agriculture depends heavily on groundwater and surface water irrigation during the growing season.

The Study Area is bounded on the south and west by the San Joaquin River, on the north by the Chowchilla River, and on the east by the approximate edge of the valley alluvial sediments (groundwater basin boundary) (Figure 1-3). Internally, the Study Area is drained by the Fresno River as well as various sloughs, creeks, and man-made canals for water delivery. Dams and water storage reservoirs have been constructed upstream on the three principal rivers providing surface water storage as summarized in the table below (USBR, 2001a; SJREC, 2001; DWR, 1996).

Drainage	*Dam/Reservoir*	*Year Constructed*	*Storage (AF)*	*Drainage Area (square miles)*
San Joaquin River	Friant Dam/ Millerton Lake[1]	1947	520,500 AF	1,650 sq. miles
Additional	upstream storage		607,600 AF	
Fresno River	Hidden Dam/ Hensley Lake[2]	1975	90,000 AF	234 sq. miles
Chowchilla River	Buchanan Dam/ Eastman Lake[2]	1979	150,000 AF	235 sq. miles

[1] *Operated by the U. S. Bureau of Reclamation*
[2] *Operated by the Army Corps of Engineers*

Water in each of the reservoirs is released and diverted to supplement groundwater for irrigation on the valley floor. The largest water delivery canal in Madera County is the Madera Canal, built by the U.S. Bureau of Reclamation (USBR) in 1945 to convey water from Millerton reservoir to Madera County growers (Figure 1-3). The 36-mile Madera Canal extends across the County near the basin boundary, terminating at the Chowchilla River. Although portions of the canal are concrete-lined (approximately 21 percent), most of the Madera Canal is earth-lined (approximately 79 percent), allowing for seepage to groundwater. Water depths in the canal average nine feet. In water year 1995-1996, more than 363,000 AF of surface water was diverted into the Madera Canal at Friant Dam (USGS, 1996). However, more than 75,000 AF was flood/storage-type releases from October through March and unavailable for irrigation during the growing season.

2.2 Hydrostratigraphy and Groundwater Occurrence

Groundwater hydrology of the Central Valley including the Study Area has been investigated and summarized in numerous documents over the last 95 years (Mendenhall, 1908; Mendenhall, et al., 1916; Davis, et al., 1959; DWR, 1966; Mitten et al., 1970; Templin, 1984; Gronberg, et al., 1998; among others). These published data are the basis of the following discussion on hydrostratigraphy and groundwater occurrence in the Study Area.

The San Joaquin groundwater basin is part of a large, northwest-trending, asymmetric structural trough filled with deeper marine and shallower continental sediments. The crystalline bedrock beneath the sediments in the Study Area is composed of pre-Tertiary granitic rocks of the Sierra Nevada. These rocks outcrop east of the Study Area and slope westward beneath the groundwater basin to depths of more than 10,000 feet. Marine and continental sediments of pre-Tertiary and Tertiary age overlie the

bedrock in the deepest portions of the basin and do not extend to the surface. These sediments are below the aquifers of the groundwater basin and would not likely yield high quantity and quality water to wells as indicated by limited data from exploratory oil and gas well logs.

The aquifers of the Study Area are composed of alluvial sediments of Quaternary and Holocene age that have been eroded and reworked from the granitic rocks to the east forming coalescing alluvial fans. The source area and manner of deposition have resulted in most of the aquifers in the Study Area exhibiting high-yielding wells of good quality water. These deposits are inter-bedded with flood-basin, lacustrine, and marsh deposits in the western portion of the Study Area, where aquifers generally yield poorer quality groundwater associated with these depositional environments. A generalized hydrogeologic cross section is provided on Figure 2-3.

Aquifers are composed of unconsolidated gravels, sands, silts, and clays. The coarse grain sediments (sands and gravels) provide the higher transmissivity of groundwater. The amount of coarse grain sediments in the shallow aquifers was estimated by USGS (Mitten, et al., 1970) using well logs from the Study Area. A map illustrating their findings is reproduced as Figure 2-4. Darker color areas represent aquifers with more than 50 percent fine-grain sediments and lighter color areas represent aquifers with more than 50 percent coarse-grain sediments. In general more coarse-grain sediments were deposited in the southern and west-central portions of the Study Area.

Aquifer parameters were estimated in the USGS studies based on aquifer tests and well log descriptions. Transmissivity (T) values in the Study Area have been estimated to range from 18,000 gallons per day per foot (gpd/ft) to 99,000 gpd/ft. Estimated specific yields for coarse grain aquifer sediments were estimated to be between about 9 percent and 25 percent.

The lacustrine and marsh environments produced extensive clay deposits that are thickest in the west and thin to the east. Early correlations of subsurface sediment layers resulted in alpha-type designations of the clay lenses, including the A-, B-, C-, D-, and E-clays. Because the E-clay was among the most continuous and extensive of the clay lenses and was readily identified on geophysical logs in the area, it has been studied and mapped throughout the Study Area. The E-clay corresponds to the regional Corcoran Clay and is a major confining unit over the Study Area. The depth, thickness, and regional extent of the E-clay beneath the Study Area are shown on Figure 2-3 as separating the unconfined and confined aquifers.

The clays beneath the western portion of the Study Area were deposited in reducing environments as evidenced by the blue and green colors of the fine-grain sediments. Oxidizing environments of deposition are indicated beneath most of the eastern portion of the Study Area (generally east of the Highway 99 corridor). Because these depositional environments may be linked to groundwater quality, the general vertical distributions of oxidized and reduced sediments are shown on Figure 2-3.

The base of the fresh groundwater has been estimated by numerous investigators using water quality samples and geophysical logs (Page, 1973; Hotchkiss and Balding, 1971; Templin, 1984). Beneath the Study Area, the base of the fresh water is estimated at elevations ranging from more than 1,000 feet below msl in the east up to less than 400 feet below msl in the southwest. Since current water levels in the County range from above 200 feet to below 100 feet msl (DWR, 1999), the thickness of the aquifer interval containing fresh water is estimated to range from about 500 to 1,200 feet thick.

Groundwater generally occurs under unconfined conditions in the shallow aquifers beneath the Study Area. Groundwater beneath the E-clay is generally considered to be under confined conditions. Groundwater levels range from less than five feet below ground surface along some portions of the San Joaquin River to more than 150 feet below ground surface in the central portion of the Study Area. Water levels from Spring 1999 are shown on Figure 2-3 and discussed in more detail in the following section.

2.3 Groundwater Levels

Water level data are available in the Study Area from USGS documents and DWR. Early investigations conducted by the USGS provide historical data and maps before groundwater was developed throughout the valley (Mendenhall, 1908; Mendenhall, et al., 1916). Water level data from about the 1920s to the present are compiled and maintained in an electronic database by the DWR. This database, containing water level data from more than 750 wells in the Study Area, was provided by DWR for use in this study. Data were combined, reformatted and reviewed to determine frequency of measurements and quality of data. Wells with more complete historical records were selected for plotting water levels over time (hydrographs) on consistent scales to examine long-term trends in the basin.

Groundwater investigations in the early 1900s documented artesian conditions in the western portion of the Study Area where groundwater flowed naturally to the surface in wells (Mendenhall, 1908). Water levels beneath the Study Area averaged more than 200 feet above mean sea level (msl) during that time. With increasing groundwater development in the 1930s, due in part to the development of the deep-well turbine pump, water levels exhibited a long-term declining trend that continues today. The long-term declining trend in water levels is illustrated on 66 hydrographs that were plotted for this Plan, showing water levels in selected wells from 1920 to 2000. Of the 66 hydrographs constructed, 36 were selected to illustrate long-term trends in various portions of the basin. Three example hydrographs are shown on Figure 2-5. The locations of the 36 wells with hydrographs including the three example wells are shown on Figure 2-6. Hydrographs for the 36 wells are included as Appendix B.

As shown by the first two hydrographs from the Chowchilla and Central Madera basins, water levels beneath portions of Madera County have declined at least since the 1920s (Figure 2-5). As shown by the hydrograph from the Southern Madera Basin, wells close to the San Joaquin River benefit from local streamflow recharge and do not exhibit declines similar to those in the central Study Area. Overall declines since the 1920s range

from less than 10 feet in wells near the San Joaquin River to more than 150 feet in northwestern Madera County. In one well west of Chowchilla, the water table has dropped from 15 feet below the ground surface to more than 160 feet below the ground surface over this time period. Overall declines of approximately 100 feet have been recorded in wells in the central portion of the Study Area, including areas northwest, west, and southwest of the City of Madera.

In general water levels correspond to precipitation and availability of surface water deliveries, rising during wet periods and falling during periods of drought. As shown on the hydrographs, water levels declined sharply during the dry years in the early 1970s, but recovered back to pre-1970 levels during the wet years of the 1980s. During the drought of the middle to late 1980s, water levels generally fell at an accelerated rate compared to other droughts in the period of record and have not recovered significantly even though the drought was followed by several of the wettest years on record. This is likely attributable to increased pumping over time. An additional factor could be lower specific yields associated with deeper sediments. Since the water storage capacity in each foot of aquifer declines with depth, an equivalent amount of groundwater extraction from deeper sediments will result in larger water level declines than in more permeable shallow sediments. Both of these conditions suggest increasingly rapid declines in the future unless overdraft is mitigated.

In addition to the long-term trends, water levels rise and fall on a seasonal basis, representing pumping associated with the growing season. High water levels are typically recorded in February or March, declining to seasonal water level lows in October. The amount of seasonal fluctuation varies considerably with distance to a pumping well and measures more than 30 feet in some areas.

2.4 Groundwater Flow

DWR prepares annual to biannual water level contour maps for the unconfined aquifer of the Southern San Joaquin Valley, including the Madera County Study Area. For this Plan, 24 maps from Spring 1936 through Spring 1999 were compiled and [illegible] additional water level contour maps prepared by the USGS for 1900, 1952, and 1966 were also reviewed (Mendenhall, 1908; Davis, et al., 1959; Templin, 1984). These maps, which provide useful historical and recent information on groundwater levels and groundwater flow in the Study Area, are the basis of the following analysis.

2.4.1 Regional Flow

The Spring 1999 DWR water level contour map is reproduced on Figure 2-6, indicating general groundwater flow directions in the Study Area with arrows. Depressions in the water table generally control flow in the shallow aquifer. In the southeast, a broadly-defined pumping depression with levels below 180 feet msl captures basin inflow from the northeast and recharge from the San Joaquin River (Figure 2-6). The large area of water levels below 100 feet msl in the west-central and northwestern

portion of the Study Area captures flow from the entire eastern portion of the County and redirects flow in the far western portion to migrate to the east.

2.4.2 Changes in Flow over Time

Maps dating back to 1900 indicate that historical patterns of groundwater flow differ significantly from current flow directions. Prior to development of groundwater in the County, groundwater flow generally followed the major surface water drainage directions from northeast to southwest. The San Joaquin River provided groundwater recharge along its entire southern reach from the basin boundary in the east to the vicinity of the Eastside Bypass. As groundwater reached the western end of the County, flow turned northwestward toward the San Joaquin basin outlet. These conditions generally persisted into the 1930s and 1940s as shown by the generalized groundwater flow arrows on Figure 2-7. Historical groundwater level contour maps prepared by the Department of Water Resources are reproduced in Appendix C for further reference.

Groundwater extraction both within and outside of Madera County began to alter the county-wide natural flow patterns in the late 1940s and 1950s. As water levels around pumping wells were lowered, depressions in the water table redirected natural flow toward pumping centers. Three major pumping centers are evident on the Spring 1958 water level map, located predominantly west of the Highway 99 corridor (orange shaded areas on Figure 2-7). The northwestern pumping depression in Spring 1958 apparently existed near the Madera – Merced county line with the largest water level decline in Merced County, lowering water levels in the area below 100 feet msl. The central depression was located south of Dairyland and the southwestern depression was near Cottonwood Creek (Figure 2-7 and Appendix C). By the late 1960s, the areas of depressed water levels had expanded across the west-central portion of the County where they persist today.

The drought of the late 1970s resulted in a continuous elongated area of water levels below 100 feet msl formed by coalescing pumping depressions. Again the lowest water levels were just north of the Madera County line (Figure 2-7 and Appendix C). By 1995, the entire western, north-central, and southeastern portions of the County had dramatically lowered water levels that controlled groundwater flow directions. These depressions have caused groundwater to migrate toward pumping centers, in some cases reversing natural groundwater flow directions. Flow along the western reach of the San Joaquin River no longer parallels the River, but rather flows eastward toward the pumping depressions (Figure 2-7). This easterly flow in the western portion of the Study Area may result in adverse water quality impacts as discussed in other sections in this Plan.

2.5 Groundwater Quantity

The amount of water stored in a groundwater basin is controlled by the volume of storage space and amounts of inflow and outflow associated with the basin. For a given period of time, the difference between inflows and outflows is the change in storage. The

change in storage is reflected in the change (rise or decline) of water levels. The quantification of these variables is referred to as a basin's water balance.

Because of data uncertainties and limitations of inflow and outflow components for the Study Area, these components are not quantified in this Plan to estimate change in storage. Rather, the average change in storage during a hydrologic cycle is quantified through an assessment of water levels changes. A discussion of major inflows and outflows for the Study Area that impact this change in storage is presented below along with previously-published estimates for some of the inflow and outflow components.

2.5.1 Inflows and Outflows

Inflows into the groundwater basin include the following components:

- Streamflow percolation, predominantly from the San Joaquin River, Chowchilla River, Fresno River, and other creeks and sloughs
- Infiltration of precipitation that falls on the valley floor
- Subsurface inflow along the eastern and northern boundaries of the Study Area, including recharge into the alluvial fans of the groundwater basin from surface water in eastern Madera County
- Seepage losses from unlined canals
- Return flows from land application of water including agricultural irrigation

Natural recharge includes percolation of streamflow in river channels, infiltration from precipitation, and subsurface inflow. Of these components, streamflow percolation likely represents the largest amount of natural recharge. In 1979 DWR estimated this amount to be approximately 184,000 AFY. Since precipitation amounts on the valley are relatively low (mean 10.6 inches), the contribution to groundwater recharge from precipitation is estimated to be lower than the contribution from streams and canals. Assuming a 10 percent infiltration rate, precipitation adds approximately 44,851 AFY to groundwater on average. The amount of subsurface inflow has not been quantified and changes from year to year based on changes in groundwater flow. The amount of subsurface inflow along the eastern groundwater basin subsurface contact was estimated by DWR to be approximately 69,000 AFY in 1979.

Recharge also occurs from seepage losses along unlined canals that transect the Study Area. Data from MID indicate an approximate 30 percent loss of diverted surface water due to canal evaporation and seepage (personal communication, Don Roberts, November 23, 2001). Return flows refer to the amount of irrigation that is not consumed by crops and allowed to percolate to the water table. Because both surface water and groundwater are used for irrigation in the Study Area, return flows represent percolation from both sources. Return flows are related to the efficiency of irrigation, with more efficient irrigation practices resulting in less return flows. Assuming an average irrigation efficiency of 80 percent and irrigation requirements estimated on Table 2-1, return flows in the Study Area may exceed 187,000 AFY.

Outflows from the groundwater basin include:

- Groundwater pumping for agricultural, municipal, industrial, and domestic use
- Subsurface outflow (unknown)
- Discharge to streamflow (if any)

Groundwater pumping is estimated to be the largest outflow component. In general, groundwater pumping for agricultural irrigation in the Study Area is not metered and current pumping amounts are not known. USGS estimated average pumping in the Study Area at 809,286 AFY from 1958 to 1964 (Mitten, et al., 1970). DWR pumping estimates for 1979 were 1,060,000 AFY, including both agricultural and municipal pumping (DWR, 1984). The amount of irrigated acreage in Madera County has not changed significantly since 1979 (slight decrease from 330,000 acres to about 309,000 acres), although the mix of crops grown is different.

With irrigation requirements of approximately 940,000 (Table 2-1) and the diversion of surface water that provides up to about 250,000 AF, current pumping for irrigation may be less than 700,000 AFY. However, significant increases in the cost of surface water over the last ten years have encouraged many growers to increase their reliance on groundwater. Municipal, industrial, and other agricultural water uses besides irrigation account for additional groundwater pumping in the Study Area.

Municipal and industrial pumping is recorded at County-operated and municipal water systems. Recent average pumping amounts for County-operated and other larger water systems in the Study Area are summarized below:

- County-operated water systems 2,392 AFY
- City of Madera 10,400 AFY
- Madera Valley Water Company 2,000 AFY
- City of Chowchilla 2,612 AFY

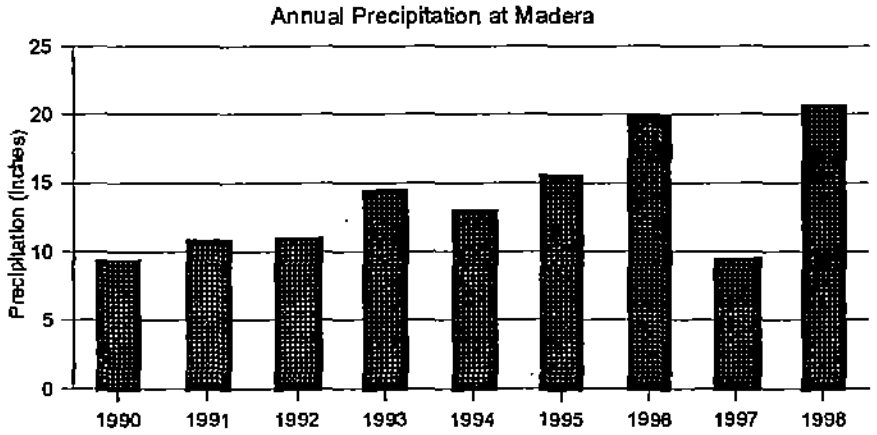
In addition, a small amount of groundwater is pumped for urban use just inside Madera County across the river from the City of Firebaugh. Total urban water use from the main municipal water systems listed above is 17,404 AFY and does not include commercial and residential use from very small water systems or domestic wells. In 1980, DWR estimated total urban water use in the Study Area to be 18,900 AFY.

2.5.2 Change in Storage

DWR (1966; 1992) has calculated long-term change in storage for several periods between 1952 and 1990. In a 1966 study, DWR presented a water balance calculation estimating inflows and outflows and the resultant change in storage from 1952 to 1958. They noted that outflows exceeded inflows over the six-year period for an average decline of –67,500 AFY, indicating an overdraft condition. In 1992, DWR reported the results of additional change in storage calculations based on water level contour maps over a longer time period. Changes in storage were estimated on an annual and

cumulative basis for the unconfined aquifer beneath Madera County from1970 to 1991. During this time period, the annual change in groundwater storage ranged from a gain of 460,000 AF during 1979 due to above-average precipitation to a loss of -609,300 AF during the drought of 1990-1991. Over the 20-year period 1970 to 1990, the cumulative change in storage was a loss of -1,482,300 AF or an average loss of -74,115 AFY (DWR, 1992).

An assessment of the change in groundwater quantity from the drought conditions of the early 1990s to the wet conditions of the late 1990s was conducted for this Plan. This analysis uses similar methodology to the DWR computations from 1970 to 1990 and updates the DWR assessment. As seen from the chart below, this period was a time of increasing precipitation, allowing water levels to recover somewhat in the basin.



Water level contour maps for the unconfined aquifer for Spring 1990 to Spring 1998 were compared quantitatively to determine the net change in water levels over the Study Area during this time period. A map of the net change in water levels is shown on Figure 2-8, showing areas of water level rise and decline from 1990 to 1998. Areas for water level change contours were computed and converted to net acre-feet of storage change using an average specific yield of 10 percent.

Water levels declined over most of the Study Area during this period even though precipitation was above average for seven of the eight years of analysis. The only areas where water levels recovered were near the San Joaquin River on the southern and western boundaries of the Study Area and areas of focused surface water recharge along the Eastside Bypass (Figure 2-8). The change in storage over the period is estimated at -546,706 AF or an average change in storage of -68,338 AFY. These calculations indicate an average water level decline of approximately -1.5 feet per year throughout the Study Area. The negative change in storage and the net water level declines quantify the overdraft condition of the basin over eight years from drought conditions to wet conditions.

Three separate calculations of change in storage, two by DWR and one by Todd Engineers, have resulted in similar quantification of overdraft for the Madera groundwater basins from 1952 to present. These data indicate that no measures to date have arrested the overdraft condition of the groundwater basin, despite recent record wet years. Without mitigation, water levels are expected to continue to decline into the future with the rate of decline controlled by precipitation and pumping patterns. As water levels reach all-time lows, damage to the groundwater basin may be occurring.

2.6 Groundwater Quality

This section addresses general mineral quality of groundwater in the Study Area as well as specific chemicals of concern. Sources of groundwater quality data compiled and reviewed for this plan include:

- DWR data and published reports
- USGS water quality studies
- Madera County Environmental Health, Water Program data
- Department of Health Services, well data
- Regional Water Quality Control Board files
- Additional published technical studies

Data are summarized in this section. Table 2-2 contains a partial tabulation of water quality data from community water systems in the Study Area.

2.6.1 Study Area Groundwater Quality

In general, data indicate that ambient groundwater in western Madera County is of high quality and meets regulatory requirements for agriculture and drinking water purposes. Total dissolved solids (TDS), one of the broad indicators of water quality, generally averages 240 milligrams per liter (mg/l) in community drinking water supplies (as indicated by recent data in Table 2-2). For reference, the United States Environmental Protection Agency (USEPA) recommends a maximum TDS concentration of 500 mg/l for drinking water purposes. TDS is not associated with health effects and the USEPA recommendation is generally for aesthetic quality such as taste. Because TDS is also impacted by the presence of other constituents in water, it is used here as an indicator of relative differences of groundwater quality.

Figure 2-9 shows the distribution of mineral types of groundwater in the Study Area as mapped by DWR (1965). These mineral types represent a method of categorizing groundwater chemistry based on the predominant cations and anions in the water and are useful as an indicator of groundwater quality. As seen on Figure 2-9, groundwater is predominantly of a bicarbonate type throughout most of the County, transitioning from a calcium- and calcium-magnesium-bicarbonate water in the east to a sodium-bicarbonate water in the west. Along the western rim of the Study Area, sodium continues to increase,

along with increasing chloride, to produce a relatively poor quality sodium-chloride type water.

The sodium-chloride water in the western portion of the County is likely related to changes in geologic sediments as previously discussed in Section 2.2. In the eastern and central Study Area, alluvial fan deposits derived from the Sierra Nevada bedrock contain water that is less mineralized with generally lower concentrations of total dissolved solids (TDS). Sediments in the western Study Area near the San Joaquin River consist of finer-grained flood basin deposits with higher concentrations of sodium chloride and TDS.

This natural progression from high quality water in the east and central Study Area to poorer water quality in the west is confirmed in other water quality studies of the area. Data from 1956 to 1966 in a USGS study indicate that TDS in the unconfined alluvial aquifers averaged 280 mg/l over 80 percent of the valley floor (data from 86 wells, Mitten et al., 1970). This average TDS concentration (280 mg/l) is very similar to more recent TDS concentrations measured in Study Area wells (240 mg/l) (Table 2-2). Groundwater in the western 20 percent of the valley (generally in the vicinity of the Eastside Bypass then west to the River) contained much higher TDS concentrations, up to 3,400 mg/l. The average TDS concentration in the western area was 1,150 mg/l as indicated by data from the 1950s and 1960s.

The 1956 - 1966 TDS data tabulated in the USGS study were plotted and contoured for this Plan to illustrate areas with TDS concentrations greater than 500 mg/l (Figure 2-10). These data were supplemented by 1971 data measured by DWR in the northwestern portion of the Study Area (DWR, 1971). In addition to the broad area of higher TDS in the western portion of the Study Area, local areas of TDS exceeding 500 mg/l also can be identified in areas surrounding Chowchilla and southwest of Madera as shown on Figure 2-10. In the few examples where data were available over time in the same well, TDS concentrations appear to have been higher in 1965-1966 than in the 1950s. Although natural conditions may be responsible for certain areas of high TDS concentrations as previously discussed, increasing concentrations over time may indicate TDS sources from human activities such as wastewater percolation, agricultural drainage, or the migration of poorer quality water toward pumping depressions to the northeast.

All of the community water systems in Madera County are required to monitor for inorganic constituents, including TDS, in their water supply wells. Groundwater quality data were compiled from the largest water systems (>200 connections) as well as all of the County-operated water systems in the Study Area. These water systems are shown on Figure 2-11 along with the service areas of the irrigation and other water districts. Selected constituents are summarized on Table 2-2. In general, ambient water quality in all of the water systems is judged good to excellent for drinking water purposes, although water quality appears to deteriorate somewhat with depth in some areas.

Differences in groundwater quality can be seen from shallow aquifers (generally above 500 feet deep), deep aquifers in the east (below 500 feet deep), and aquifers in the

west (with poorer water quality). Generalized data for these three subsets are compared on a geochemical plot referred to as a Stiff Diagram, named for the geochemist who developed the methodology (Figure 2-12) (Stiff, 1951). This type of plot allows for a visual comparison between water quality types based on concentrations of specific cations and anions in water. Smaller concentrations of cations and anions (lower TDS) are represented by smaller, slimmer plots shown by the top plot on Figure 2-12. The middle plot, representing deeper groundwater in some areas, shows a slightly wider plot indicating a higher TDS concentration and the presence of detectable metals. In contrast, the higher TDS concentrations in western groundwater produce a relatively wide diagram dominated by sodium and chloride (Figure 2-12). The geochemical plot graphically illustrates the changes in water quality with depth and in particular the poorer water quality in the west.

2.6.2 Chemicals of Concern

Local water quality problems include numerous detections of elevated nitrates, a broad area of concern for potential pesticide contamination, elevated concentrations of iron and manganese, some contamination associated with industry, and the encroachment of saline water from the west.

2.6.2.1 Nitrate

Nitrate (NO_3) is an oxidized nitrogen compound found in groundwater that has been linked to adverse health impacts including methemoglobinemia in small children if ingested at sufficiently high concentrations over a long period of time (Hem, 1989). For human health protection, USEPA has set a maximum contaminant level (MCL) at 45 mg/l for nitrate in drinking water. Nitrate in groundwater is often associated with agriculture (pesticides and livestock drainage) as well as human waste disposal methods including septic tanks and leach fields. In general, nitrate data are more limited in coverage than TDS data.

In their 1970 study, USGS identified five wells with nitrate concentrations exceeding the MCL. Two additional wells with elevated nitrate concentrations were identified in connection with a regional water quality sampling program (Templin, 1984). Areas of nitrate concern are identified on Figure 2-13.

Elevated nitrate concentrations have also been identified at several of the community water systems in the Study Area. Systems that have detected nitrate at or above the MCL in one or more system wells include the following:

- Valeta (MD 85)
- City of Madera
- Madera Ranchos (MD10)

Measures are being taken to ensure that nitrate concentrations in drinking water do not exceed the MCL. These include blending and rehabilitating supply wells with poor seals.

Water systems that only have one water supply well such as the Valeta system are especially vulnerable. Nitrate detections indicate that elevated concentrations exist in many parts of the basin. Since nitrate is not monitored county-wide, it is not known if plumes of nitrate are widespread. Nitrate is difficult to contain and treat once in groundwater. Additional monitoring is critical to preventing further damage to already over-drafted aquifers.

2.6.2.2 DBCP Area of Concern

The soil fumigant, dibromochloropropane (DBCP), has been used historically in the valley to combat parasites such as nematodes. In 1976, this chemical ranked 11th in the list of 354 most commonly used pesticides in California (Moore, 1995). DBCP was historically applied throughout the central portion of the Study Area along the Highway 99 corridor, with the heaviest applications being south of the City of Madera (Templin, 1984). As a result of toxicological studies, the chemical was banned in 1977 (Dubrovsky, et al., 1998). In 1989, the U. S. Environmental Protection Agency (USEPA) reduced the maximum amount of DBCP allowed in drinking water to 0.2 ug/l (Moore, 1995).

In 1998, USGS found that DBCP exceeded USEPA drinking water limits in 20 percent of domestic wells sampled in the eastern San Joaquin Valley (Dubrovsky, et al., 1998). The study correlated the occurrence of the highest concentrations with vineyards, where DBCP was heavily applied. Concentrations generally decreased with depth and were highly variable at the water table.

DBCP sampling in Madera County was first conducted from 1979 to 1984 by Madera County Environmental Health and DHS (Moore, 1995). DBCP was detected in 54 Madera County wells in the southwestern portion of the Study Area, south of the City of Madera and west of Highway 99 (Figure 2-13). This area of detections correlated with the area of heaviest DBCP application in the County (Templin, 1984) and areas of vineyards as shown on land use maps (compare Figures 2-5 and 2-13). Concentrations in groundwater ranged from less than 0.01 ug/l to 40 ug/l. Samples from 48 wells exceeded the maximum allowable concentration of 0.2 ug/l (Moore, 1995).

As part of a Masters Thesis project (Moore, 1995), DBCP was re-sampled in this area in 1993. Of the 127 wells sampled, 28 detected DBCP at levels higher than the MCL with concentrations ranging up to 3.2 ug/l. Although overall concentrations were generally lower in 1993 than in the 1979-1984 sampling events, DBCP concentrations increased at approximately 25 percent of the locations sampled. Further, data on water levels and well construction were not adequate to determine the cause of changes in concentrations.

DBCP has been detected in three of the County-operated community water systems within or near the DBCP area of concern including Eastin Arcola (MD-36), Ripperdan (MD-28) and Parkwood (MD-19) (Figure 2-13). In addition, one City of Madera well has detected DBCP, although recent concentrations have met regulatory levels. Only one well contained DBCP levels (0.25 to 0.5 ug/l) at or above regulatory

limits (0.2 ug/l) and was immediately shut down to prevent exposure to DBCP in drinking water.

Two private facilities, MID and Ripperdan Dehydrator, have installed DBCP remediation systems in the area of concern to remove DBCP from pumped groundwater. The MID system, located in the northeastern corner of the area of concern treats groundwater with a recent concentration of 0.42 ug/l DBCP. The system at the fruit dehydrator is located about one mile north of the San Joaquin River in the south central portion of the DBCP area and treats groundwater from one well with a 2001 DBCP concentration of 0.91 ug/l.

Madera County Division of Environmental Health has designated this broad area (more than 50,000 acres) as an area of concern for DBCP groundwater contamination, subject to increased monitoring and well construction restrictions (Madera County Environmental Health, 2001) (Figure 2-13). Any wells drilled in this area are required to be sealed from the surface down into the competent clay layer at a depth of approximately 150 feet.

Data indicate that concentrations of DBCP are predominantly in the shallow aquifers near the water table. Shallow extraction for agricultural irrigation will likely be beneficial by recycling the DBCP, preventing (to some extent) downgradient migration, and allowing concentrations to dilute and degrade. The two remediation systems discussed above also remove some DBCP from the groundwater. Madera County's policy of sealing off the shallow aquifers in drinking water wells and extracting groundwater below deeper clay layers provides some protection against DBCP contamination in drinking water. However, continued deep extraction for drinking water may eventually cause shallow DBCP to migrate vertically to deeper layers. In addition, to the extent that DBCP concentrations are allowed to continue to migrate downgradient with groundwater flow, additional wells to the west may be impacted. Continued DBCP monitoring both within and in the vicinity of the DBCP Area of Concern will be necessary to protect drinking water in the future.

2.6.2.3 Iron and Manganese

Elevated concentrations of iron and manganese have been detected in some areas of the Madera County groundwater basins. Although these constituents are not generally associated with health effects, USEPA recommends maximum concentrations of iron (0.3 mg/l) and manganese (0.05 mg/l) in drinking water for considerations such as taste, odor, or staining. Local investigators have observed that elevated concentrations are often associated with groundwater in sediments that were originally deposited in reducing environments as indicated by clays that are blue, gray, black, or green in color (Schmidt & Associates, 1998; Montgomery Watson, 1997). County-operated water systems that have detected elevated metals in groundwater generally involve the systems in the southeastern portion of the County including La Vina, Madera Ranchos, Ranchos West, and Rolling Hills (Figure 2-13). The City of Madera has also detected elevated iron and manganese in some of their wells on a sporadic basis (Montgomery Watson, 1997).

2.6.3 Sites Regulated by the RWQCB

The Regional Water Quality Control Board (RWQCB), Central Valley Region, is responsible for protection of the beneficial uses of the waters in the region including groundwater (RWQCB, 1998). As a result, the RWQCB has developed regulations and criteria for discharges to surface water and groundwater. Discharges to groundwater that can degrade water quality have been associated with a variety of historical and ongoing activities including:

- Industrial and agricultural chemical use and spills
- Underground and above ground storage tank and sump leaks
- Landfill leachate and gas releases
- Septic tank failures
- Improper animal waste management

Permits and orders that regulate discharges have been issued at more than 80 sites in the Study Area including the following:

Selected Site Types Regulated by the RWQCB in the Study Area

Type of Site	Number of Sites in Study Area[1]
Dairy Farms[2]	50
Food Processing	12
Wineries, Distilleries	7
Refuse Systems	5
Sewage Systems	4
Construction, Concrete, Sand/Gravel	4
Bulk Petroleum Station/Terminal	3
Pesticides/Fertilizers	3

[1] *From RWQCB Files*
[2] *All dairies are not currently regulated by RWQCB Waste Discharge Requirements*

RWQCB maintains a list of facilities that have been associated with a spill, leak, investigation, or cleanup (SLIC projects) involving groundwater. Four facilities in the Study Area are associated with active SLIC projects in the Study Area as listed below. The approximate locations of these facilities are shown by triangles on Figure 2-13.

Active SLIC Sites in Study Area

Facility Name	SLIC Description
Chowchilla Cleaners	PCE in soil and groundwater
MacGillis & Gibbs Pole Treatment	Wood treating wastes

3. GROUNDWATER USE AND MANAGEMENT

Water users in Western Madera County rely upon both surface water and groundwater for water supply. Municipal and domestic uses are supplied from groundwater wells with delivery systems permitted and regulated by state or local governmental agencies. Municipal demand is estimated at 17,404 AFY (see Section 2.5.1). Surface water and groundwater are used conjunctively for agricultural irrigation. Irrigation demand is unknown in the Study Area, but is estimated to be approximately 940,000 AFY (Table 2-1). Surface water is delivered to the agricultural community by water and irrigation districts (Figure 1-3). Deliveries are controlled by contracts with the federal government, the state, and the various districts and are not regulated by the County. A large percentage of surface water deliveries is supplied from the Madera Canal. From 1949 through 1995, diversions into the Madera Canal at Friant dam have averaged approximately 256,674 AFY (based on monthly means recorded by USBR and included in USGS, 1996). This amount is considerably higher than surface water delivery to growers and includes amounts diverted for flood control and losses due to evaporation and seepage.

3.1 Agricultural Supply

Five main water agencies provide irrigation water to the agricultural community in the Study Area including Madera Irrigation District, Chowchilla Water District, Gravelly Ford Water District, Madera Water District, and Columbia Canal Company. Additional water districts have been formed for future deliveries, but to date have not provided water service (including Root Creek Water District and Aliso Water District). Apparently Sierra Water District delivered water to its service area at one time, but has since been dissolved (Richard Harman, personal communication, July 30, 2001). Two additional water districts including the Clayton Water District and New Stone Water District may have delivered water in the past, but are apparently inactive now (Franklin Secara, personal communication, October 9, 2001).

Service areas for these water districts are shown on Figure 1-3. Operations, groundwater management activities, and monitoring programs of these water districts are discussed below.

3.1.1 Madera Irrigation District (MID)

The Madera Irrigation District (MID) is the largest water district in the County, covering more than 128,000 acres (Figure 1-3). MID delivers water to the growers of Madera County through a series of pipelines, lined and unlined canals, and natural streambeds. Their main sources of water include releases from Friant Dam and Hidden Dam through contracts with the USBR (Boyle, 1999). Releases are diverted into the Madera Canal and distributed through the MID system.

MID's contract for water from Friant Dam provides for 85,000 AFY of Class 1 water and 186,000 AFY of Class 2 water. On average, 100 percent of Class 1 water and

48 percent of Class 2 water is available. MID also holds water rights to an average of 20,000 AFY from the Fresno River (Boyle, 1999) and contracts for up to 24,000 AFY from Hidden Dam. In 1997, MID delivered 154,821 AFY to growers within the district, approximately 49 percent of estimated irrigation demand in the District. MID engages in the replenishment of the groundwater system by diverting excess surface water into eight recharge facilities totaling more than 350 acres, as well as allowing percolation along unlined channels and canals.

MID monitors groundwater levels in an average of 229 wells located throughout the district, with 15 wells selected as representative of water level conditions (Boyle, 1999). Static water levels are measured in October and February, representing the maximum water level low and high associated with the growing season. Groundwater quality is not currently monitored, although several quality problems relating to high salinity and DBCP contamination have been identified beneath district lands in recent years.

3.1.2 Chowchilla Water District (CWD)

Formed in 1949 from a portion of the original Madera Irrigation District, Chowchilla Water District (CWD) covers 80,000 acres in both Madera and Merced Counties. The estimated service area within Madera County covers approximately 65,600 acres as shown on Figure 1-3. CWD delivers surface water to lands within its boundaries through a delivery system that includes approximately 160 miles of unlined canals and laterals and 46 miles of pipeline (CWD-Red Top RCD, 1997). Water has been transported into the District via the Madera Canal since 1945 (originally by MID, CDWR, 1966). As of 1997, the District contract with the Bureau of Reclamation involved a maximum of 55,000 AFY of Class 1 water and an annual average of 77,000 AFY of Class 2 water from Friant Dam via the Madera Canal. In addition, CWD receives approximately 24,000 AFY from Buchanan Dam releases on the Chowchilla River (CWD-Red Top RCD, 1997). Assuming full delivery of Class 1 water, and adding the average deliveries of Class 2 and Buchanan Dam water, it is estimated that CWD delivers an approximate average of 156,000 AFY to growers in the District.

CWD purchases water to recharge groundwater when available. Natural and artificial recharge is accomplished in the unlined portions of the surface water conveyance system, nearby stream channels, two surface water retention reservoirs, and eight recharge basins located throughout the District. CWD monitors water levels in approximately 143 wells each spring and fall. Plans are underway to improve groundwater monitoring.

3.1.3 Gravelly Ford Water District (GFWD)

The Gravelly Ford Water District (GFWD) was formed in 1962 by the local agricultural community to obtain a permanent water supply. A water delivery system was constructed in 1984, allowing additional surface water to supplement the use of groundwater and water from Cottonwood Creek. The District has contracts with the

USBR for 14,000 AFY of Class II water and a contract with MID to purchase spill waters in Cottonwood Creek (Bair and Westra, 1998). GFWD covers approximately 8,300 acres, as shown on Figure 1-3.

The GFWD distribution system consists primarily of the Gravelly Ford Canal, which extends from the San Joaquin River to Cottonwood Creek, and small connecting pipelines used to deliver water to metered turnouts. The unlined canal allows for groundwater recharge by percolation of water into the underlying sandy soils (Bair and Westra, 1998).

According to their Groundwater Management Plan, GFWD plans to implement a routine groundwater monitoring program to supplement the data currently collected by the USBR and MID (Bair and Westra, 1998). The program would include both water levels and water quality monitoring.

3.1.4 Root Creek Water District (RCWD)

Root Creek Water District (RCWD) was formed in 1996 when agricultural development of district lands was essentially complete. RCWD service area covers approximately 9,234 acres as shown on Figure 1-3. As described in their groundwater management plan (Provost and Pritchard, 1997a), the District does not own or operate any wells or water distribution facilities nor does it deliver water supply within its boundaries. Water needs in the District are served solely by private wells and irrigation systems. In the 1997 groundwater management plan, RCWD expressed the desire to increase groundwater recharge within the District and was exploring various options for obtaining and recharging water. One plan component involved conducting groundwater recharge feasibility studies.

As of 1997, RCWD did not operate nor participate in any groundwater monitoring programs for groundwater levels or quality within District boundaries. As mentioned in their groundwater management plan, RCWD intends to initiate a water level monitoring program in coordination with USBR and DWR that would include measurements of water levels in selected District wells each spring and fall. They were recently awarded a state grant for developing a coordinated groundwater monitoring program.

In 1998, RCWD conducted a hydrogeologic investigation of more than 50,000 acres including RCWD service area, subdivisions of Madera Ranchos, Ranchos West, and Rolling Hills, and the proposed Village of Gateway (Schmidt and Provost & Pritchard, 1998). The study documented overdraft in the area of approximately 22,000 AFY. Four areas were identified as having the most potential for artificial recharge to partially mitigate overdraft conditions. These areas included permeable sediments at two locations along the San Joaquin River, an area south of Avenue 10 and west of Road 39, along Root Creek in the central part of the District, and an area north of Avenue 12, adjacent to MID Lateral 6.2.

3.1.5 Aliso Water District (AWD)

The Aliso Water District consists of approximately 25,723 acres in southwestern Madera County along the San Joaquin River (Figure 1-3). As described in their groundwater management plan (AWD, 1996), AWD has no surface water supply and currently does not deliver water to growers. Its principal objective is to assist growers with the protection and management of the groundwater resources inside of the District boundaries. AWD is pursuing the purchase of surplus surface water to minimize groundwater extractions, using private canals within the district for distribution. The District also intends to investigate cooperative efforts for groundwater management with neighboring water agencies, landowners, and water users. According to the Groundwater Management Plan, AWD will also track and evaluate changing water levels within District boundaries.

3.1.6 Madera Water District (MWD)

The Madera Water District was formed in 1987 to supply 3,740 acres of mature pistachio orchards with irrigation water (Provost and Pritchard, 1997b). The District's only surface water supply is the ability to purchase water from Madera Irrigation District delivered via the Dry Creek Canal. MWD also operates two pumping plants on the canal to supplement groundwater irrigation. MWD also owns and operates wells to provide water for irrigation. Average water use in the district from 1993 through 1997 was 9,150 AFY, with approximately 82 percent (7,459 AFY) from groundwater and 18 percent (1,692 AFY) from surface water. Groundwater pumping decreased after surface water facilities were completed and from 1996 through 1997, groundwater extractions averaged 6,840 AFY. Similar to most areas beneath Madera County, declining water levels indicate conditions of overdraft beneath the District. MWD's AB3030 Groundwater Management Plan expresses a commitment to increased use of surface water from the Dry Creek Canal in lieu of groundwater pumping, hoping to mitigate overdraft conditions.

At the time of their AB3030 Groundwater Management Plan, Madera Water [illegible] did not conduct routine groundwater monitoring, although DWR measures water levels for some wells in the vicinity of the District (Provost and Pritchard, 1997b). MWD indicated in their plan that a water level monitoring program will be implemented within [illegible] of the plan and coordinated with the USBR and DWR. The resulting data will be used to construct water level contour maps to estimate changes in groundwater storage.

3.1.7 Columbia Canal Company (CCC)

The Columbia Canal Company covers approximately 15,746 acres in western Madera County and is one of four member agencies of the San Joaquin River Exchange Contractors Water Authority. Under a Joint Powers agreement, the Exchange Contractors receive deliveries of surface water from USBR along the Delta-Mendota Canal in exchange for USBR use of water from water rights held by the Exchange Contractors. Water deliveries by CCC have averaged about 58,500 AFY over the last three years

(Randy Houk, personal communication, October 15, 2001). Because surface water deliveries are insufficient to meet crop demands during some time periods, groundwater is pumped into the system from wells within the service area. Groundwater is pumped during April, May, and June so that surface water can be "banked" for access during peak demand. Groundwater is also pumped during June, July, and August to supplement surface water.

In the Company's *Rules and Regulations Governing Transfers of Water Under the Central Valley Project Improvement Act of 1992*, the Company recognizes the overdrafted condition of the groundwater basin and the negative impacts created by substituting groundwater for transferred surface water. To protect the underlying groundwater basin, CCC does not allow transfer of groundwater to areas outside the Company service area (SJREC, 1997). Also, CCC does not allow transfer of surface water without fallowing the land to which such surface water would have been delivered.

3.2 Municipal, Domestic, and Industrial Supply

Residents of Madera County rely on public and private water systems as well as domestic wells for their water supply. Almost all of the public and private water systems use groundwater. For the larger water systems, defined as more than 200 connections, the Department of Health Services Drinking Water Division inspects and monitors groundwater used for potable water supply. For systems with less than 200 connections, defined as small water systems, inspections and monitoring are conducted by the County's Department of Environmental Health. Water system permits listing the terms and conditions of operation and monitoring are on file at Environmental Health. Physical inspections are conducted to ensure permit compliance. Groundwater quality monitoring is also conducted according to the conditions of the permit and data are submitted to the County for review.

3.2.1 County-Operated Water Systems

Madera County operates 12 small public water systems that are identified on Figure 2-11. All but one (Sumner Hills) system rely on groundwater to meet residential and commercial use. The eleven groundwater systems are summarized on Table 3-1. These systems provide drinking water in the Study Area to more than 7,000 residents and 32 commercial settings including schools. Water is supplied by 21 groundwater wells that have pumped an average of 2,372 AFY over the last five years.

3.2.2 City of Madera

The City of Madera relies on groundwater to provide potable water to more than 35,000 customers over approximately 12 square miles of incorporated area. Water is pumped from the City's 15 active wells with a combined capacity of more than 23,000 gpm (Montgomery Watson, 1997). Annual pumping from 1993 through 1995 averaged 10,400 AFY. Specific capacities for the wells range from 17 gpm/ft to more than 100

gpm/ft. A portion of this water demand is discharged back into the groundwater system as treated wastewater at the City's percolation ponds.

The City has recognized the need for groundwater management and authorized a preliminary assessment of groundwater conditions and management in their Water System Master Plan (currently in draft form, Montgomery Watson, 1997). The report recommends that the City pursue a comprehensive groundwater recharge program and identifies favorable areas for groundwater recharge including the Fresno River channel to the northeast and underlying the City. The report also recommends favorable areas south and southwest of the City where coarse grain sediments persist with depth. The report also assesses the availability of additional surface water supplies to replace groundwater for direct use.

3.2.3 Madera Valley Water Company

The Madera Valley Water Company is a mutually owned water company providing water to approximately 1,738 residential and 25 commercial connections. The Company has installed five groundwater supply wells and plans to develop a sixth well in the coming year. Over the last four years, the Company has pumped approximately 2,000 AFY to meet water demand. The Company also captures stormwater runoff for recharge back to the groundwater basin.

3.2.4 City of Chowchilla

The City of Chowchilla pumps approximately 2,612 AFY from eight active groundwater wells to provide residents with a reliable water supply (City of Chowchilla, 2001). Stormwater and treated wastewater is returned back to the groundwater system through percolation ponds. Current groundwater management activities include plans to conduct source water assessment tests in compliance with State guidelines for their water supply wells. The City also implements an urban water conservation program that restricts landscape irrigation during the day from April 1 through October 31 of each year (City of Chowchilla, 2001).

3.3 County Groundwater Management Activities

The County has historically conducted groundwater management activities through County Ordinances and Policies as contained in Title 13, Water and Sewers, of the Madera County Code. Two of the County's groundwater management actions are summarized below.

3.3.1 Groundwater Exportation, Groundwater Banking, and Importation of Foreign Water

Article V of Title 13 of the Madera County Code provides rules and regulations pertaining to groundwater banking, importation of foreign water for the purpose of groundwater banking and exportation of groundwater outside the County. The Ordinance

recognizes overdraft conditions and the extent to which the County's residents, environment, and economy rely on groundwater. The Ordinance requires permits for groundwater banking, exportation, or importation for purposes of ground water banking within the area of its application as defined by the Ordinance. Local water agencies as defined by the Ordinance are exempt from permit requirements to allow for the continuation of surface water delivery and recharge activities that benefit the groundwater basin. An application package, referenced in the Ordinance, requires applicants to completely evaluate impacts of banking, import, and/or export projects on the groundwater basin, residents, environment, and economy of the County.

As part of activities associated with the Mendota Pool Group (MPG) pumping contract with the USBR, Farmers Water District (FWD, Fresno County) has been pumping groundwater inside Madera County and exporting this water via the Mendota Pool (USBR, 2001b; Schmidt and Luhdorff and Scalmanini, 2000a; 2000b). FWD owns six wells on the Madera County side of the San Joaquin River in the southwestern corner of the Study Area. The wells are located just west of the Eastside Bypass in two river meanders referred to as the east and west loops. Three wells were installed in each loop (EL-1, EL-2, EL-3, WL-1, WL-2, WL-3) with one well inactive (EL-1). Pumping for export to Westlands Water District has been conducted since 1991. Pumping amounts for three years of data were provided in recent technical documents as follows (Schmidt and Luhdorff and Scalmanini, 2000a; 2000b):

1997 –	1,979 AFY	(5 wells)
1998 –	676 AFY	(4 wells)
1999 –	2,137 AFY	(5 wells)

3.3.2 Well Construction and Abandonment

Chapter 13.51, Article I of Title 13 requires any water supply to meet standards for both quantity and quality. The well testing protocol incorporates published accepted methodologies from the American Water Works Association. Chapter 13.52 regulates the location, construction, maintenance, abandonment, and destruction of all wells that may affect the quality of groundwater. A well permit is required to be obtained from the County for all wells drilled in the unincorporated areas. The chapter adopts water well standards developed by DWR and set forth in DWR Bulletin 74-81. Modifications to the DWR well standards are required in some instances to further protect drinking water or groundwater quality.

4. AB3030 GOALS AND PLAN IMPLEMENTATION

4.1 Goals

Long-term goals of the groundwater management planning process were identified by Water Oversight Committee and County personnel (Table 4-1). Goals are organized by specific issues and conditions to be addressed. It is recognized that this is the first step in the planning process and all goals may not be obtainable in the short-term. This first Plan sets the hydrogeologic framework within which to develop strategies for reaching higher priority goals. Strategies that may be incorporated into the Plan are discussed below.

4.2 Strategies

The following strategies have been developed through discussions with County staff and the AB3030 Subcommittee of the Water Oversight Committee. These strategies will be considered in the long-term planning process for reaching the goals identified in Table 4-1 and are summarized below.

4.2.1 Groundwater Quantity, Overdraft, and Export

As described in Chapter 2 of this Plan, overdraft conditions have persisted in the basin since at least the 1930s and continue today. Since 1952, the loss of groundwater from storage has averaged more than 65,000 AFY. Increased importation of surface water into the County has not arrested the overdraft conditions, but likely has been offset by an increase in pumping. If no action is taken, water levels are expected to continue to decline and may decline at an accelerated rate as water levels move into less permeable portions of the aquifer. In addition, as water levels decline below extensive clay layers in the basin, recharge to the basin may be impacted and dewatering and subsidence may cause a permanent storage loss in the basin. The impacts of the continuation of present trends in water level declines may include the following:

- costs of lowering pumps or installing larger pumps in wells
- installation of new wells
- more expensive lifting costs
- loss of groundwater in storage
- potential land subsidence
- potential loss of aquifer storage capacity
- potential loss of stream baseflow
- potential adverse impacts to groundwater quality

To avoid these impacts and achieve Plan goals for a sustainable groundwater supply for the future (Goal I-1, Table 4-1), either less water must be extracted from the basin or more water must be added into the basin. Four strategies are discussed here to address the water balance of the basin: recharge, limits on export, agricultural land conversion, and urban development strategies. Conservation is discussed in later sections.

4.2.1.1 Maximize Groundwater Recharge

To increase water into the groundwater basin, an additional water source must be identified. Although the County has a contract to purchase water from USBR at Millerton Lake, the amount is small. Maximizing natural streamflow recharge in the County is one strategy to partially mitigate overdraft conditions (Goals I-1 and I-2, Table 4-1). The County should investigate additional potential recharge along current stream channels including the Fresno and Chowchilla Rivers, Dry Creek, Cottonwood Creek, and Berenda and Ash Sloughs. Several irrigation and water districts including MID and CWD already conduct streamflow recharge along stream channels and spreading basins.

One area that appears to provide additional recharge potential is Madera Lake, northeast of Madera and north of the Fresno River Channel. This area is currently used as an artificial recharge basin by MID where approximately 2,500 AFY are percolated to groundwater (personal communication, Don Roberts, November 21, 2001). The basin consists of approximately 1,100 acres and a small earthen dam where seepage problems have occurred in the past.

The County should coordinate with current groundwater management practices by MID and other agencies to ensure streamflow recharge is maximized. These efforts should also be coordinated with flood control where feasible. Downstream rights would need to be considered. Recharge efforts also need to be monitored into the future to evaluate impacts on the basin water balance and changes in groundwater basin conditions.

In the anticipation that excess natural streamflow will not be sufficient to fully mitigate groundwater overdraft, the purchase of additional water should be considered. Diversion records suggest that flood/storage water from Friant Dam is available during most water years. With agricultural demand so low during the non-growing season, water released in the winter months into the Madera Canal to control reservoir storage is mostly unused in Madera County. For example, of the 39,770 AF released into the Madera Canal March of 1996, MID diverted 29,600 AF into the Fresno River as flood flows. Although some percolation in the river bottom likely occurred, the majority of the release flowed down the river and out of the County. This water available for recharge typically occurs sporadically and at high flow rates. A major challenge will be to develop sufficient storage capacity in the recharge areas to allow a maximum amount of water to be captured.

An additional challenge will be to generate funds to purchase storage/flood surface water when available. As areas for recharging water are identified, the County will need to investigate funding mechanisms for purchasing water.

4.2.1.2 Preclude Export

In addition to increasing basin recharge, the County should endeavor to preclude water exports beyond the County, to the extent of its authority, that would decrease the long-term volume of usable groundwater in the County (Goal I-3, Table 4-1). This goal has been addressed by the recent adoption of Ordinance 573A reproduced in Appendix D. As previously discussed, this ordinance requires an application and permit process for groundwater banking, exportation of groundwater or importation of foreign water for the purpose of groundwater banking within the area of the County's authority.

4.2.1.3 Agricultural Land Conversion

It is difficult to quantify the current amount of pumping or changes in pumping over time because most of the pumping is not metered. Agricultural pumping is estimated to be more than 95 percent of all groundwater pumping in the County and, with more competition for surface water, this pumping may increase in the future. Madera County wishes to support agricultural uses of land and maintain the agricultural economy. Accordingly the County discourages the conversion of prime agricultural land to urban use (Madera County, 1995). Although some agricultural areas may convert to urban land uses in the future, this conversion may or may not result in less groundwater usage. If agricultural lands currently irrigated with surface water convert to urban use with total reliance on groundwater, the groundwater demand may increase, while the surface water return flows are lost from the current system.

4.2.1.4 Develop Standards for Urban Development

While efforts are underway to stabilize water levels in the basin, the County wishes to develop standards for assessing water supply for new urban developments in the County (Goal I-4, Table 4-1). Inconsistent methodologies and analyses are currently being used to satisfy the County's requirements to demonstrate a sufficient water quantity before a new development is approved. In developing comprehensive and consistent standards, the County should require that the regional overdraft conditions and the basin-wide water balance are considered in the analysis rather than a local water balance on a subdivision basis.

4.2.2 Groundwater Quality and Protection

Ambient groundwater quality beneath the Study Area is generally of very high quality for uses identified in the basin. In some areas, groundwater quality has been impacted by chemicals of concern as discussed in Chapter 2. The nature and extent of these impacts have not been fully defined. Additional water quality monitoring and data analysis will be necessary to identify a full range of appropriate strategies. If left unchecked, contamination may spread throughout the aquifer, limiting groundwater use in some areas. Relevant quality issues are addressed below.

4.2.2.1 Nitrate

In order to achieve goals of protecting groundwater quality in the basin (Goals II-1 and II-2, Table 4-1), nitrate detections in groundwater need to be addressed. The sporadic detections of nitrate in excess of MCLs throughout the County are a major concern (Figure 2-13). Septic systems and leach fields are suspected sources of some of the nitrate contamination. The County may want to consider the requirement of denitrification packages for wastewater treatment at the larger proposed developments. Recent waste discharge requirements developed by the RWQCB, Los Angeles Region, sets limits on nitrate concentrations emanating from small commercial and multifamily residential sewage disposal systems (RWQCB, 2001a). This order may be worthy of review for sections applicable to Madera County. In addition, a USEPA guidance document offers ways of upgrading package wastewater treatment systems to limit potential groundwater impacts (USEPA, 1996).

Although all of the water systems in the County are required to monitor water supply wells for nitrate, there is no County-wide monitoring program capable of identifying the nature and extent of the problem upgradient and downgradient of affected wells. Efforts to compile current data and collect additional data for a county-wide analysis of the problem must be undertaken. Recommended strategies for addressing the lack of nitrate data are included in groundwater monitoring strategies (Section 4.2.6).

4.2.2.2 DBCP

Recent research on DBCP contamination in groundwater has identified an area of concern in the southern portion of the Study Area. In this area, the County has adopted a policy of requiring wells with deep seals to lessen the likelihood of contamination. The continued use of shallow groundwater for agriculture and two remediation facilities will likely lessen the impacts of the DBCP in some areas over time. However, wells in this area, including private wells, should be carefully monitored for DBCP in the future. The [illegible] extent of DBCP has not been investigated on a county-wide basis and other areas may also contain DBCP contamination.

4.2.2.3 Saline Water

The migration of saline water from the western portion of the valley is a threat to the groundwater of Madera County. Because the Columbia Canal Company borders the western portion of the Study Area and the area of saline water, wells in their service area may provide the most critical data for monitoring the movement of saline water into Madera County. Available water quality data from the Columbia Canal Company service area should be incorporated into the county-wide groundwater monitoring program.

4.2.2.4 Other Water Quality Concerns

Other areas of water quality concern including leaking underground storage tanks and spills and leaks from local industry should be carefully monitored. The County

should continue to work with the RWQCB to identify areas of water quality concern. One strategy would be to conduct a detailed file review of active cases at the RWQCB to determine the risk of impacting County or private wells in the future.

The Drinking Water Source Assessment Program (DWSAP) implemented by DHS requires that each new water supply well be evaluated for nearby sources of contamination that could impact water quality. This program provides a useful framework for the evaluation of groundwater quality in the vicinity of all community water systems and should be considered for County implementation.

4.2.3 Groundwater Management, Recharge, Conjunctive Use

Several strategies to reach this goal, including maximizing streamflow recharge, were addressed in Section 4.2.1. The County should investigate for permeable areas where recharge could be maximized and optimally-located areas to provide maximum benefits to the groundwater basin. The County should continue to support and coordinate with ongoing groundwater management efforts of other water agencies in the basin. Hydrogeologic analyses of recharge proposals will be necessary to:

- identify areas where water levels will be most impacted,
- quantify the anticipated water level rise (or decrease in decline) and
- determine which efforts optimize groundwater recharge for the least cost.

4.2.4 Local Control of Groundwater Management and Local Water Rights

The preparation of this Plan demonstrates the County's desire to coordinate with and participate in local control of the groundwater basin. The County recognizes the large role that this resource plays in the vitality and well-being of County's farms, businesses and residents.

4.2.5 Conservation and Reuse

Madera County has a policy of encouraging water conservation efforts including: requiring water-conserving design and equipment in new construction, encouraging water-conserving landscaping, retrofitting existing development with water-conserving devices, and encouraging the use of recycled water for landscaping (Madera County, 1995). The County also supports the reuse of wastewater to offset the demand for new water supplies. Most of the residential wastewater effluent in the County is percolated back to the groundwater basin, thereby recycling a portion of the water supply. To avoid water quality impacts, standards for wastewater percolation at new developments should be developed. This will allow for the continued reuse of water in the critically overdrafted groundwater basins. Water conservation efforts are also encouraged by the County for agricultural users, and are often required as part of a governmental contract for surface water delivery.

The State of California mandates an evaluation of management of urban water for systems with more than 3,000 connections (Urban Water Management Plan, UWMP). Municipalities and local agencies should consider the program's applicability to portions of Madera County. The County wishes to continue to support water conservation and reuse. As the planning process progresses, the County will explore additional options and strategies for water conservation in the County.

4.2.6 Groundwater Monitoring Programs

A variety of groundwater monitoring programs exists throughout the County. However, they generally are for specific purposes and limited to specific areas or data types. These constraints limit their usefulness for countywide assessments. DWR and USBR provide the largest groundwater data depositories of groundwater levels and hydrologic data. The Department of Health Services and Madera County Environmental Health contain the most water quality data from public water supply wells. RWQCB collects regional water quality data, issues water quality orders and permits, and maintains data on specific water quality concerns in the County. In addition, many water agencies maintain their own groundwater monitoring program within their service area.

Although a central clearinghouse for data management would be helpful, none of the entities may have the resources to develop a county-wide groundwater monitoring program. Madera County Environmental Health is currently developing a geographical information system (GIS) for maintaining and displaying water quality data. This system may be the most efficient for storing other water quality data monitored for characterization purposes. Root Creek Water District was recently awarded a grant for a data management system including water levels and water quality in the Root Creek service area. This system could potentially be expanded to incorporate data from the County (Philip Pierre, personal communication, July 10, 2001).

The most logical strategy for reaching the goal of an adequate county-wide monitoring program would be a meeting of all parties currently collecting groundwater data to discuss data collection and management through the Water Oversight Committee. Methods for accessing and sharing data among all parties should also be addressed. Indeed, the California Water Code section 10755.3 requires an annual coordination meeting among all local agencies, including cities and counties, that manage groundwater within the same groundwater basin.

4.2.7 Education

As part of the AB3030 planning process, a public hearing will be held to present the Plan and obtain comments from County residents. This hearing will provide an opportunity to educate County residents on the current status of the groundwater basin and the County's Plan to replenish, preserve, and protect it. Furthermore, it is recommended that the Plan be updated annually to provide an ongoing mechanism to keep County residents informed and to provide a forum to discuss issues and plan ahead.

4.2.8 Coordination

With representatives from water agencies and City and County government, the Water Oversight Committee has provided an excellent forum for involving local stakeholders in County groundwater management decisions. Continued oversight by the Committee is seen as an efficient way to ensure that management decisions by one entity do not unintentionally impact another entity. Ongoing communication can also identify groundwater management opportunities where resources can be pooled to reach a common goal.

Certain activities outside of County boundaries may also impact groundwater beneath the Study Area. The Committee provides an excellent vehicle for working with entities outside of the County, as necessary, to make sure that the County's resources are protected. The Committee should also be involved in the annual update of the AB3030 Plan to guide its efforts and provide coordination among all County stakeholders.

4.3 Plan Development and Implementation

To focus the groundwater management planning efforts for the first year of the program, the County will concentrate first on the issues relating to groundwater overdraft, groundwater quality, monitoring and coordination. Planned activities are summarized below.

Maximize Recharge:

- Investigate recharge possibilities along County creeks and rivers
- Discuss possibility of maximizing recharge in Madera Lake with MID
- Combine recharge projects with flood control where appropriate
- Develop additional surface storage to capture flood flows when available
- Explore funding mechanisms to purchase additional surface water for recharge

Develop Standards for New Developments

- Develop consistent methodologies for proving a sustainable water supply
- Develop guidelines for placement and treatment requirements of new wastewater systems
- Consider a requirement of denitrification packages on wastewater systems

Groundwater Monitoring

- Meet with all entities in the basin that currently monitor groundwater
- Compile details of current monitoring programs including wells, aquifers, constituents, measurements, frequency, and reporting
- Discuss possibility of maintaining a county-wide GIS-based water quality data management system at Madera County Environmental Health

- Explore possibilities of groundwater data management systems in the County including responsibilities and data sharing

Coordination

- Continue to support the efforts of the Water Oversight Committee
- Continue to manage groundwater with the cooperation of local water agencies

Plan Update

For the AB3030 planning process to be useful, the Plan should be viewed as a living document, revisited regularly and updated on an annual basis. This will provide the mechanism by which the County can document progress and re-focus efforts as hydrogeologic and institutional conditions change.

5. References

Aliso Water District (AWD), 1996, Groundwater Management Plan, January 23.

Bair, Lewis E., and Westra, Jacob J., 1998, Groundwater Management Plan for Gravelly Ford Water District, January.

Beard, S., and Laudon, J., 1988, Data for Ground-Water Test Holes in Fresno County, Western San Joaquin Valley, California, June to August 1985, prepared in cooperation with the San Joaquin Drainage Program, USGS Open-File Report 88-78.

Boyle Engineering Corporation (Boyle), 1999, AB3030 Groundwater Management Plan, Madera Irrigation District, May.

Brewer, E., 1970, Groundwater Recharge in Friant Division of Central Valley Project, US Bureau of Reclamation, Presentation before the Underground Water Committee at the 1970 Spring convention of the Irrigation Districts Association of California, April 8-10.

California Department of Water Resources (DWR), 2001, Monthly Precipitation Data at Madera Station, DWR Website.

California Department of Water Resources (DWR), 1999, San Joaquin District, Unpublished water level contour maps, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer, San Joaquin Valley, Map Scale 1 inch = 4 miles (21,120 feet), Spring 1990 – 1999, 10 Maps.

California Department of Water Resources (DWR), 1996, "Dams within Madera County", Bulletin 17, updated February 2.

California Department of Water Resources (DWR), 1995a, San Joaquin District, Lines of Equal Elevation of Water in Wells, San Joaquin Valley, 1989 and 1993), Memorandum Report by Anthony Camoroda, January.

California Department of Water Resources (DWR), 1995b, Madera County 1995 Land Use, San Joaquin District, DWR website.

California Department of Water Resources (DWR), 1995c,, Bulletin No. 118, (Chowchilla, Madera, and Delta-Mendota Groundwater Basins), website revised October 1995.

California Department of Water Resources (DWR), 1992, San Joaquin District, Historical Unconfined Ground Water Trends in the San Joaquin Valley, March.

California Department of Water Resources (DWR), 1990, San Joaquin District, Natural Radioactivity in Ground Water of the Western Sierra Nevada, District Report, October.

California Department of Water Resources (DWR), 1989, San Joaquin District, Unpublished water level contour maps, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer, San Joaquin Valley, Map Scale 1 inch = 4 miles (21,120 feet), 14 maps, 1936-1989.

California Department of Water Resources (DWR), 1985, San Joaquin District, Ground Water Study, San Joaquin Valley, Third Progress Report, Computer Model Modifications and Projections of Future Ground Water Conditions, District Report, September.

California Department of Water Resources (DWR), 1984, San Joaquin District, Land and Water Resources, Madera County, District Report, March.

California Department of Water Resources (DWR), 1981, San Joaquin District, Hydrologic Data, Surface Water Flow, Diversions, Surface Water Quality, Ground Water Levels, and Ground Water Quality, 1980 Water Year, June.

California Department of Water Resources (DWR), 1980, Ground Water Basins in California, A Report to the Legislature in Response to Water Code Section 12924, Bulletin No. 118, January.

California Department of Water Resources (DWR), 1975, California's Ground Water, Bulletin No. 118 September.

California Department of Water Resources (DWR), 1971, San Joaquin District, A General Survey of Electrical Conductivity in Ground Water, San Joaquin Valley, March through June 1971, in cooperation with most member agencies of the Friant Water Users Association and other agencies.

California Department of Water Resources (DWR), 1966, Madera Area Investigation, Bulletin 135, Preliminary Edition, August.

California Department of Water Resources (DWR), 1965, Hydrologic Data: 1963, Volume IV: San Joaquin Valley, Bulletin 130-63, May.

California Department of Water Resources (DWR), 1964, Madera Area Investigation, Bulletin 135-1, Progress Report, March.

California Regional Water Quality Control Board, Central Valley Region (RWQCB), 2001b, File research, Unpublished facility files and order lists for Madera County.

California Regional Water Quality Control Board, Los Angeles Region (RWQCB), 2001a, General Waste Discharge Requirements for Small Commercial and Multifamily Residential Subsurface Sewage Disposal Systems, Order No. 01-031, February.

California Regional Water Quality Control Board, Central Valley Region (RWQCB), 1998, Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region, Fourth Edition, Sacramento River and San Joaquin River Basins.

California State Water Resources Control Board (SWRCB), 2001, Geotracker maps, Leaking Underground Fuel Tank (LUFT) Sites, Website geotracker.swrcb.ca.gov.

Chowchilla Water District-Red Top Resource Conservation District (CWD-Red Top RCD) Joint Powers Authority, 1997, Groundwater Management Plan in Accordance with AB 3030.

City of Chowchilla, 2001, Unpublished pumping data and 200 Annual Water Quality Report for city wells, furnished by Robert Acree, October 19.

Davis, G.H., Green, J.H., Olmsted, F.H., and Brown, D.W., 1959, Ground-Water Conditions and Storage Capacity in the San Joaquin Valley, California, USGS Water-Supply Paper 1469.

Domagalski, Joseph L., 1998, Pesticides in Surface and Ground Water of the San Joaquin-Tulare Basins, California: Analysis of Available Data, 1966 Through 1992, USGS Water-Supply Paper 2468.

Dubrovsky, Neil, M., Kratzer, Charles R., Brown, Larry R., Gronberg, JoAnn M., Burow, Karen R., 1998, Water Quality in the San Joaquin-Tulare Basins, California, 1992-95, USGS Circular 1159.

Economic Development Commission of Madera County (EDC), 2001, Madera County Industry Statistics, website http://www.maderaindustry.org/statistics.html.

Fogelman, R.P., 1982, Compilation of Selected Ground-Water-Quality Data from the San Joaquin Valley, California, USGS Open-File Report 82-335, April.

Fresno County, Groundwater Management Plan, 1997, Prepared by Public Works & Development Services, Development Services Division, March 11.

Gronberg, Jo Ann M., Dubrovsky, Neil M., Kratzer, Charles R., Domagalski, Joseph L, Brown, Larry R., and Burrow, Karen R., 1998, Environmental Setting for the San Joaquin-Tulare Basins, California, USGS Water-Resources Investigations Report 97-4205, National Water-Quality Assessment Program.

Hem, John D., 1989, Study and Interpretation of the chemical Characteristics of Natural Water, 3rd Edition, USGS Water-Supply Paper 2254.

Hotchkiss, W. R., 1972, Generalized Subsurface Geology of the Water-Bearing Deposits, Northern San Joaquin Valley, California, USGS Open-File Report.

Hotchkiss, and Balding, 1971, []

Keppen, Dan, and Slater, Scott, 1996, Tehama County Flood Control and Water Conservation District, Coordinated AB 3030 Groundwater Management Plan, Prepared for Tehama County Flood Control & Water Conservation District Board of Directors, November 20.

Madera County, 2001, Ordinance No. 573A, An Ordinance Amending Article V of Title 13 of the Madera County Code Relating to Groundwater Exportation, Groundwater Banking, and Importation of Foreign Water, Approved April 3.

Madera County Department of Agriculture, 2001, 2000 Agricultural Crop Report.

Madera County Environmental Health, 2001, Map of area of DBCP well restrictions.

Madera County Planning Department, 1999, Parcel Maps, Memorandum to Board of Supervisors from Leonard Garoupa, Planning Director, (outline of County parcel map procedures), June 18.

Madera County General Plan, 1995, Background Report and Policy Document, Adopted October 24.

Mendenhall, W. C., 1908, Preliminary Report on the Ground Waters of San Joaquin Valley, California, USGS Water Supply Paper 222.

Mendenhall, W.C., Dole, R.B., and Stabler, Herman, 1916, Ground Water in San Joaquin Valley, California, USGS Water-Supply Paper 398.

Merced County and Merced Irrigation District, 1997, Merced Groundwater Basin, Final Draft, Groundwater Management Plan, Filed December 24.

Montgomery Watson, 1997, Water System Master Plan, City of Madera, Draft Report (check copy), January 30. (excerpts only).

Moore, Kathi Lynn, 1995, An Assessment of the Variance Between the Levels of DBCP in the Ground Water in Madera County, California, Unpublished Masters thesis, California State University, Fresno, May.

Mitten, H. T., Ground-Water Pumpage, 1972, San Joaquin Valley, California, 1967-68, USGS Open-File Report, not numbered, November 28.

Mitten, H. T., LeBlanc, R. A., Bertoldi, Gilbert L., 1970, Geology, Hydrology, and Quality of Water in the Madera Area, San Joaquin Valley, California, USGS Open-File Report 70-228, March 6.

National Oceanographic and Atmospheric Administration (NOAA), 2001, Monthly precipitation data from 1931 to 2000 at Madera Station No. 045233.

Ogilbee, William, 1966, Progress Report – Methods for Estimating Ground-Water Withdrawals in Madera County, California, USGS Open-File Report, December 8.

Page, R.W., 1973, Base of Fresh Ground Water (Approximately 3,000 Micromhos) in the San Joaquin Valley, California, USGS Hydrologic Investigations Atlas HA-489, in cooperation with the California Department of Water Resources.

Page, R.W., Bertoldi, G.L., Tyley, S.J., and Mitten, H.T., 1967, Data for Wells in the Madera Area, San Joaquin Valley, California, prepared in cooperation with CDWR, Open-File Report.

Provost and Pritchard, Inc., 1997a, Ground Water Management Plan for Root Creek Water District, October 13.

Provost and Pritchard, Inc., 1997b, Ground Water Management Plan for Madera Water District, December 1.

Ross, D.C., and McCulloch, D.S., 1979, Cross Section of the Southern Coast Ranges and San Joaquin Valley from Offshore Point Sur to Madera, California, Geological Society of America Map and Chart Series, MC-28H.

San Joaquin River Exchange Contractors Water Authority (SJREC), 2001, Water Report for the Four Entities Board Meeting, to Steve Chedester and the Four Entities Board of Directors, from Larry Freeman, Four Entities Watermaster, October. 5

San Joaquin River Exchange Contractors Water Authority (SJREC), 1997, AB 3030 – Groundwater Management Plan, October.

San Joaquin Valley Agricultural Water Committee, 1979, Water Resources Management in the Southern San Joaquin Valley California, A Study of the Physical and Institutional Management Practices for Surface and Ground Water Utilization, prepared by Bookman-Edmonston Engineering, Inc., January.

Schmidt, Kenneth D. & Associates and Luhdorff and Scalmanini Consulting Engineers, 2000b, Long-Term Impacts of Transfer Pumping by the Mendota Pool Group, Prepared for San Joaquin River Exchange Contractors Water Authority, Newhall Land and Framing Company, and Mendota Pool Group, December.

Schmidt, Kenneth D. & Associates and Luhdorff and Scalmanini Consulting Engineers, 2000a, Results of 1999 Test Pumping Program for Mendota Pool Group Wells, Prepared for San Joaquin River Exchange Contractors Water Authority, Newhall Land and Framing Company, and Mendota Pool Group, May.

Schmidt, Kenneth D. & Associates and Provost & Pritchard Engineering Group, 1998, Hydrogeologic Investigation, Southeastern Madera County, Prepared for Root Creek Water District, June.

Schmidt, Kenneth D. & Associates, 1997a, Groundwater Flows in the San Joaquin River Exchange Contractors Service Area, Prepared for San Joaquin River Exchange Contractors, May.

Schmidt, Kenneth D. & Associates, 1997b, Groundwater Conditions in and Near the Central California Irrigation District, Prepared for Central California Irrigation District, May.

Shelton, L.R., and Miller, L.K., 1988, Water-Quality Data, San Joaquin Valley, California, March 1985 to March 1987, USGS Open-File Report 88-479, Regional Aquifer System Analysis, in cooperation with the San Joaquin Valley Drainage Program.

Sorenson, James F., 1941, A Study of the Demand and Available Water Supply for Irrigation in the Madera Irrigation District, Thesis prepared in the College of Engineering, Department of Civil Engineering, University of California, April.

Stiff, H. A., Jr., 1951, The Interpretation of Chemical Water Analysis by Means of Patterns, Journal of Petroleum Technology, v. 3, no. 10, 15-17.

Tehama County Flood Control and Water Conservation District, 2000, First Annual Report, Calendar Year 1999, Coordinated AB 3030 Groundwater Management Plan, Presented to the Board of Directors, March 28.

Templin, W. E., 1984, Ground-Water-Quality Monitoring Network Design for the San Joaquin Valley Ground-Water Basin, California, USGS Water-Resources Investigations Report 83-4080, August 1984.

United States Department of the Interior, Bureau of Reclamation (USBR), 2001a, Dataweb, Friant Dam – California, CA10154, September.

United States Department of the Interior, Bureau of Reclamation (USBR), 2001b, Environmental Assessment, EA Number 01-24, Mendota Pool 2001 Exchange Agreement, Draft, June 21.

United States Department of the Interior, Bureau of Reclamation (USBR), 1995, Central Valley Project, California, Interim Renewal Contract Between the United States and County of Madera, Contract No. 14-06-200-2406A-IR1, March 1.

United States Department of the Interior, Bureau of Reclamation (USBR), 1957, Central Valley Project, California, Contract Between the United States and Farmers Water District, Contract No. 14-06-200-6221, August 28.

United States Department of Agriculture, 1954, Irrigation Practices and Consumptive Use of Water in Central California Areas, Sterling Davis, Irrigation Engineer, Merced, California, for Merced and Madera counties, December 13-15.

United States Environmental Protection Agency (USEPA), 1996, Wastewater Treatment: Alternatives to Septic Systems, Guidance Document USEPA Region 9, Drinking Water Program, EPA/909-K-96-001, June.

United States Geological Survey (USGS), 1996, California Hydrologic Data Report, Madera Canal at Friant, CA, 1996 WY.

United States Geological Survey (USGS), 1988, Yosemite Valley, California, 1:100,000-scale Metric Topographic Map, 30 x 60-Minute Quadrangle, 1976, Photoinspected 1988.

United States Geological Survey (USGS), 1983, Merced, California, 1:100,000-scale Metric Topographic Map, 30 x 60-Minute Quadrangle.

United States Geological Survey (USGS), 1982, Fresno, California, 1:100,000-scale Metric Topographic Map, 30 x 60-Minute Quadrangle.

United States Geological Survey (USGS), 1982, Mendota, California, 1:100,000-scale Metric Topographic Map, 30 x 60-Minute Quadrangle.

United States Geological Survey (USGS), 1980, Shaver Lake, California, 1:100,000-scale Metric Topographic Map, 30 x 60-Minute Quadrangle.

United States Geological Survey (USGS), 1966, Progress Report – Methods for Estimating Ground-Water Withdrawals in Madera County, California, Prepared in cooperation with the California Department of Water Resources, Open-File Report.

University of California, 2000, USA Counties and Census 2000 Redistricting Data, Public Law 94-171, Summary File, California, The Regents of the University of California website, http://countingcalifornia.cdlib.org/counties/madera.

Table 1-1
Water Oversight Committee

Name	Affiliation	
Denis Prosperi	Madera Ranch Project Oversight Committee	Chairman
George Andrew	Gravelly Ford Water District	
Frank Bigelow	County of Madera - Board of Supervisors	
Roy Catania	Aliso Water District	
Loren Freeman	Mosquito/Vector Control District	
Ron Harris	City of Chowchilla	
Randy Houk	Columbia Canal Co.	
Leon Lancaster	City of Madera	
Michele Lasgoity	Madera Ranch Project Oversight Committee	
Vern Moss	County of Madera - Board of Supervisors	
Phillip Pierre	Root Creek Water District	
Ron Pistoresi	Madera Irrigation District	
Claude Rust	Coarsegold Resource Conservation District	
Kole Upton	Chowchilla Water District	
Glenn Igo	City of Chowchilla	Alternate
Tim Da Silva	Gravelly Ford Water District	Alternate
Michael Kirn	County of Madera – Engineering Department	Technical Staff
Doug Nelson	Madera County Counsel	Technical Staff
Steve Ottemoeller	Madera Irrigation District	Technical Staff
Leonard Garoupa	County of Madera – Planning Department	Technical Staff
Bonnie Holiday	County of Madera – Board of Supervisors	Recording Secretary

Table 2-1
Irrigation Water Requirements

Crop Type	Crop	Irrigated Acreage[1]	Applied Water Requirements[2]	Est. Annual Irrigation
Fruit and Nut Crops				
	Grapes	96,210 acres	2.9 AF/acre	279,009 AF
	Almonds	47,600 acres	3.0 AF/acre	142,800 AF
	Pistachios	19,270 acres	3.0 AF/acre	57,810 AF
	Figs	9,550 acres	3.0 AF/acre	28,650 AF
	Other	15,460 acres	3.6 AF/acre	55,656 AF
	TOTAL	**188,090 acres**		**563,925 AF**
Field Crops				
	Alfalfa	36,500 acres	4.4 AF/acre	160,600 AF
	Cotton	27,500 acres	3.3 AF/acre	90,750 AF
	Wheat	23,600 acres	1.5 AF/acre	35,400 AF
	Corn	17,100 acres	2.9 AF/acre	49,590 AF
	Irrigated Pasture	4,500 acres	4.4 AF/acre	19,800 AF
	Oat	4,200 acres	1.2 AF/acre	5,040 AF
	Other	3,220 acres	2.5 AF/acre	8,050 AF
	TOTAL	**116,620 acres**		**369,230 AF**
Vegetable Crops[3]	**TOTAL**	**3,400 acres**	2.0 AF/acre	6,800 AF
Total Annual Applied Water				**939,955 AF**
Average Unit Applied Water			**3.1 AF/acre**	

[1] Harvested acreage from Madera County Department of Agriculture, Agricultural Crop Report 2000

[2] DWR, San Joaquin Division, applied water averaged for Madera County hydrologic units
Actual irrigation requirements vary with soil type across the County

[3] (includes artichokes, cabbage, carrots, cucumbers, eggplant, garlic, herbs, melons, onions, peppers, potatoes, squash, tomatoes, and misc. truck crops)

Table 2-2
Inorganic Water Quality Data[1]
Selected Madera County Water Systems[2]

System	Well Information			Water Quality Data - Selected Constituents (mg/l)											
	Well Name/No.	State Well No.	Depth of Perforations	Sample Date	Na	K	Ca	Mg	Cl	HCO_3	SO_4	Fe	Mn	NO_3	TDS
City of Madera	Airport	11S/17E-10E1	240' - 600'	3/4/86	18	3	13	5	20	67	6	<0.100	<0.030	12	180
				6/30/88	21	3	17	3	21	87	2	<0.100	<0.030	7	184
				1/9/91	21	5	22	3	22	105	2	<0.100	<0.030	5	162
				6/29/93	3	17	14	4	17	80	4	0.110	0.240	11	170
	Well #9	11S/17E-23J2		3/4/86	18	3	14	5	21	79	9	<0.100	<0.030	4	168
				6/30/88	21	4	20	6	25	104	4	<0.100	<0.030	7	192
	Well #10	11S/18E-19B2	260' - 620' ?	3/4/86	21	4	16	5	21	98	7	<0.100	<0.030	6	188
				6/30/88	21	4	48	5	20	104	3	<0.100	<0.030	7	200
	Well #11	11S/17E-25B2		3/4/86	19	6	17	6	19	104	8	<0.100	<0.030	9	195
				6/30/88	20	4	17	5	22	99	3	<0.100	<0.030	4	168
	Well #15	11S/17E-22J1	195' - 465'	3/4/86	41	10	46	15	44	232	14	<0.100	<0.030	25	375
				6/30/88	48	8	60	17	51	272	18	<0.100	<0.030	27	384
				1/9/91	53	12	50	14	46	246	14	0.200	<0.030	27	368
				11/16/93	41	8	48	15	41	244	12	ND	ND	25	380
				11/22/96	40	8	54	16	41	240	17	0.100	ND	29	390
				11/18/99	48	8	58	16	41	200	ND	ND	ND	27	350
				5/24/01										32	
	Well #16	11S/18E-18F1	190' - 520'	3/4/86	19	3	17	5	21	98	6	<0.100	<0.030	6	180
				9/1/93	3	23	21	6	16	112	5	3.600	0.110	7	200
				3/27/96	25	2	15	5	20	92	4	ND	ND	4	120
				5/20/99	22	3	19	5	14	80	8	ND	ND	7	180
	Well #17	11S/18E-19P1	260' - 620'	3/4/86	19	3	15	4	21	85	6	<0.100	<0.030	4	168
				6/30/88	24	5	20	5	26	110	4	<0.100	<0.030	8	188
				1/9/91	27	4	21	6	25	105	5	<0.100	<0.030	4	188
				11/16/93	26	4	18	6	21	127	7	ND	ND	4	210
				11/22/96	26	3	20	6	21	120	9	ND	0.017	5	220
				11/18/99	28	4	23	7	23	92	10	ND	ND	5	180
				12/21/00										14	
	Well #18	11S/17E-24B1	280' - 610'	3/4/86	22	3	17	5	22	104	7	<0.100	<0.030	5	188
				1/9/91	25	4	15	4	20	99	2	<0.100	<0.030	1	148
				1/5/94	25	3	17	5	19	117	4	0.130	ND	5	180
				2/26/97	22	4	18	6	19	110	6	0.200	ND	6	190
				2/24/00	22	3	22	6	21			ND	ND	6	170
	Well #19	11S/17E-26C2		3/4/86	34	10	37	11	40	177	15	<0.100	<0.030	23	318
				5/20/86	38	8	40	12	42	189	13	<0.100	<0.030	2	318
	Well #20	11S/17E-14J1	to 600'?	3/4/86	17	4	16	5	20	79	6	<0.100	<0.030	8	188
				6/30/88	18	3	17	5	21	93	3	<0.100	<0.030	6	180
				1/9/91	21	5	18	5	21	99	4	<0.100	<0.030	6	172
				11/16/93	19	4	20	6	19	106	5	0.080	ND	8	200
				11/22/96	19	4	22	6	19	100	6	1.810	0.274	9	200
				11/18/99	22	4	23	6	19	80	7	ND	ND	7	180
				12/21/00										9	
	Well #21	11S/18E-30L1	230' - 600'	3/4/86	29	8	31	9	33	140	31		<0.030	6	283
				5/22/86	34	8	38	11	32	161	36	<0.100	<0.030	2	283

System	Well Name/No.	State Well No.	Depth of Perforations	Sample Date	Na	K	Ca	Mg	Cl	HCO_3	SO_4	Fe	Mn	NO_3	TDS
City of Madera (continued)	Well #21 (continued)			1/9/91	27	4	18	5	24	105	4	<0.100	<0.030	2	176
				11/16/93	25	5	27	9	26	141	19	0.600	ND	6	260
				11/22/96	24	5	29	9	3	120	2	0.246	ND	0	250
				11/18/99	29	5	30	9	28	94	17	ND	ND	7	230
				12/21/00										10	
	Well #22	11S/17E-24G3	240' - 520'	3/4/86	16	4	15	5	20	85	5	<0.100	<0.030	4	170
				6/30/88	21	3	15	4	23	87	2	<0.100	<0.030	2	156
				1/9/91	18	4	15	5	20	86	2	0.600	<0.030	2	144
				11/16/93	17	3	15	5	17	101	3	0.230	ND	4	180
				11/22/96	16	3	16	5	17	82	4	0.329	ND	4	170
				11/18/99	20	4	18	5	17	68	4	ND	ND	4	140
	Well #23	11S/17E-12P1	210' - 770'	3/4/86	21	5	18	5	20	85	8	0.200	<0.030	11	203
				6/30/88	40	3	13	4	23	133	2	<0.100	0.060	3	244
				1/9/91	24	4	18	4	20	99	2	<0.100	<0.030	1	172
				11/16/93	36	3	13	4	19	138	2	ND	ND	4	210
				11/22/96	19	2	15	5	18	79	4	0.058	ND	5	170
				11/18/99	22	3	16	5	18	66	4	ND	ND	5	150
				12/21/00										7	
	Well #24	11S/18E-18L3	210' - 520'	3/4/86	17	4	14	4	16	85	6		<0.030	4	163
				5/20/86	19	3	18	4	17	88	3	<0.100	<0.030	<1	143
				6/30/88	19	3	14	4	16	81	3	<0.100	<0.030	2	140
				1/9/91	24	4	15	5	20	921	2	<0.100	<0.030	2	152
				11/16/93	18	4	15	5	13	109	4	ND	ND	4	180
				11/22/96	17	3	16	5	13	89	5	0.057	ND	5	160
				11/18/99	23	3	16	5	16	76	5	ND	ND	4	150
	Well #25	11S/17E-14D1	275' - 505'	3/4/86	19	3	20	3	21	85	5	<0.100	<0.030	12	185
				6/30/88	34	3	18	3	23	127	2	<0.100	<0.030	3	204
				1/9/91	24	5	23	7	23	129	2	0.400	<0.030	7	184
				11/16/93	26	4	22	7	20	131	3	0.670	ND	9	220
				11/22/96	21	3	24	7	20	120	5	0.062	ND	9	200
				11/18/99	24	4	23	7	20	94	<1	ND	ND	8	170
				12/21/00										10	
	Well #26		240' - 600'	3/27/96	17	3	14	4	18	65	3	0.700	0.200	11	130
				2/26/99	19	4	16	5	17	58	3	ND	ND	10	170
	Well # 27	11S/17E-26J3	270' - 510'	8/20/92	22	5	25	9	25	118	7	<0.050	<0.030	11	220
				6/12/97	24	8	39	13	30	180	7	ND	ND	19	270
				2/25/98	24	8	39	13	31	160	7	ND	ND	23	290
				12/29/00	29	7	44	14	32	150	4	ND	ND	23	300
				5/24/01										44	
	Well #28	11S/18E-18J1	270' - 540'	11/16/93	24	2	16	5	19	108	3	ND	ND	2	180
				11/22/96	23	2	16	5	19	95	4	ND	ND	9	160
				11/18/99	22	3	19	5	19	84	ND	ND	ND	3	160
	Well #29	11S/17E-23	370' - 590'	2/27/95	20	2	13	4	17	95	4	ND	ND	3	170
				3/5/98	19	<2	15	5	23	77	4	0.005	0.079	4	170
	Well #30	11S/17E-26J3	430' - 720	2/7/95	23	2	16	5	19	110	4	ND	ND	4	180
				3/5/98	24	<2	16	5	23	89	4	ND	ND	4	170
Madera Valley Water Co.	Well #1	11S/17E-11C2	238' - 568'	4/10/86	15		11	4	18	56	<5	<0.620	0.040	9	93
				4/5/89	18	2	13	4	19	70	2	<0.100	<0.030	11	164
				3/3/92	2	19	15	4	17	79	5	0.080	<0.030	12	156
				5/2/95	15	3	4	4	21	57	<8	<0.005	<0.005	10	180
				1/20/98	19	2	6	4	18	42	4	<0.050	<0.005	10	180

System	Well Name/No.	State Well No.	Depth of Perforations	Sample Date	Na	K	Ca	Mg	Cl	HCO_3	SO_4	Fe	Mn	NO_3	TDS
Madera Valley WC (continued)	Well #2A	10S/17E-35J2	294' - 494'	4/10/86	19		12	5	24	86	<5	<0.100	<0.010	6	116
				4/5/89	20	3	15	5	24	82	2	0.300	<0.030	8	192
				3/3/92	3	21	16	5	22	85	5	<0.050	<0.030	11	176
				5/2/95	16	3	4	4	<8	59	<8	<0.005	<0.005	10	180
				1/20/98	20	2	6	4	19	58	4	<0.050	<0.005	9	190
	Well #3	10S/17E-36B1	250' - 450'	4/10/86	18		12	5	24	72	<5	<0.100	<0.010	3	120
				4/5/89	21	3	15	5	24	82	2	<0.100	<0.030	8	204
				3/3/92	2	20	17	6	21	81	5	<0.050	<0.030	18	176
				5/2/95	17	3	5	4	24	67	<8	<0.005	<0.005	11	210
				1/20/98	19	2	6	4	18	55	4	<0.050	<0.005	10	180
	Well #6	10S/17E-35Q1		3/3/92	2	22	15	5	21	86	5	<0.050	<0.030	14	180
				5/2/95	17	3	4	4	22	65	<8	<0.005	0.010	7	200
				1/20/98	20	3	6	4	19	56	4	<0.050	<0.005	9	190
	Well #10	10S/17E-36H1	284' - 564'	1/5/94	23	3	16	5	26	99	3	<0.050	<0.030	5	200
				5/2/95	17	3	4	3	24	67	<8	<0.005	0.015	7	200
				1/20/98	20	2	6	4	18	55	4	<0.050	<0.005	10	180
Chowchilla City Water Dept.	Well #1	9S/16E-30B2		4/4/85	21		19	4	23	76	<5	<0.010	<0.01	3	132
				11/30/94	18	6	16	4	19	85	ND	ND	ND	2	140
				12/2/97	18	5	6	3	20	66	3	<0.050	0.030	7	190
	Well #2	9S/16E-30L1		4/4/85	21		17	4	24	68	<5	<0.100	0.050	3	125
				10/10/91	18	5	18	5	22	87	9	<0.100	<0.030	5	116
	Well #3	9S/16E-30J1		4/4/85	19		18	4	23	70	<5	<0.100		4	125
				10/10/91	21	6	16	3	23	86	9	<0.100	<0.030	2	115
				12/1/94	21	6	22	6	22	110	3	ND	ND	3	160
				12/2/97	37	2	50	21	36	226	16	0.090	0.013	27	390
	Well #4	9S/15E-25M1		4/4/85	25		38	10	25	140	9		0.050	14	235
				3/15/88	17	5	14	5	21	74	4	<0.100	<0.010	5	179
				10/10/91	18	5	19	4	22	88	9	<0.100	<0.030	5	117
				11/30/94	18	5	19	5	20	95	ND	ND	ND	2	140
				12/18/97	20	4	11	6	22	85	4	0.100	<0.005	6	220
	Well #5	9S/16E-31F1		4/4/85	49		56	16	54	172	15	0.380	<0.020	24	420
				3/16/88	9	4	17	7	22	78	6	<0.100	<0.014	4	181
				10/10/91	19	5	17	5	22	87	9	<0.100	<0.030	3	115
				12/2/94	39	2	64	20	56	270	18	ND	ND	26	420
	Well #6	9S/16E-30B3		4/4/85	16		19	4	21	62	<5	<0.100	<0.010	4	115
				10/10/91	18	4	17	3	21	86	9	<0.100	<0.030	3	111
				12/1/94	16	2	18	5	18	85	ND	ND	ND	2	130
	Well #7	9S/16E-29P1		4/4/85	19		26	6	25	82	<5		0.070	8	157
				3/16/88	20	5	14	5	23	78	5	0.260	<0.018	1	162
				10/10/91	19	4	17	3	21	87	9	<0.100	<0.030	4	113
				12/1/94	26	2	37	10	34	150	10	0.250	ND	19	240
				12/2/97	21	2	21	9	30	108	9	0.050	0.010	19	260
	Well #8	9S/16E-29C1	242' - 402'	10/10/91	17	2	18	4	20	83	9	0.415	<0.030	4	108
				12/1/94	17	3	18	4	19	85	3	ND	ND	1	130
				12/2/97	16	1	8	4	19	56	3	0.240	0.030	10	160
	Well #9	9S/16E-29C2		12/1/94	19	4	17	4	19	82	4	0.140	ND	<1	140
				12/2/97	16	3	7	4	19	64	2	0.050	0.018	8	170
	Well #10	9S/15E-35A1	358' - 474'	12/1/94	26	3	40	12	46	160	6	ND	ND	14	280
				12/2/97	22	3	31	13	46	136	6	<0.050	<0.005	20	310
	Well #11			8/19/96	16	4	18	4	22	78	5	ND	ND	3	120
Chuck Chansl SA 14		10S/18E-32?	to 389'?	5/5/99	21	3	5	3	22	60	4	0.070	<0.005	12	210

System	Well Name/No.	State Well No.	Depth of Perforations	Sample Date	Na	K	Ca	Mg	Cl	HCO_3	SO_4	Fe	Mn	NO_3	TDS
Valeta MD 85	Wellhead	10S/15E-27	to 205'?	7/26/79										34	
				8/13/81	27		88	34	91	337	14	<0.010	<0.010		551
				1/6/88	31	4	90	36	130	220	22	<0.100	<0.020	63	500
				3/8/91	37		91	25	81	320	14	<0.050	<0.005	39	550
				9/18/95	35	2	86	29	83	255	16	<0.005	<0.005	33	881
				9/9/98	38	3	78	30	72	266	16	<0.050	<0.005	32	530
				5/22/01										37	
Fairmead MD 33	Well #2	10S/16E-11	240' - 552'?	5/12/99	22	2	10	5	27	78	3	0.070	<0.005	14	200
Central CA Women's Facility	Well 401	10S/17E-6A3		12/27/89	26	5	24	7	36	108	8	<0.300	<0.050	7	235
				7/7/92	26		27	7	36	80	7	<0.100	<0.030	10	183
				1/31/95	24	5	25	7	34	110	7	ND	ND	7	220
				6/3/98	25		25	7	35	76	6	ND	ND	8	240
				10/20/99										9	
	Well 402	10S/17E-6A4		6/4/90	30	5	28	7	40	117	14	<0.300	0.051	4	245
				7/7/92	26		27	7	36	80	7	<0.100	<0.030	12	179
				1/31/95	26	4	25	7	33	100	18	0.300	ND	4	240
				10/20/99										11	
	Well 403	10S/17E-6J1		6/4/90	30	4	25	7	33	107	10	0.056	0.031	11	240
				7/7/92	23		24	6	26	67	6	<0.100	<0.030	19	153
				1/31/95	25	4	25	7	30	99	9	ND	ND	9	220
				10/20/99										12	
Ripperdan MD 28		12S/17E-25	450' - 500'	5/5/99	21	2	6	3	23	5	3	<0.050	<0.005	7	170
La Vina MD 37	West Well	12S/17E-21	297' - 393'	5/5/99	19	3	5	3	14	71	3	1.400	0.009	2	170
Easlin Arcola MD 36		12S/18E-21	280' - 360'	5/12/99	18	3	6	5	30	64	3	0.070	<0.005	7	200
Ranchos West MD 95	North Little	11S/19E-31?	to 550'?	4/29/99	43	6	12	10	98	78	4	<0.050	0.311	11	360
Perkasdale SA 3	Well #1	11S/18E-29Q1	216' - 480'	1/13/87	20		11	11	19	80	13	<0.100	<0.020	9	130
				3/14/90	20	3	14	5	20	80	3	<0.100	<0.010	13	170
				5/10/99	21	4	5	3	17	67	4	<0.050	0.007	9	190
				4/5/00										12	
	Well #2	11S/18E-28M2	216' - 456'	1/13/87	20		13	9	20	81	3	<0.100	<0.020	9	140
				3/14/90	19	3	14	5	25	80	1	<0.100	<0.010	11	160
				5/10/99	21	4	5	3	17	65	4	<0.050	<0.005	9	180
				4/5/00										12	
Parkwood MD 19	Well #2	11S/18E-31D3		1/13/87	22		18	6	24	87	12	<0.100	<0.020	6	170
				3/14/90	26	4	23	7	29	105	8	<0.100	<0.010	7	240
				5/12/99	43	11	28	14	51	147	36	0.140	0.005	19	400
				4/5/00										18	
	Well #3	11S/18E-31F1	240' - 456'	1/13/87	24		16	7	24	90	5	<0.100	<0.020	5	150
				3/14/90	25	4	20	7	26	100	7	<0.100	<0.010	7	200
				5/12/99	23	4	8	5	26	<84	9	0.070	<0.005	8	210
				4/5/00										19	
	Well #4	11S/18E-31E1	to 365'?	1/13/87	23		18	7	25	96	9	<0.100	<0.020	6	160
				3/14/90	26	4	21	7	29	110	7	<0.100	<0.010	9	210
				5/12/99	29	5	10	7	34	<95	14	0.070	<0.005	9	270
				4/5/00										9	
Valley State Prison for Women	Well #1			3/4/98	32	5	30	8	37	140	14	ND	ND	ND	260
				3/2/99	37	5	34	8	31	130	16	ND	0.028	ND	270
				2/16/00	26	6	31	8	38	96	7	ND	ND	ND	240
	Well #2			3/4/98	31	5	29	8	40	260	6	ND	0.031	ND	250
				3/2/99	37	4	34	8	30	140	9	0.140	0.040	ND	260
				2/16/00	37	4	32	8	31	130	8	0.220	0.050	ND	250

System	Well Name/No.	State Well No.	Depth to Perforations	Sample Date	Na	K	Ca	Mg	Cl	HCO_3	SO_4	Fe	Mn	NO_3	TDS
Maderos Ranchos MD 10A	Sparta	11S/19E-3[illegible]1	150' - 500	4/19/85	18		13	5	13	64	4	0.400	<0.004	19	148
				2/26/88	27		23	6	29	87	1	5.700	0.131	28	216
				5/19/93	30	5	29	10	61	84	6	ND	ND	18	300
				9/30/97	35	6	22	10	72	62	8	<0.05	<0.005	17	320
				9/10/98										35	
				4/29/99										45	
				8/5/99										17	
				12/9/99										17	
	Fender	12S/19E-3C1	275' - 660'	4/19/85	14		15	5	14	67	3	0.680	<0.014	20	175
				2/26/88	26		22	6	31	76	3	<0.03	<0.001	24	200
				5/19/93	25	4	24	8	43	82	5	0.250	0.036	17	250
				9/30/97	27	5	10	7	10	60	7	0.080	0.110	16	250
				4/29/00	18	1	7	6	27	50	5	0.060	<0.005	21	230
				7/17/00										24	
				10/19/00										21	
	Fernwood	11S/19E-35P1		4/19/85	23		15	5	19	79	4	<0.02	<0.001	19	190
				2/26/88	28		22	6	31	74	2	<0.06	<0.001	17	209
				5/19/93	20	4	18	6	19	78	5	ND	ND	18	200
				9/30/97	18	5	6	5	17	53	7	<0.050	0.007	19	210
				4/29/99										24	
				1/19/00										51	
				4/28/00	16	2	5	4	12	47	4	0.450	0.018	23	180
				7/17/00										29	
				10/19/00										23	
Rolling Hills SA 19	Olive/S&J	12S/20E-4M1	222'-236'	10/22/85	14	3	11	5	10	75	<5	<0.050	0.080	7	110
				7/16/98	17		4	5	10	64	3	<0.050	<0.005	6	140
	New #1	12S/20E-9D1	650'-861'	7/15/86	50		16	12	75	85	15	<0.100	<0.020	4	280
				3/14/90	49	4	27	8	60	120	7	<0.100	<0.010	5	280
				4/29/99	47	5	13	7	77	93	14	<0.050	0.018	5	310
	Well #2	12S/20E-9L1	240'-526'	10/22/85	14	3	13	6	6	94	<5	<0.050	<0.010	2	125
				3/14/90	17	4	17	8	8	100	9	<0.100	<0.010	9	ND
				4/29/99	15	4	5	4	11	65	407?	<0.050	<0.005	4	140

[1] Table contains recent available data from Department of Health Services and Madera County Environmental Health databases
[2] Water Systems include systems with > 200 connections and County-operated systems in Study Area
MD = Maintenance District
SA = Service Area
Blank cell = no data
<0.100 = Not detected above detection limit shown
ND = Not detected; detection limit not available

Table 3-1
Madera County-Operated Groundwater System Information

District	No.	Location	Water Connections Residential	Commercial	Number of Wells	Pumpage (AFY)	Water Supply Issues Quantity	Quality
Madera Ranchos	MD-10	Ave. 12 & Road 36 1/2	979	25	5	738 AFY	All sources used during peak times	Elevated TDS and nitrate concentrations. Elevated arsenic, iron, and manganese concentrations at depths below 500'
Parkwood	MD-19	Ave. 13 & Hwy. 145	587	4	3	519 AFY		Elevated TDS and nitrate concentrations - DBCP detections
Ripperdan	MD-28	Ave. 7 & Hwy 145	20	0	1	20 AFY	Only 1 well	Well in DBCP area of concern
Fairmead	MD-33	Ave. 22 1/2 & Road 19 1/2	148	1	2	202 AFY		
Eastin Arcola	MD-36	Ave. 8 1/2 & Road 29 1/2	21	1	2	28 AFY	Only 1 of 2 wells active	DBCP exceedances in one well
La Vina	MD-37	Ave. 9 & Road 23 1/2	101	1	2	116 AFY		Elevated iron concentrations. Wells in DBCP area of concern
Valeta	MD-85	Robertson Blvd & Hwy 152	19	0	1	25 AFY	Only 1 well	Elevated TDS and nitrate concentrations
Parksdale	SA-3	Ave. 13 1/4 & Road 28 1/2	548	5	2	159 AFY		
Chuck Chansl	SA-14	Ave. 18 & Road 28 1/2	31	0	1	37 AFY	System delivery limited by pump problems - only 1 well	
Rolling Hills	SA-19	Ave. 10 1/2 at Hwy. 41	330	12	1	527 AFY	Water shortage problem - low well yields - using irrigation well to meet demand	Arsenic and other trace metals generally within standards but present
Ranchos West	MD-95	Ave. 12 & Road 34	15	0	2	20 AFY		Elevated iron and manganese in standby well. Septic systems will be within 200' to 500' of well at buildout
TOTAL			2,799	49	22	2,392 AFY		

Ranchos West pumpage estimated

Table 4-1
Long Term Goals
Madera County AB3030 Groundwater Management Plan

I. Groundwater Quantity, Overdraft, and Export:
- I-1. Ensure a sustainable, long-term groundwater supply for County users
- I-2. Preclude water exports that decrease the long-term volume of usable groundwater within the County.
- I-3. Optimize the volume of usable groundwater within the County
- I-4. Develop standards for assessing water quantity for new developments

II. Groundwater Quality and Protection:
- II-1. Ensure the long-term availability of high-quality groundwater
- II-2. Maintain a high-quality drinking water supply for County water systems in the basin

III. Groundwater Management, Recharge, Conjunctive Use:
- III-1. Investigate and develop opportunities to coordinate or conduct groundwater recharge or groundwater management projects

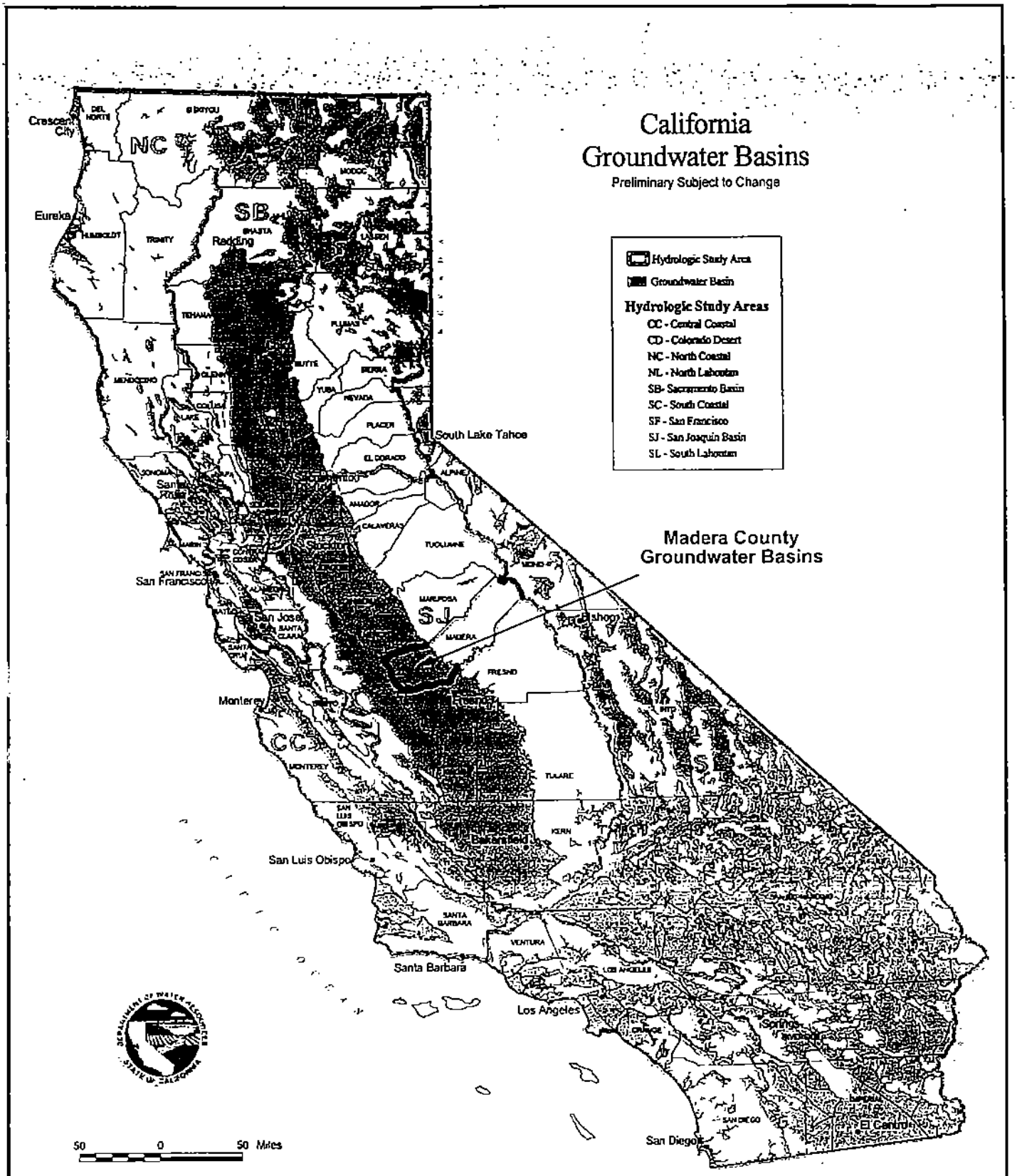
IV. Local Control of Groundwater Management and Local Water Rights:
- IV-1. Maintain local groundwater management authority
- IV-2. Ensure the unrestricted, non-export-related private use of groundwater within the County
- IV-3. Support local control through County Ordinances

V. Conservation and Reuse:
- V-1. Promote countywide water conservation
- V-2. Support incentive programs to enhance efficient use of water in the County

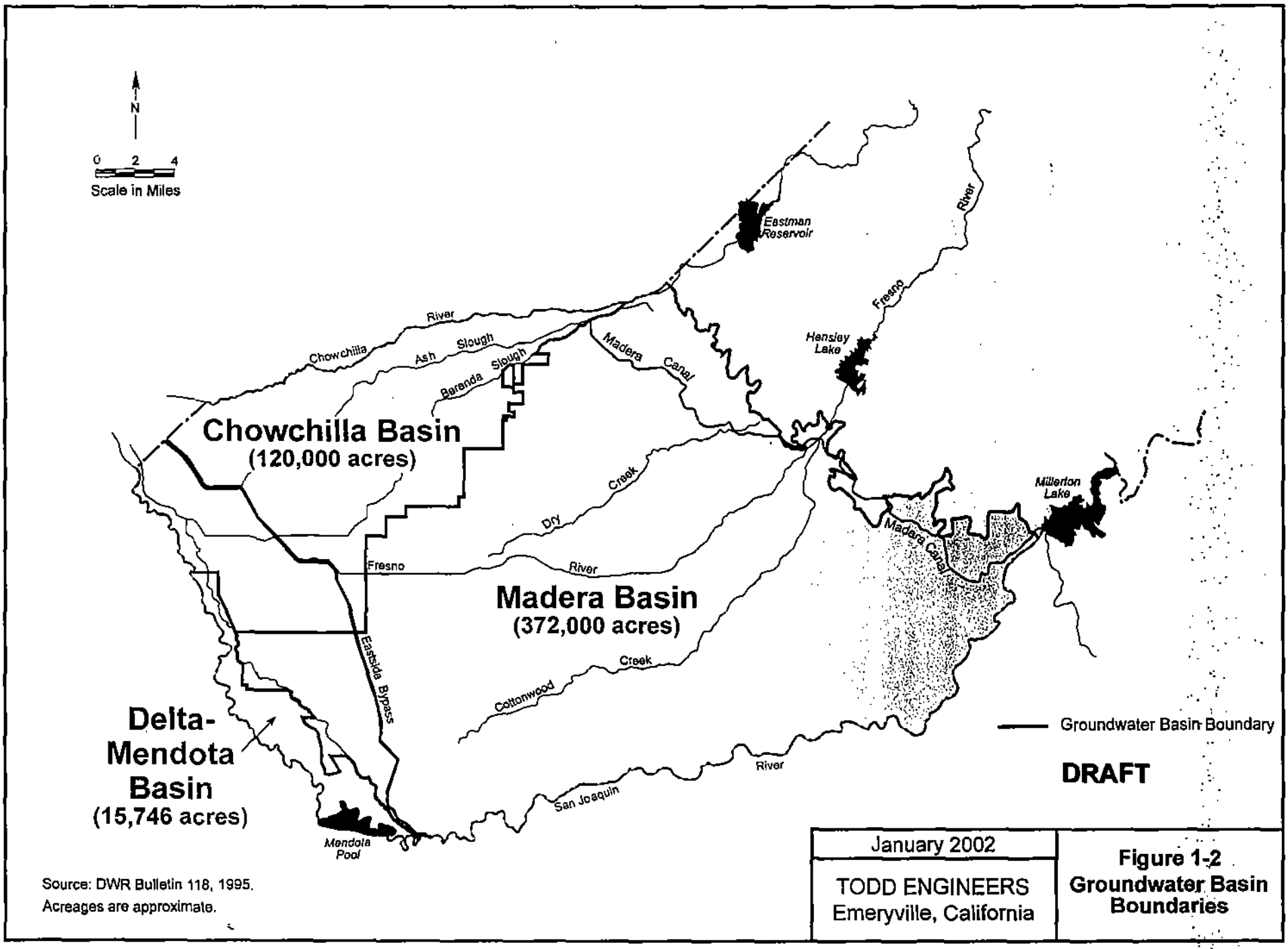
VI. Groundwater Monitoring Programs:
- VI-1. Monitor the County's groundwater for quantity and quality

VII. Education:
- VII-1. Conduct, sponsor, or support programs to educate and inform County residents on the status of the county's groundwater supply and conservation efforts

VIII. Coordination:
- VIII-1. Ensure coordination of groundwater management efforts within the County
- VIII-2. Maintain and support the Madera County Water Oversight Committee as the vehicle to ensure coordination of water issues and policy for the County
- VIII-3. Develop cooperative relationships between regulatory agencies, neighboring agencies with groundwater management authority, and County of Madera through the Water Oversight Committee



September 2001	**Figure 1-1**
TODD ENGINEERS Emeryville, California	**Madera County Groundwater Basins**



Source: DWR Bulletin 118, 1995.
Acreages are approximate.

January 2002

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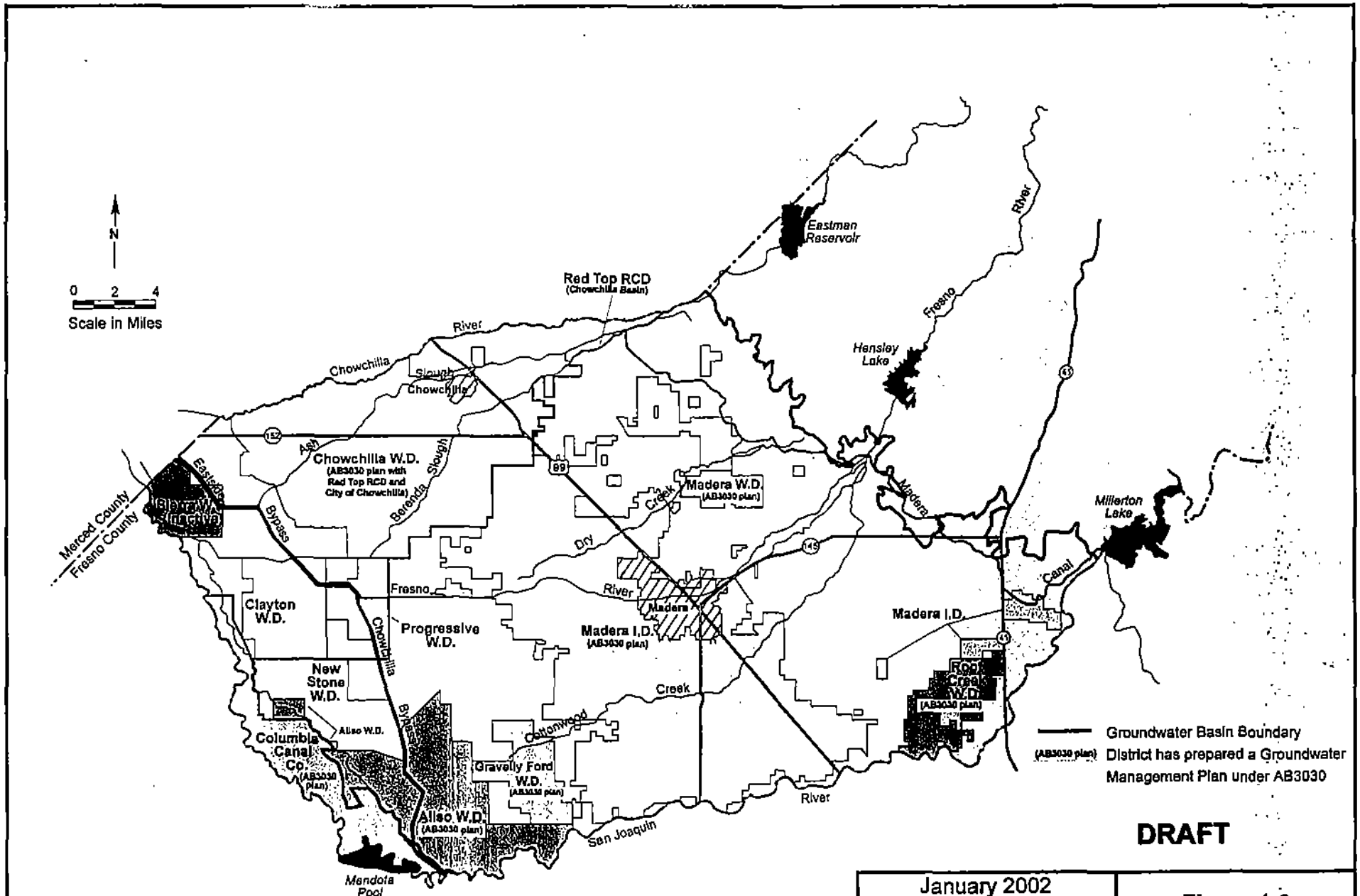
Emeryville, California

Figure 1-2
Groundwater Basin Boundaries


N
0 2 4
Scale in Miles
Eastman Reservoir
Red Top RCD
(Chowchilla Basin)
Fresno River
Hensley Lake
Chowchilla Slough
Chowchilla River
Ash Slough
Chowchilla W.D.
(AB3030 plan with Red Top RCD and City of Chowchilla)
Berenda Slough
Madera W.D.
(AB3030 plan)
Madera Canal
Millerton Lake
Merced County
Fresno County
Bypass
Dry Creek
Fresno River
Clayton W.D.
Progressive W.D.
Madera I.D.
(AB3030 plan)
Madera I.D.
Rock Creek W.D.
(AB3030 plan)
New Stone W.D.
Chowchilla Bypass
Cottonwood Creek
Columbia Canal Co.
(AB3030 plan)
Alilso W.D.
Gravelly Ford W.D.
(AB3030 plan)
Alilso W.D.
(AB3030 plan)
San Joaquin River
Mendota Pool
Groundwater Basin Boundary
(AB3030 plan) District has prepared a Groundwater Management Plan under AB3030
DRAFT
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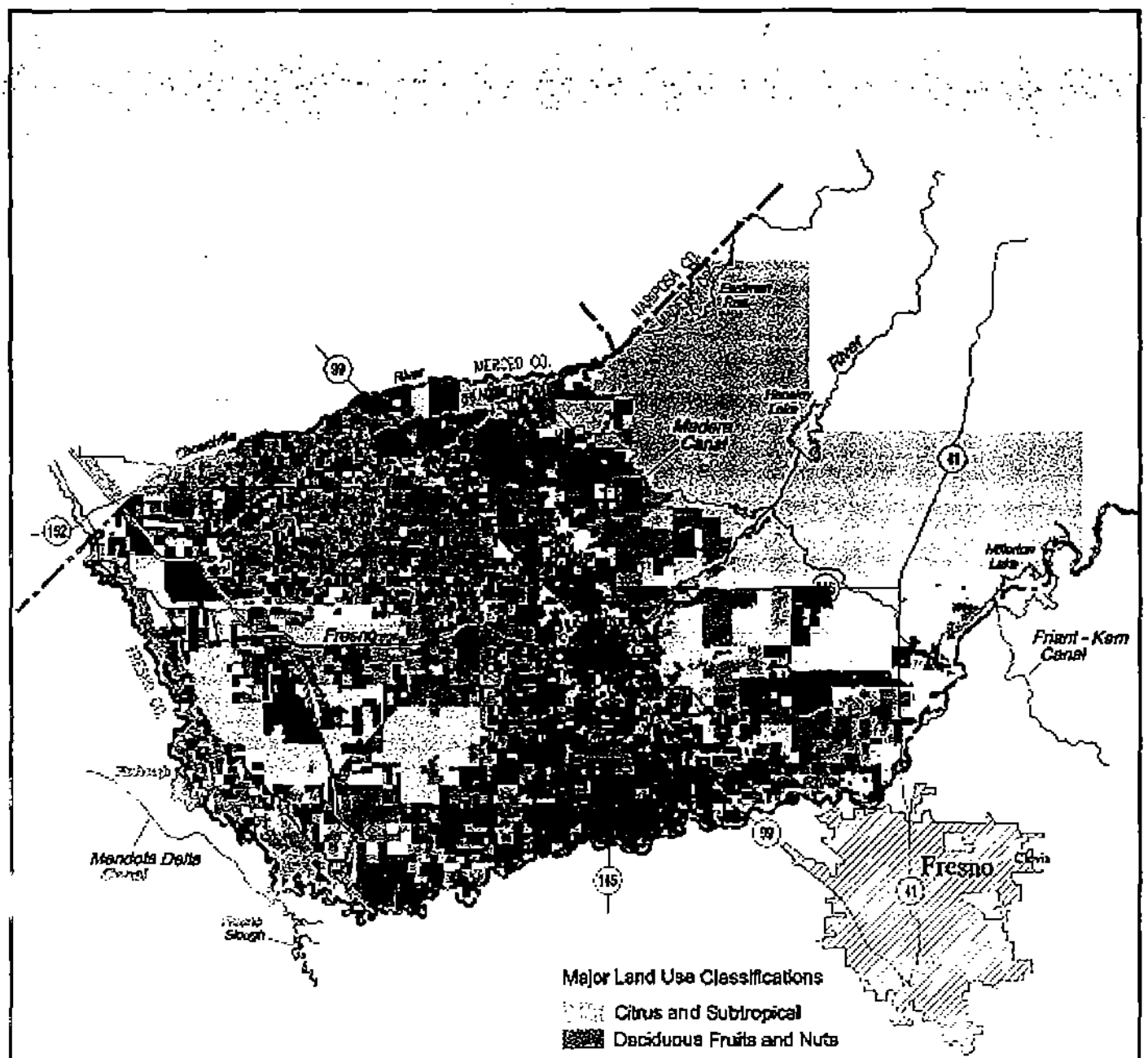
Emeryville, California
Figure 1-3
Water and Irrigation Districts



Source: DWR, 1995.

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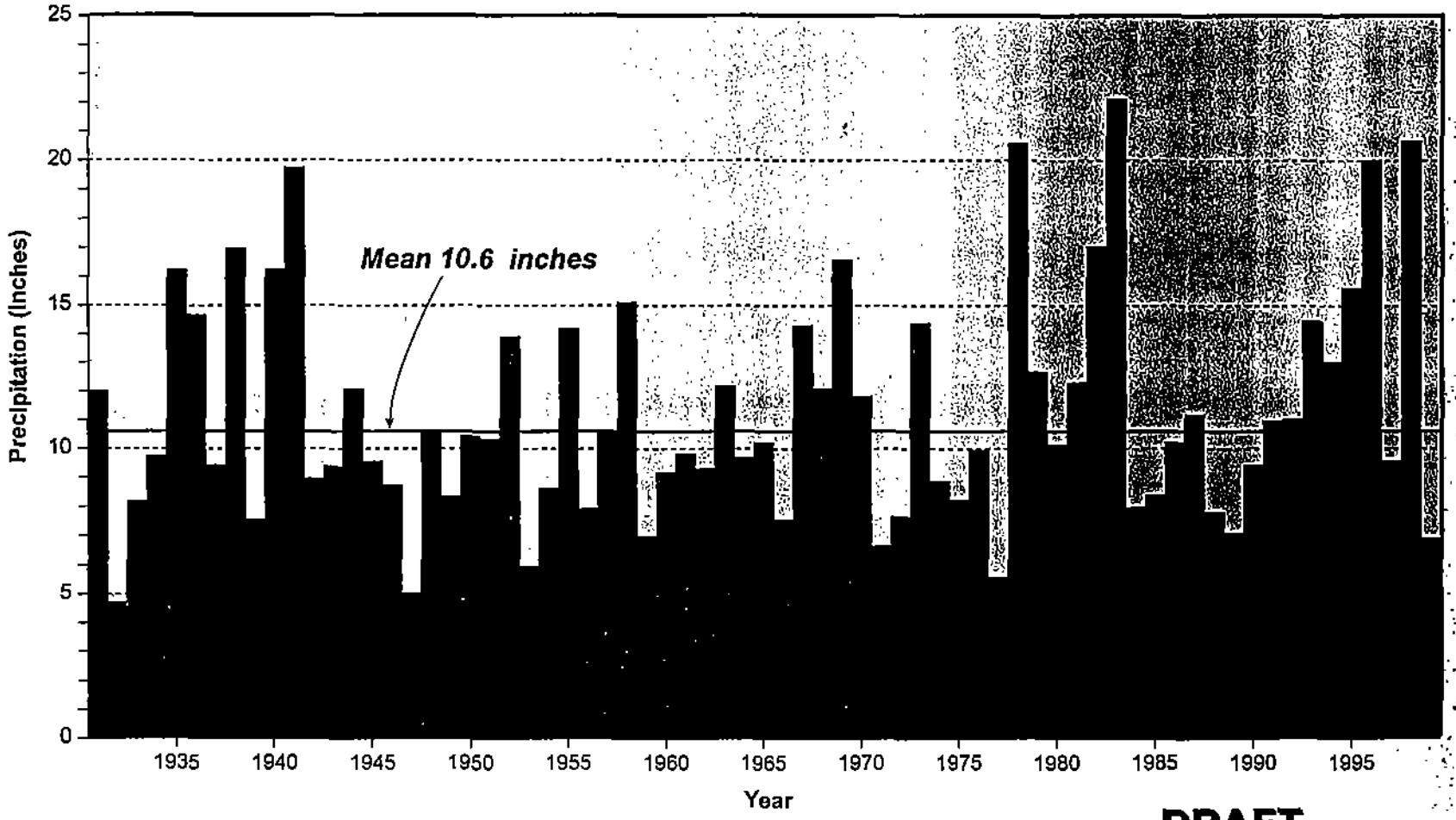
Emeryville, California

Figure 2-1
1995
Land Use



DRAFT

Based on monthly data from Madera Station No. 45233 NOAA

January 2002

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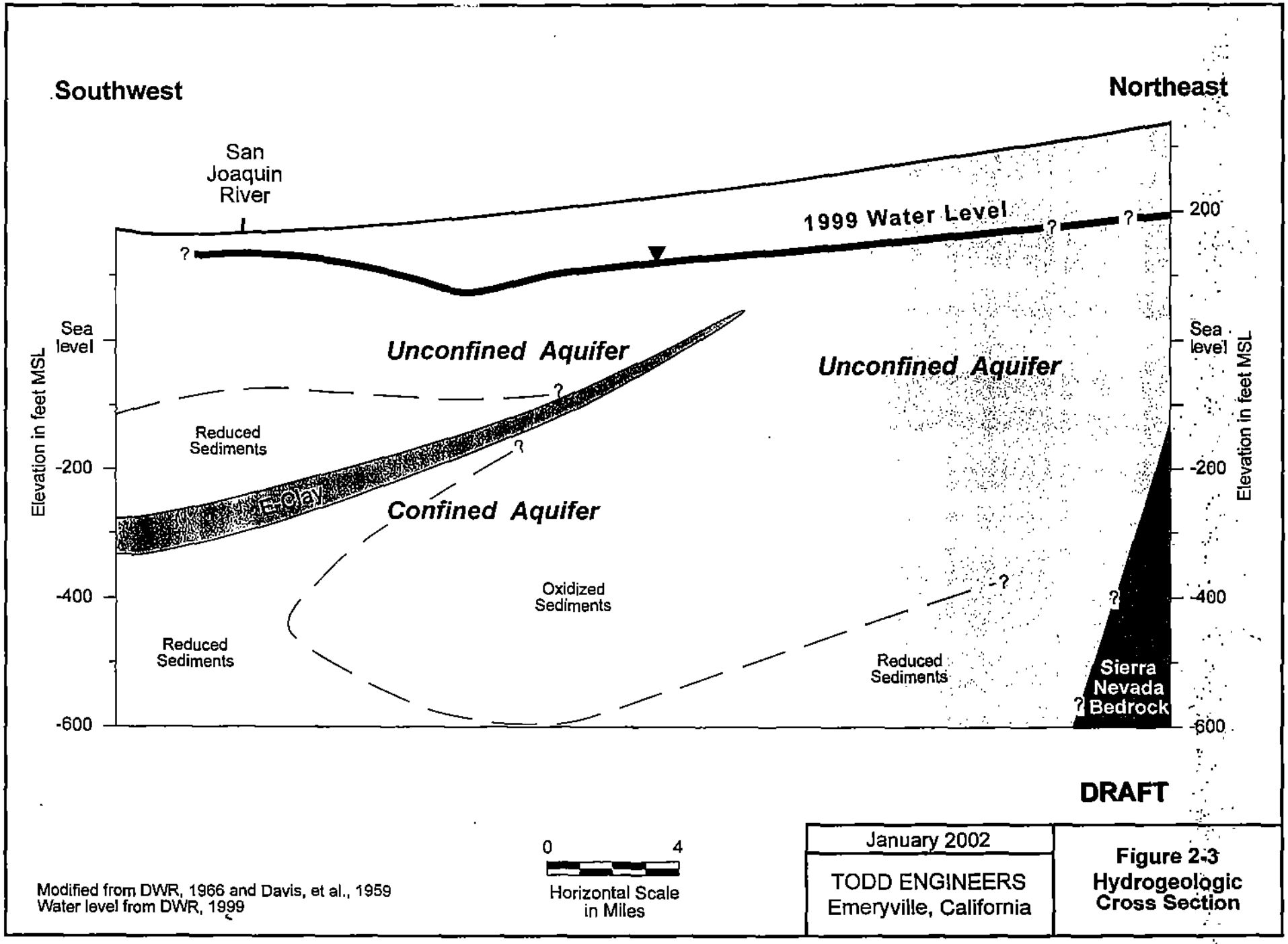
Figure 2-2
Annual Precipitation
1931 - 1999



Modified from DWR, 1966 and Davis, et al., 1959
Water level from DWR, 1999

January 2002

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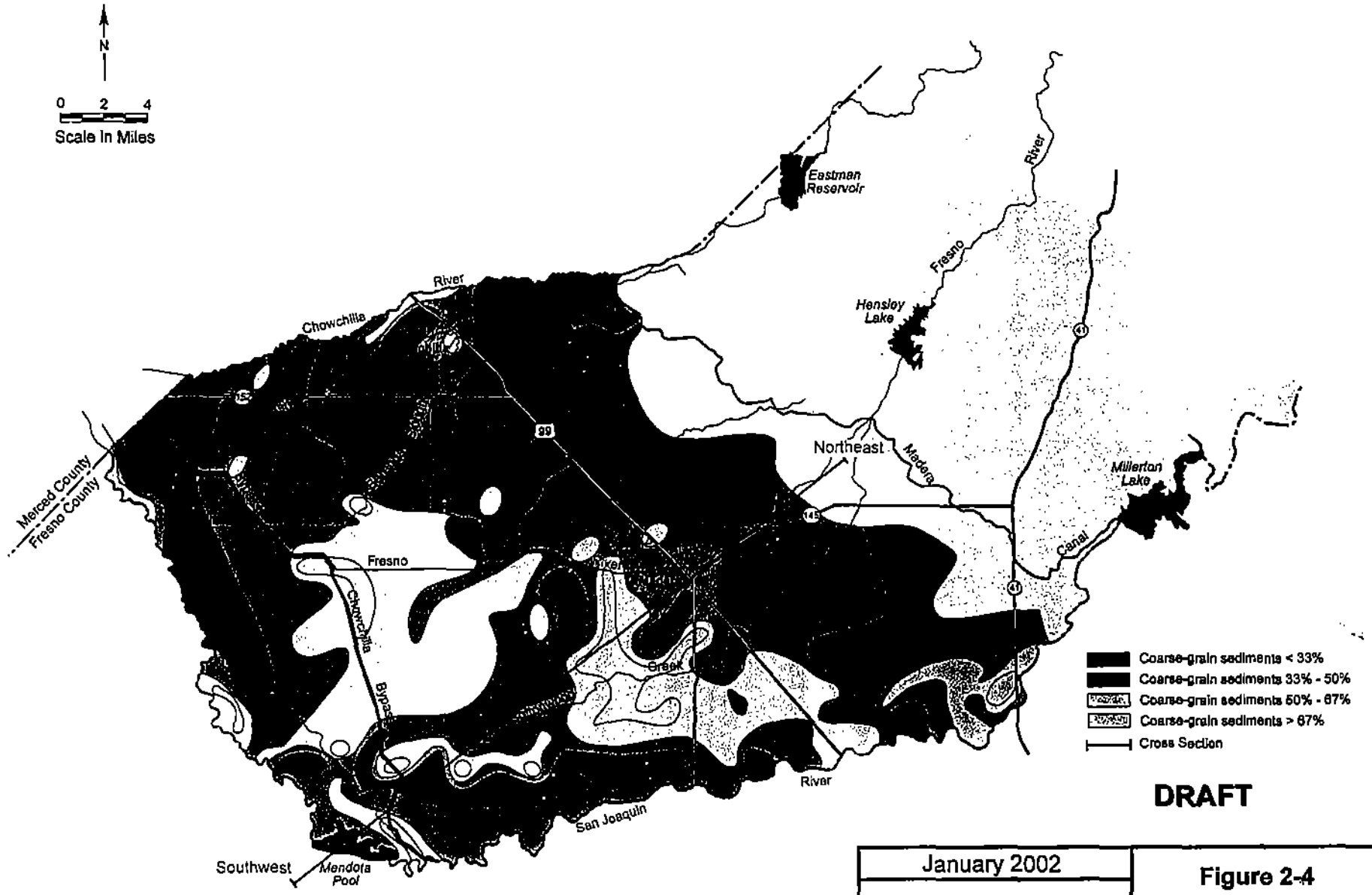
Emeryville, California

Figure 2-3
Hydrogeologic Cross Section



Source: Mitten, LeBlanc, and Bertoldi, 1970, USGS open-file Report.

January 2002

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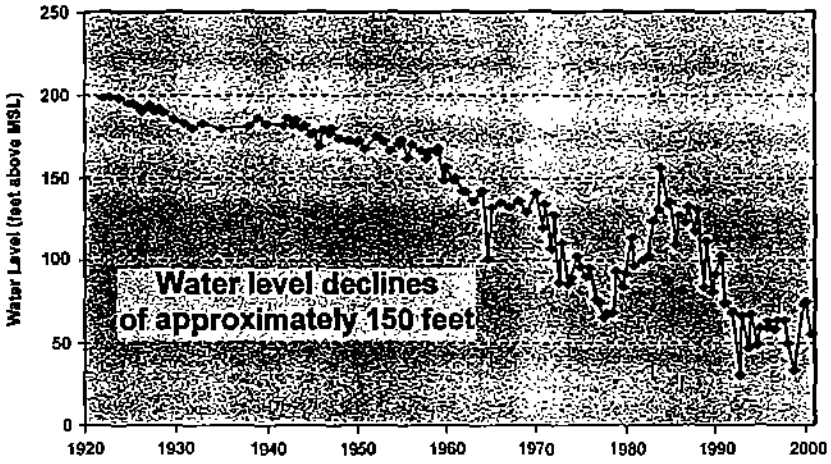
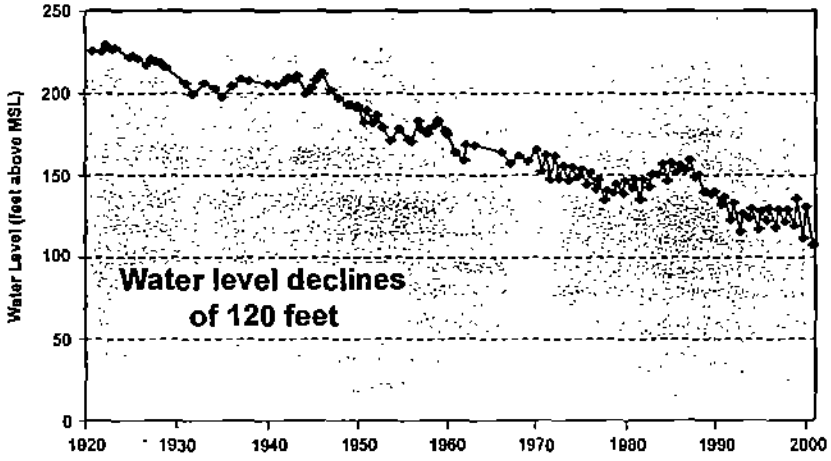
Emeryville, California

Figure 2-4
Lithofacies Map
Unconfined Aquifer

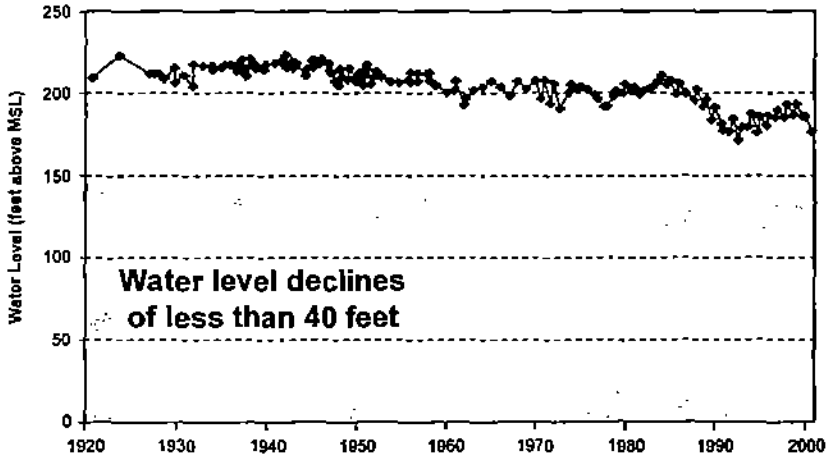
Chowchilla Basin
Southwest of Chowchilla



Central Madera Basin
Southwest of Madera

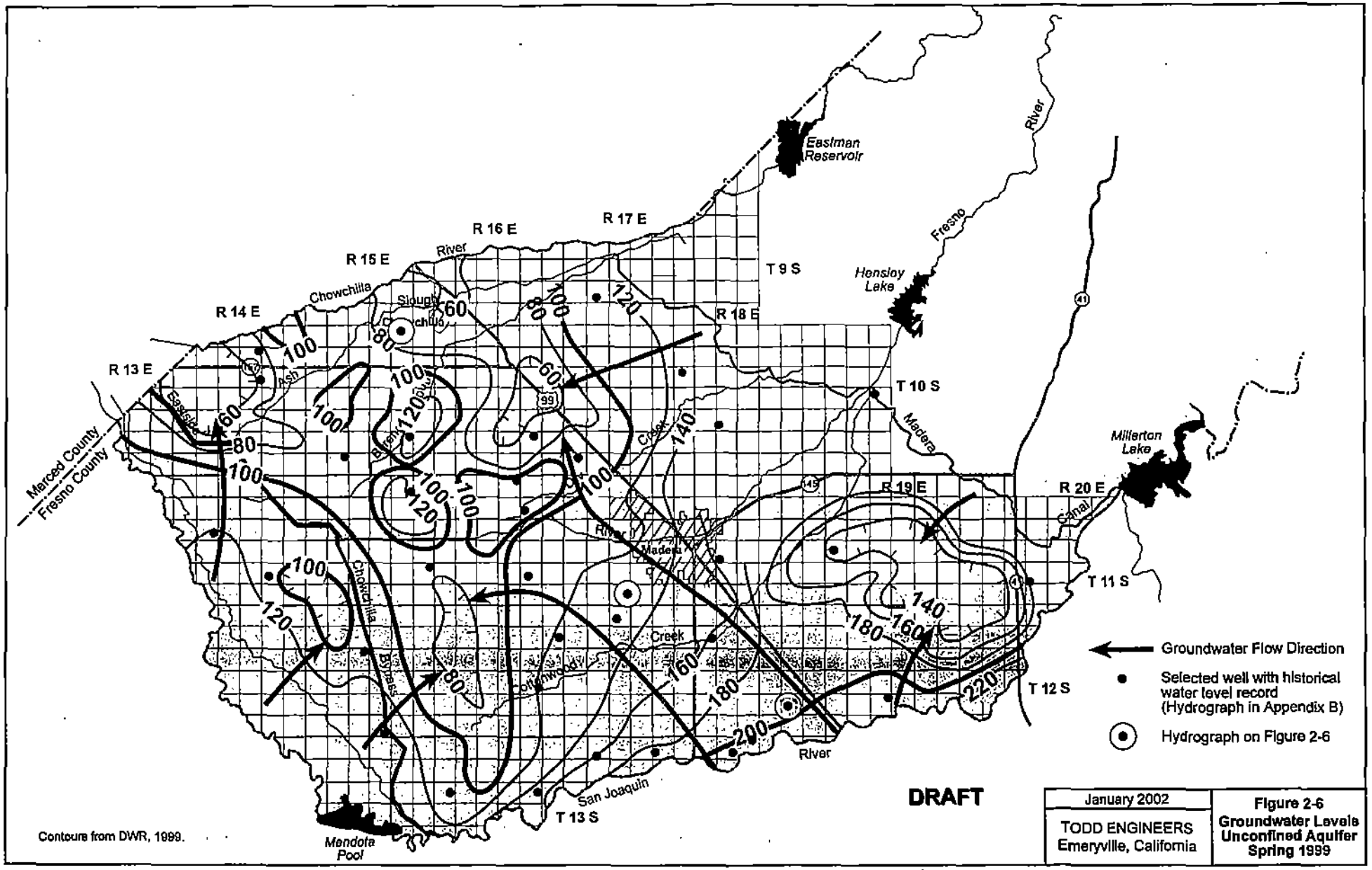


Southern Madera Basin
North of San Joaquin River



DRAFT

January 2002	**Figure 2-5** **Madera County** **Hydrographs** **1920 - 2000**
TODD ENGINEERS Emeryville, California	


Eastman Reservoir
Fresno River
Hensley Lake
Millerton Lake
Madera Canal
Chowchilla Bypass
Ash Slough
Berenda Slough
Eastside Bypass
Merced County
Fresno County
R 13 E
R 14 E
R 15 E
R 16 E
R 17 E
R 18 E
R 19 E
R 20 E
T 9 S
T 10 S
T 11 S
T 12 S
T 13 S
Groundwater Flow Direction
Selected well with historical water level record (Hydrograph in Appendix B)
Hydrograph on Figure 2-6
DRAFT
Contours from DWR, 1999.
Mendota Pool
San Joaquin River
January 2002
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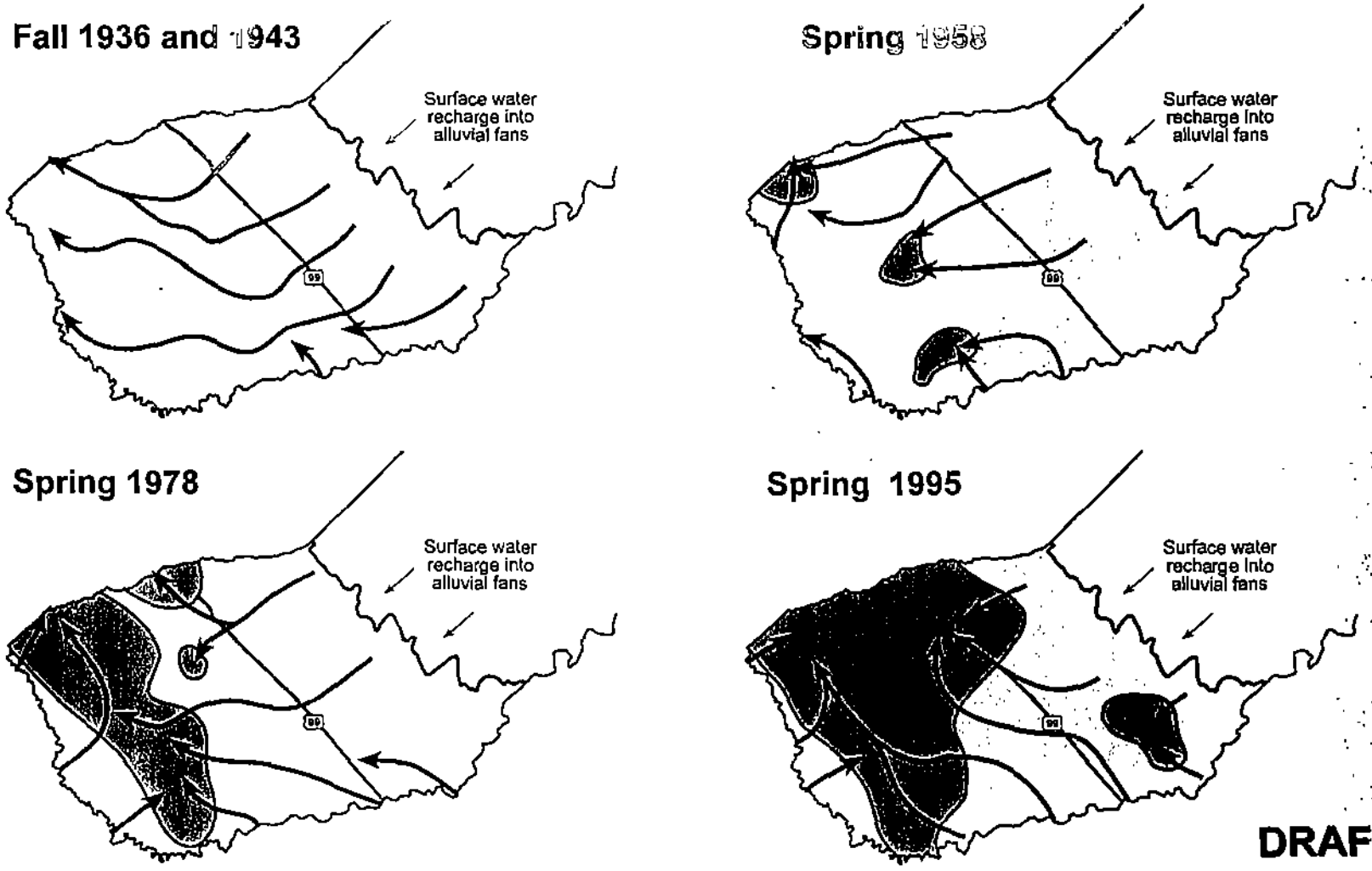
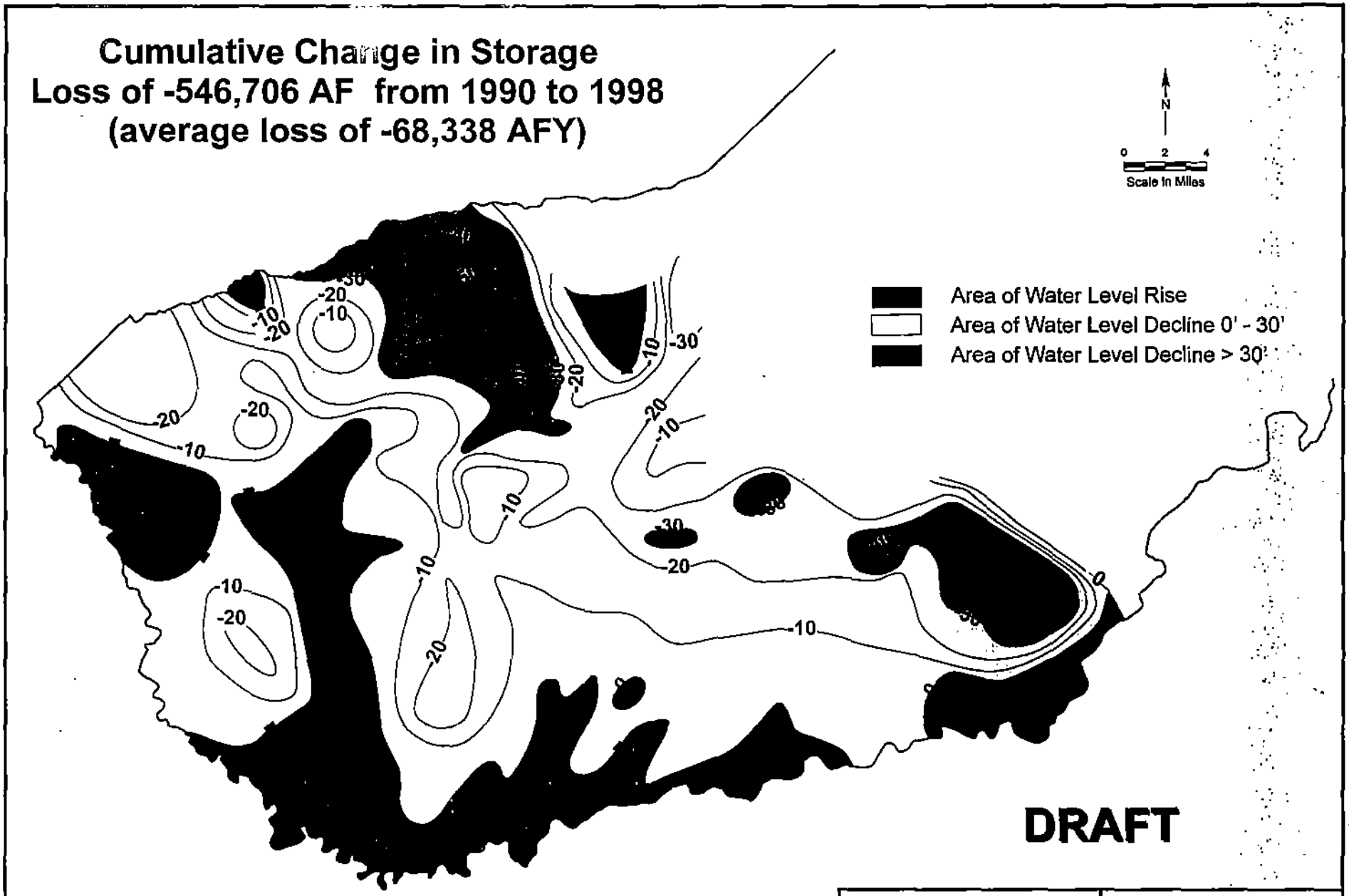
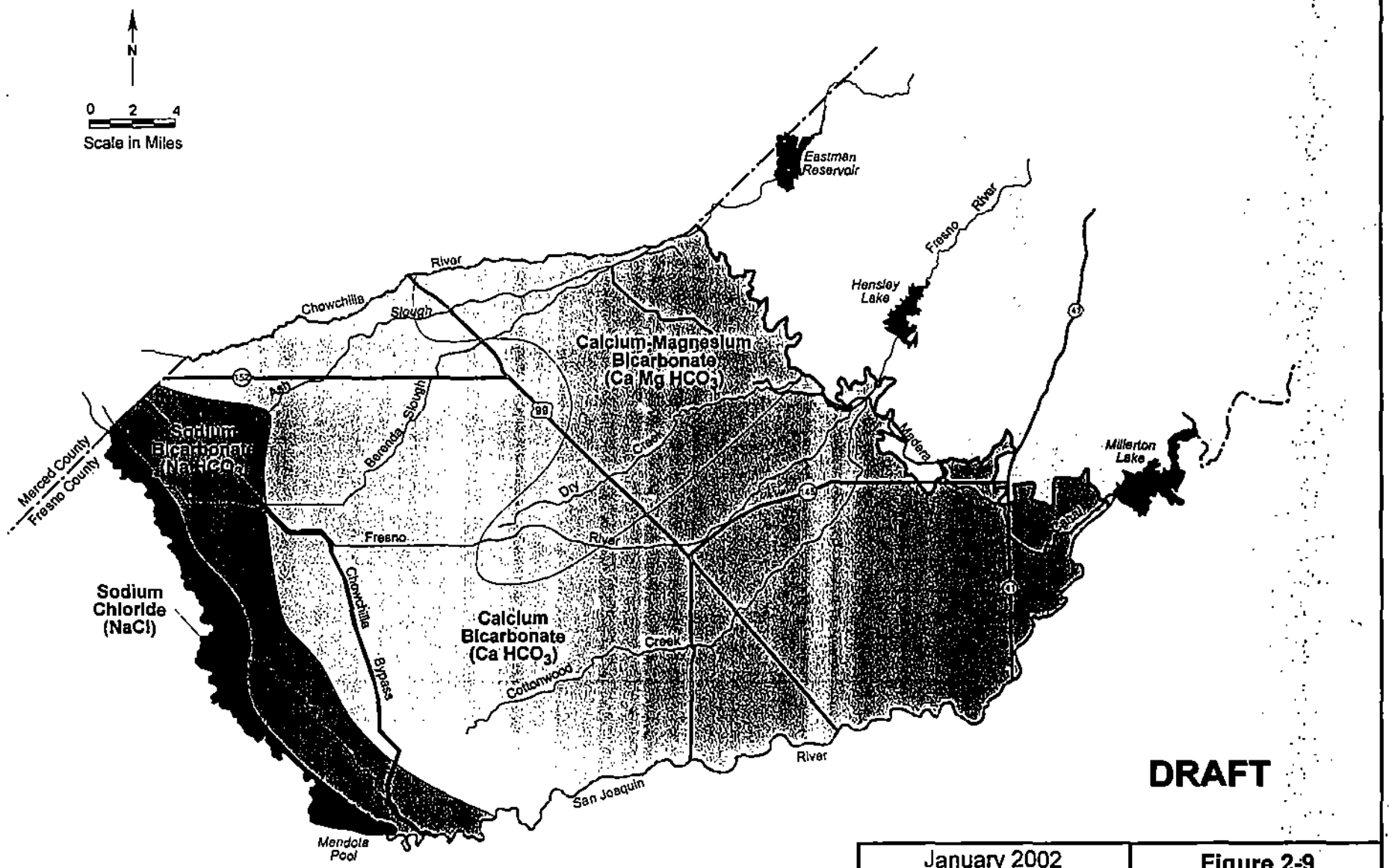
Emeryville, California
Figure 2-6
Groundwater Levels
Unconfined Aquifer
Spring 1999



January 2002	Figure 2-7 Change in Groundwater Flow Directions over Time
TODD ENGINEERS Emeryville, California	

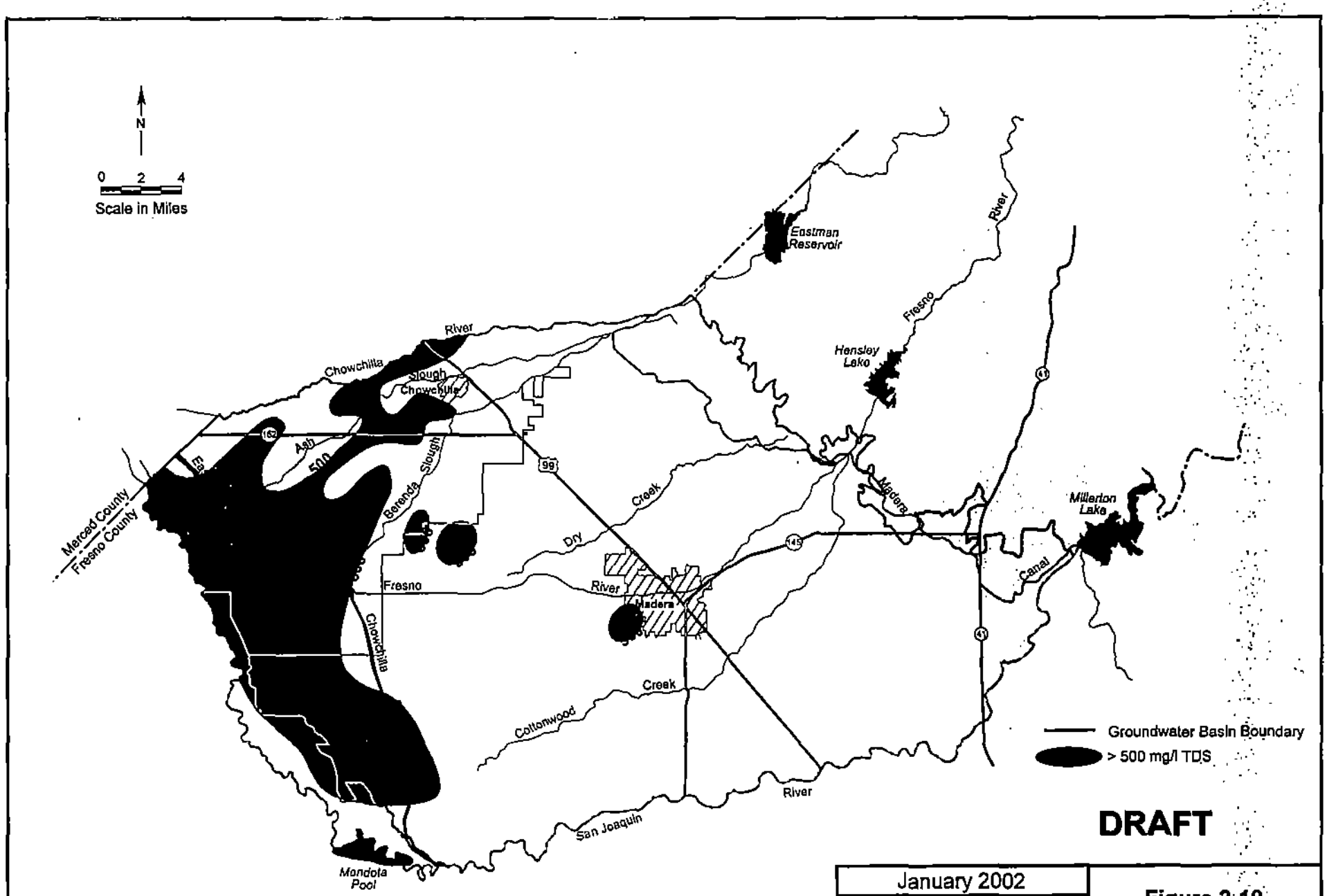


January 2002	**Figure 2-8**
TODD ENGINEERS Emeryville, California	**Change in Groundwater Storage 1990 - 1998**



Source: California Department of Water Resources, Bulletin 130-63, 1965.

January 2002	**Figure 2-9**
TODD ENGINEERS Emeryville, California	**Distribution of Groundwater Mineral Types**



Sources of TDS data in wells: DWR, 1971 and Mitten et al., 1970.

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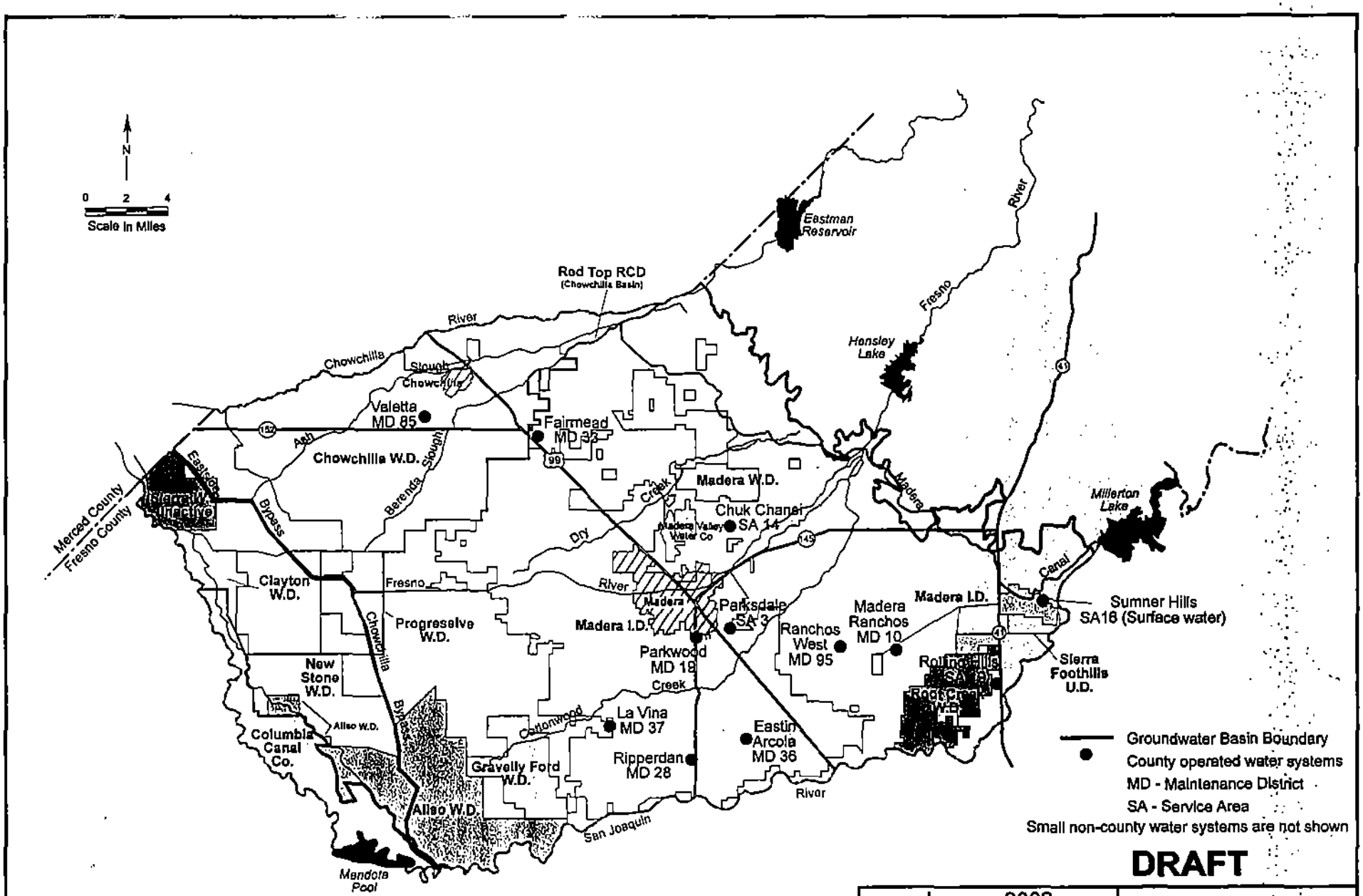
Figure 2-10
TDS in Groundwater


N
0 2 4
Scale in Miles
Eastman Reservoir
Hensley Lake
Millerton Lake
Red Top RCD
(Chowchilla Basin)
Fresno River
Chowchilla Slough
Chowchilla River
Valetta MD 85
Fairmead MD 33
Chowchilla W.D.
Ash Slough
Berenda Slough
Eastside Bypass
Merced County
Fresno County
Sierra View
Madera W.D.
Madera Creek
Chuk Chanai SA 14
Madera Valley Water Co
Dry Creek
Madera
Madera I.D.
Canal
Clayton W.D.
Fresno River
Progressive W.D.
Chowchilla Bypass
Parksdale SA 3
Parkwood MD 18
Ranchos West MD 95
Madera Ranchos MD 10
Madera I.D.
Sumner Hills SA16 (Surface water)
Sierra Foothills U.D.
New Stone W.D.
Alliso W.D.
Columbia Canal Co.
Cottonwood Creek
La Vina MD 37
Eastin Arcola MD 36
Ripperdan MD 28
Gravelly Ford W.D.
Alliso W.D.
San Joaquin River
Mendota Pool
Groundwater Basin Boundary
County operated water systems
MD - Maintenance District
SA - Service Area
Small non-county water systems are not shown
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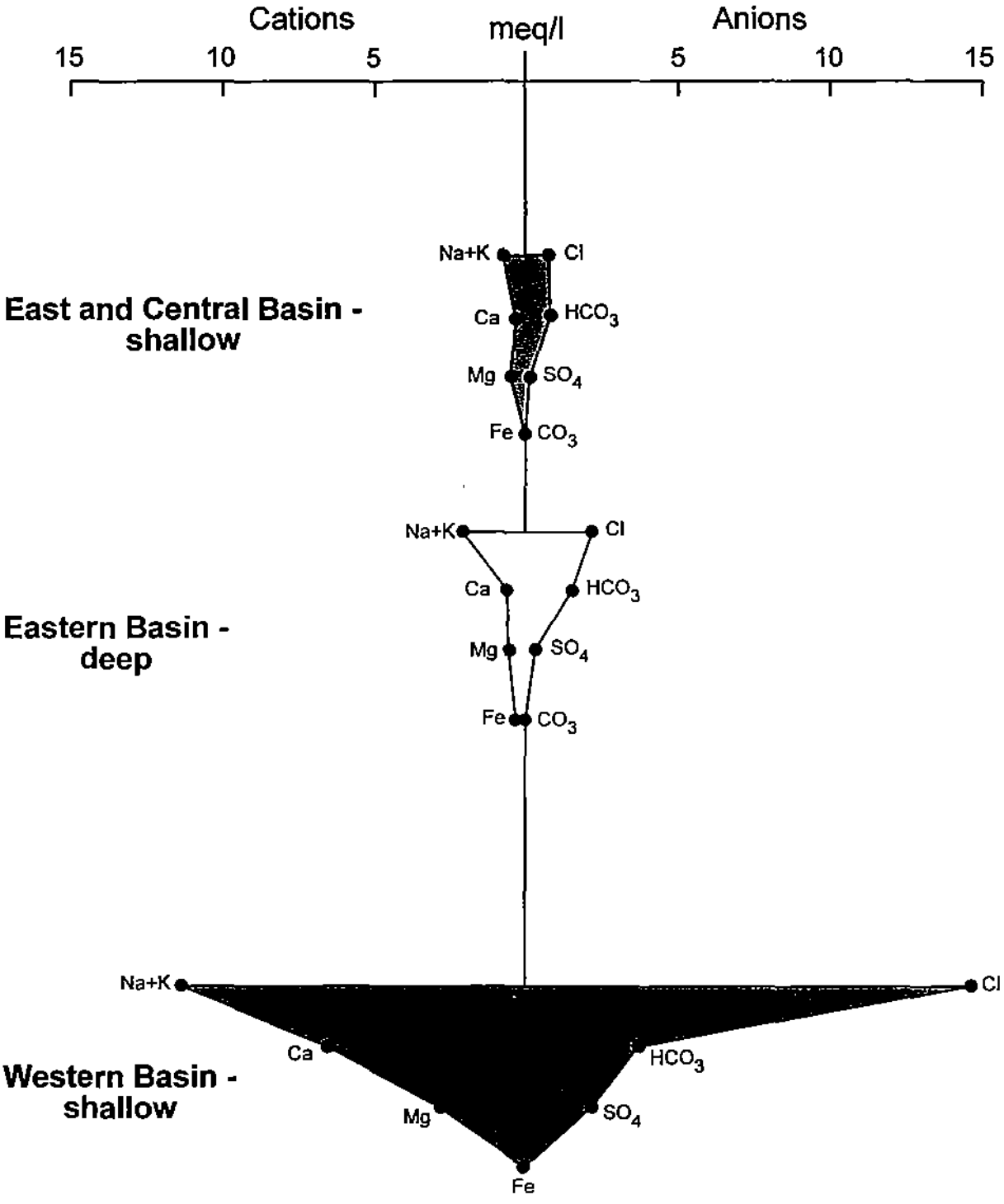
Emeryville, California
Figure 2-11
Community
Water Systems



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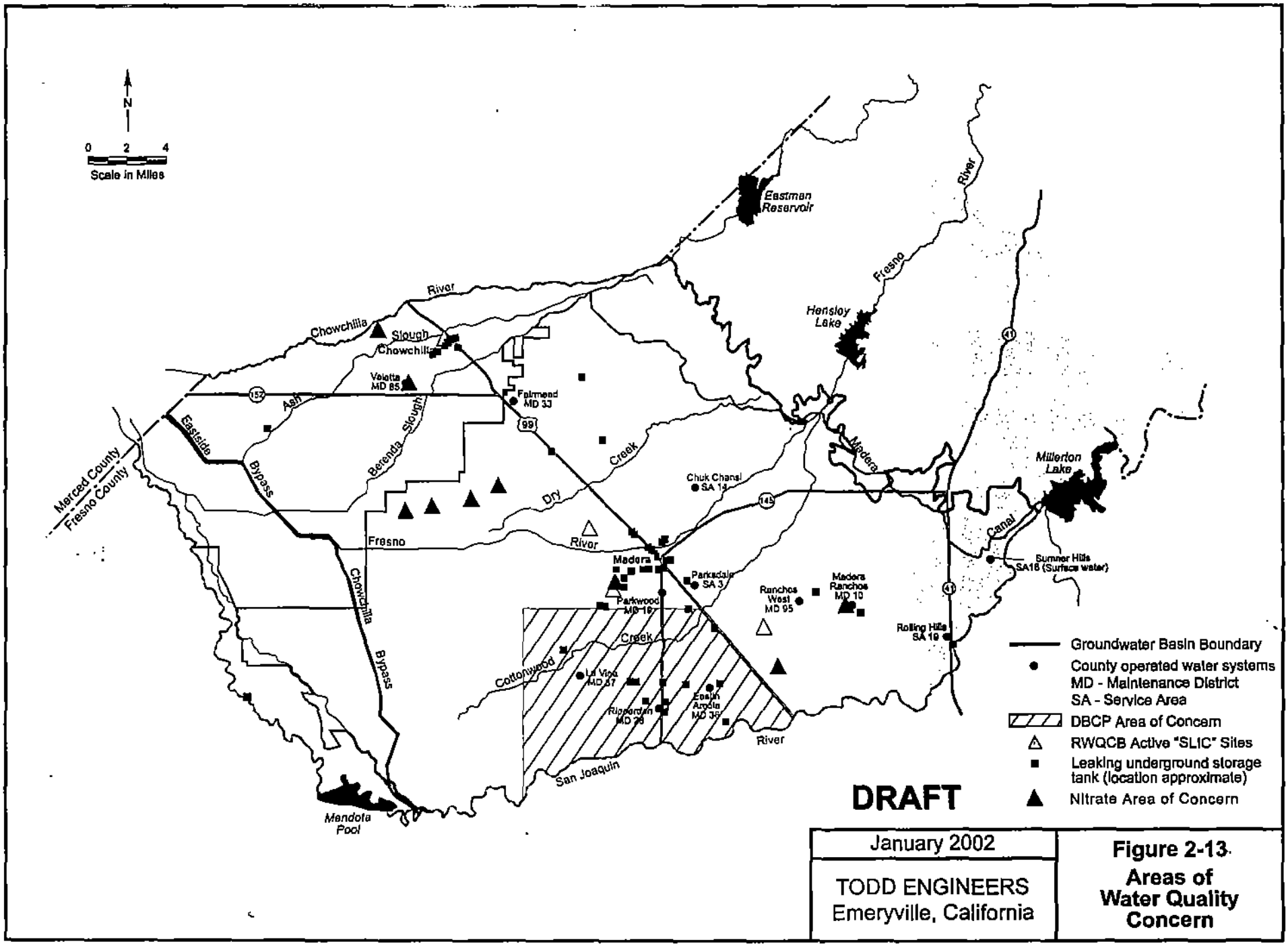
January 2002	**Figure 2-12**
TODD ENGINEERS Emeryville, California	**Inorganic Water Quality**


N
0 2 4
Scale in Miles
Eastman Reservoir
Hensley Lake
Millerton Lake
Fresno River
Chowchilla Slough
Chowchilla
Velotta MD 85
Fairmead MD 33
Ash Slough
Berenda Slough
Eastside Bypass
Merced County
Fresno County
Dry Creek
Chuk Chansi SA 14
Madera Canal
Fresno River
Madera
Parkwood MD 16
Parksdale SA 3
Ranchos West MD 95
Madera Ranchos MD 10
Rolling Hills SA 19
Sumner Hills SA18 (Surface water)
Chowchilla Bypass
Cottonwood Creek
La Vina MD 37
Riverdan MD 28
Eastin Arcola MD 36
San Joaquin River
Mendota Pool
Groundwater Basin Boundary
County operated water systems
MD - Maintenance District
SA - Service Area
DBCP Area of Concern
RWQCB Active "SLIC" Sites
Leaking underground storage tank (location approximate)
Nitrate Area of Concern
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TODD ENGINEERS
Emeryville, California
Figure 2-13
Areas of Water Quality Concern

APPENDIX A

Resolution of Intention of The Board of Supervisors of The County of Madera to Draft a Groundwater Management Plan

BEFORE
THE BOARD OF SUPERVISORS
OF THE COUNTY OF MADERA
STATE OF CALIFORNIA

In the Matter of MADERA COUNTY GROUND-WATER MANAGEMENT PLAN	Resolution No.: 2001- 144 RESOLUTION OF INTENTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF MADERA TO DRAFT A GROUNDWATER MANAGEMENT PLAN

WHEREAS, the Madera, Chowchilla, and Delta-Mendota Groundwater Basins (the "Basins") consist of lands overlying the alluvium in Madera County; and

WHEREAS, the Basins cover the portion of Madera County that is west of the Sierra Nevada foothills; and

WHEREAS, the Basins have been determined by the State of California Department of Water Resources to be critically overdrafted; and

WHEREAS, it is in the best interests of the County and the landowners and other constituents within the County to investigate and develop a plan for the long term management of the groundwater resources within the portions of the Basins located within the County, but not already within the service area of another local agency as defined in the California Water Code section 10752(g) (the "Management Area"), in order to protect the availability of groundwater for continued use in future years; and

WHEREAS, the California State Legislature has authorized the County and other local agencies to develop and adopt groundwater management plans pursuant to California Water Code sections 10750 et seq.:

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of the County of Madera intends to draft a plan for the management of groundwater resources lying beneath the Management Area. The process for the development of the draft groundwater management plan shall consider the relationship of groundwater resource availability and utilization within the Management Area and adjacent areas. Such draft plan shall be acted upon within two (2) years from the date of this resolution, after further public hearing in accordance

with the provisions of Section 10750, et seq., of the California Water Code.

****

The foregoing Resolution was adopted this 22nd day of May, 2001, by the following vote:

Supervisor Bigelow voted: Yes

Supervisor Moss voted: Yes

Supervisor Dominici voted: Absent

Supervisor Silva voted: Yes

Supervisor Gilbert voted: Yes

Chairman, Board of Supervisors

ATTEST:

Clerk, Board of Supervisors

Approved as to Legal Form:
COUNTY COUNSEL

By

APPENDIX B

Water Level Hydrographs

Appendix B
Water Level Hydrographs

More than 60 hydrographs were constructed from the DWR water level database to examine long-term trends in the Study Area. Of these hydrographs, 36 were selected as being representative of water levels in various portions of the basin over the last 80 years and are included in this Appendix. Water levels are plotted at consistent vertical scales (one inch equals approximately 60 feet) from 1920 to 2000. Two hydrographs are shown on each page for convenience. The elevation of the ground surface (GSE) at each well is identified on each hydrograph in the lower left corner in feet above msl.

The State Well Number is shown at the top of each hydrograph and can be used to identify the corresponding well location on Figure 2-6 using the section-township-range grid as shown by the following example.

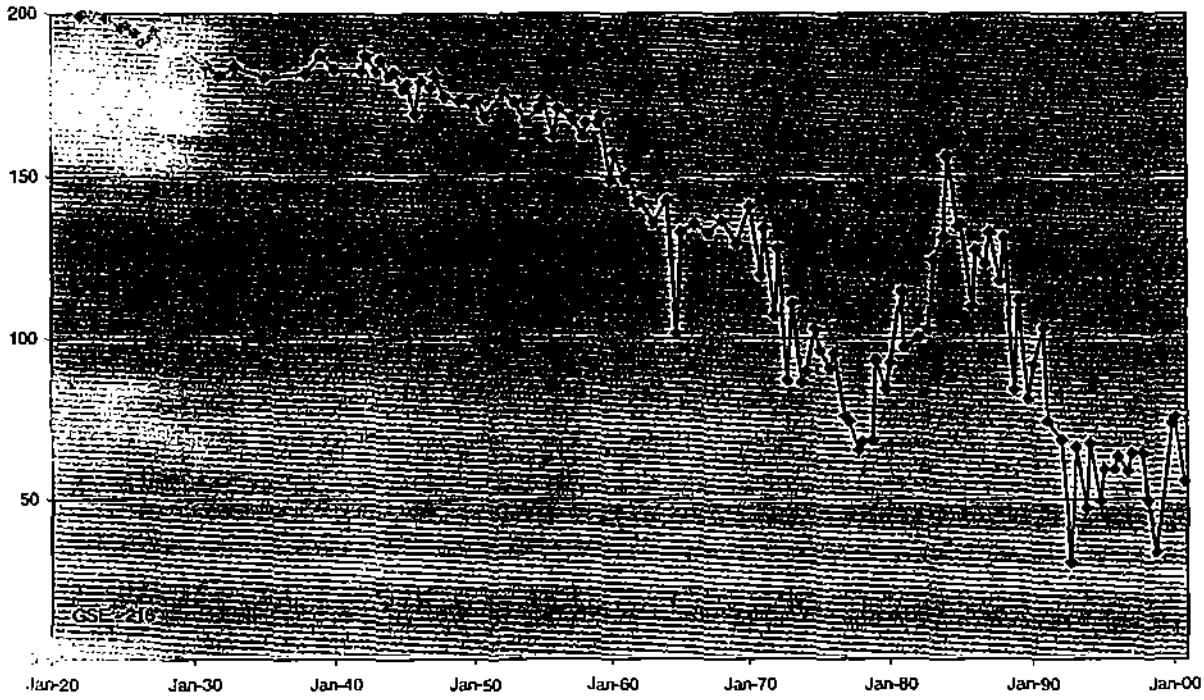
R 16 E

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	●	23	24
30	29	28	27	26	25
31	32	33	34	35	36

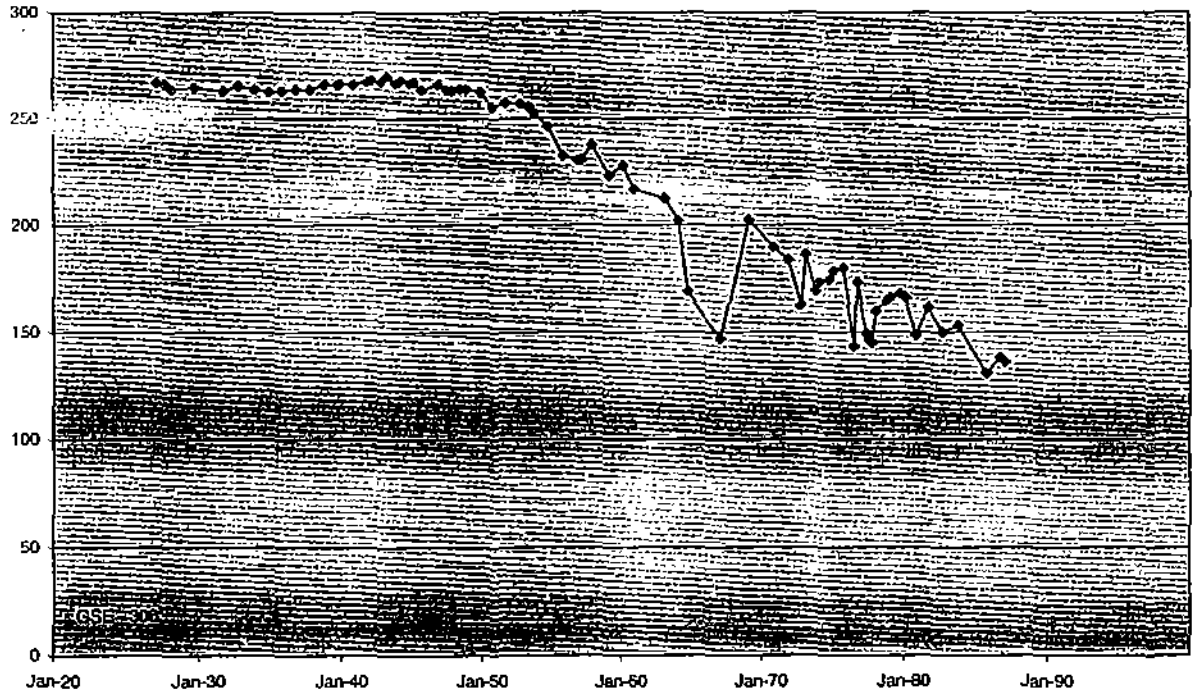
T 11 S

An example well is shown in Section 22 of Township 11 South, Range 16 East and would have a state well number of 11S/16E-22. Letters following the section-township-range designation further delineate the location within the section. Each section is one square mile (640 acres).

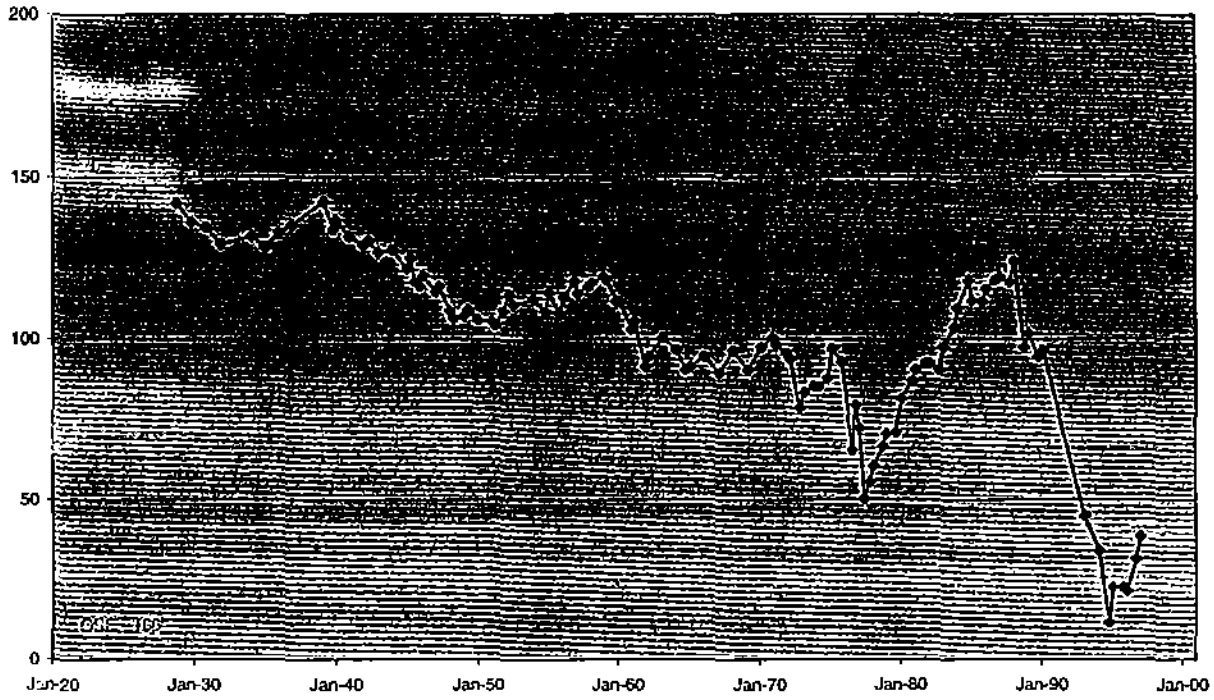
9S/15E-35 C01



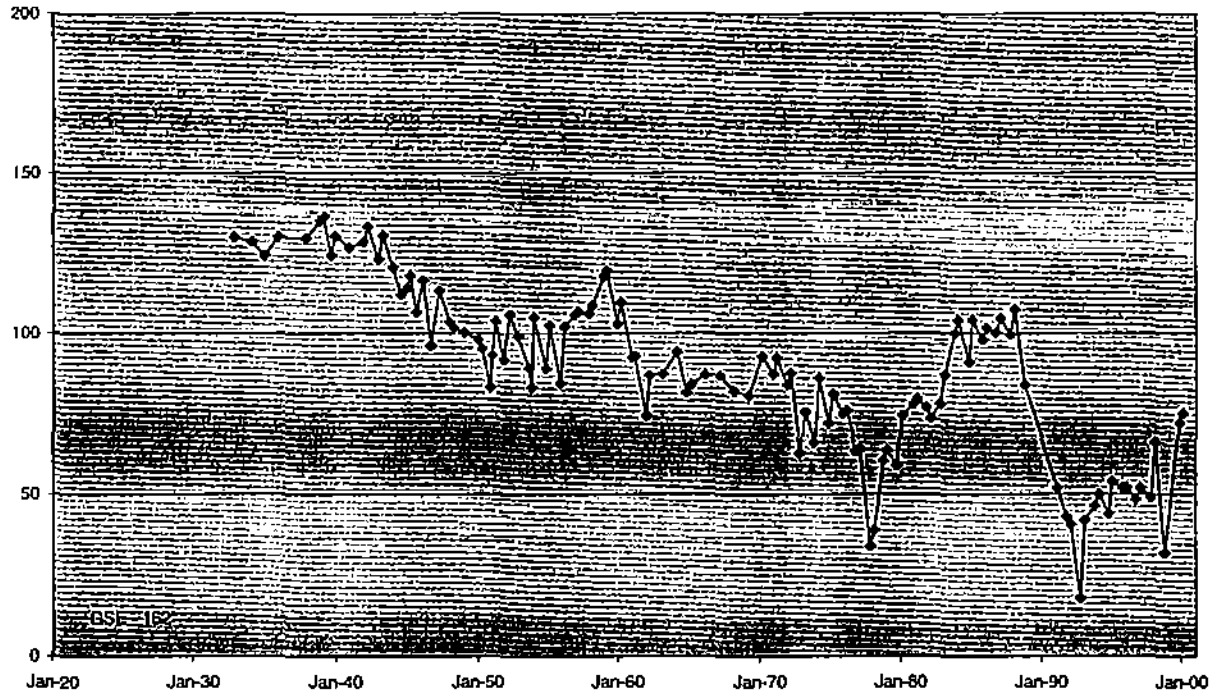
9S/17E-20 L1



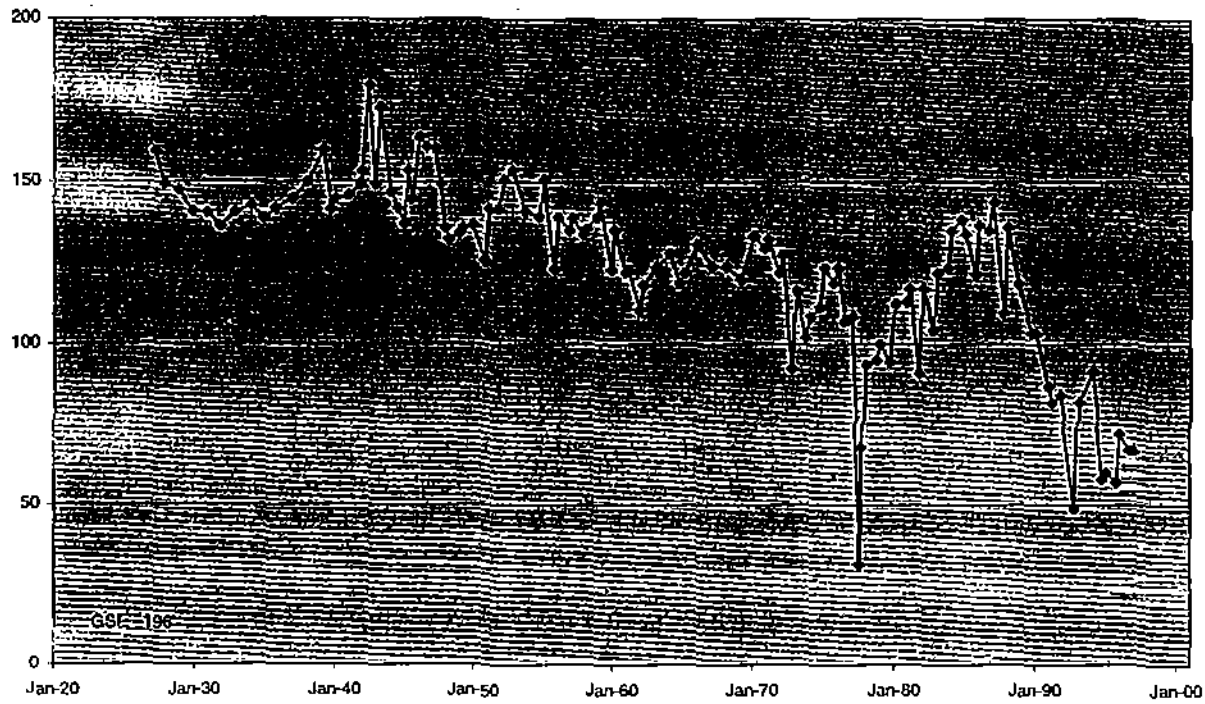
10S/14E-3 A1



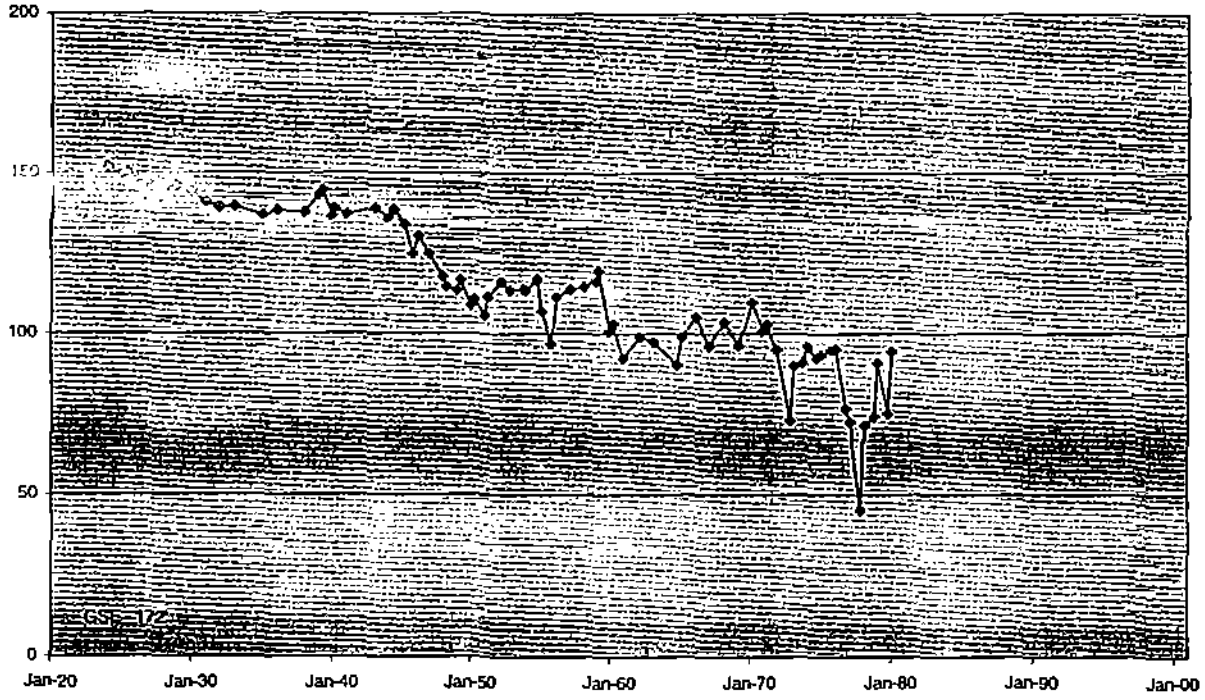
10S-14E-10H!



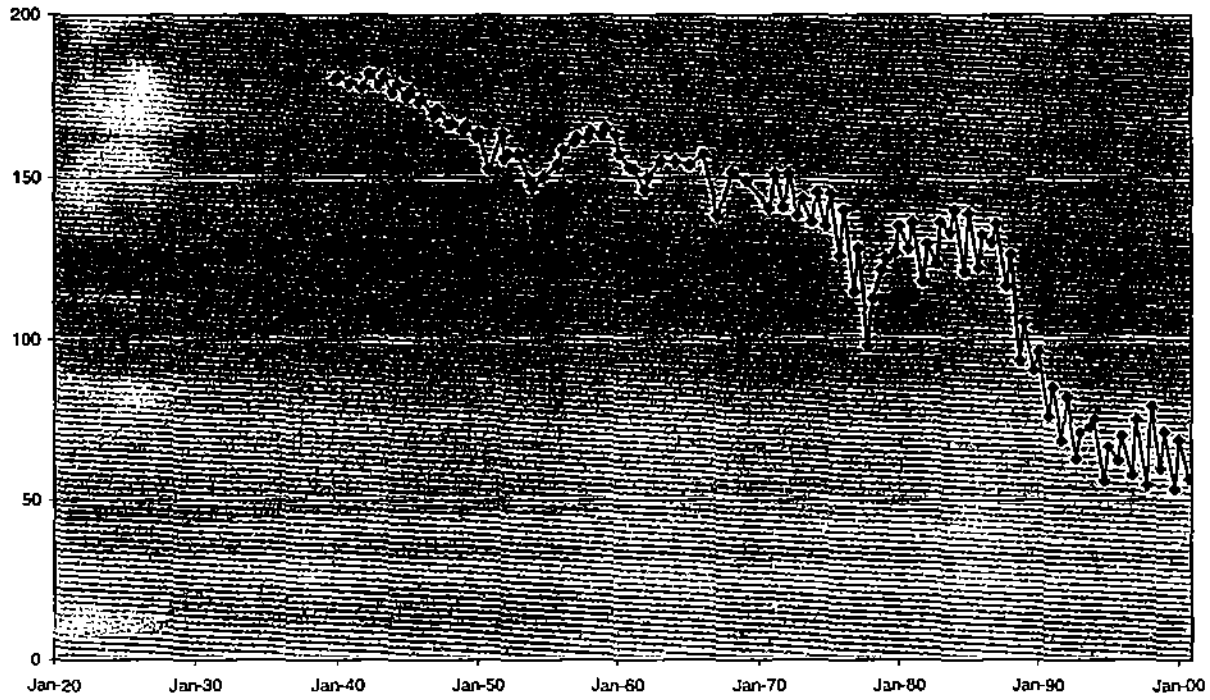
10S/15E-26A1



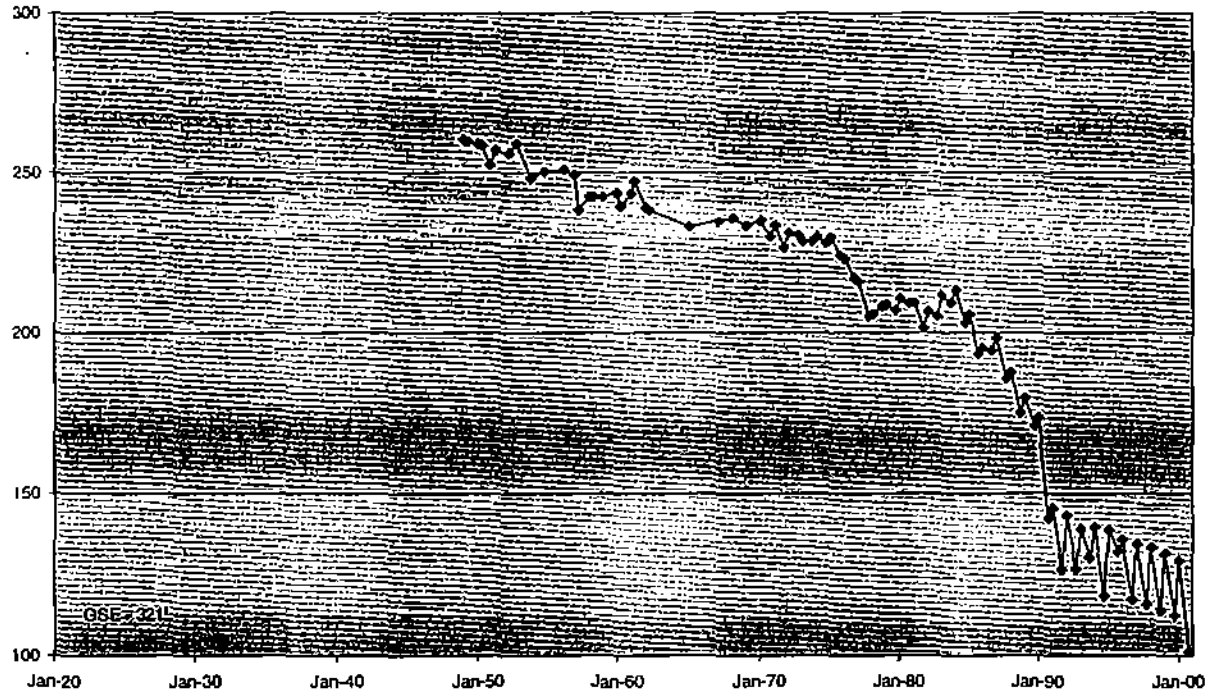
10S/15E-32A1



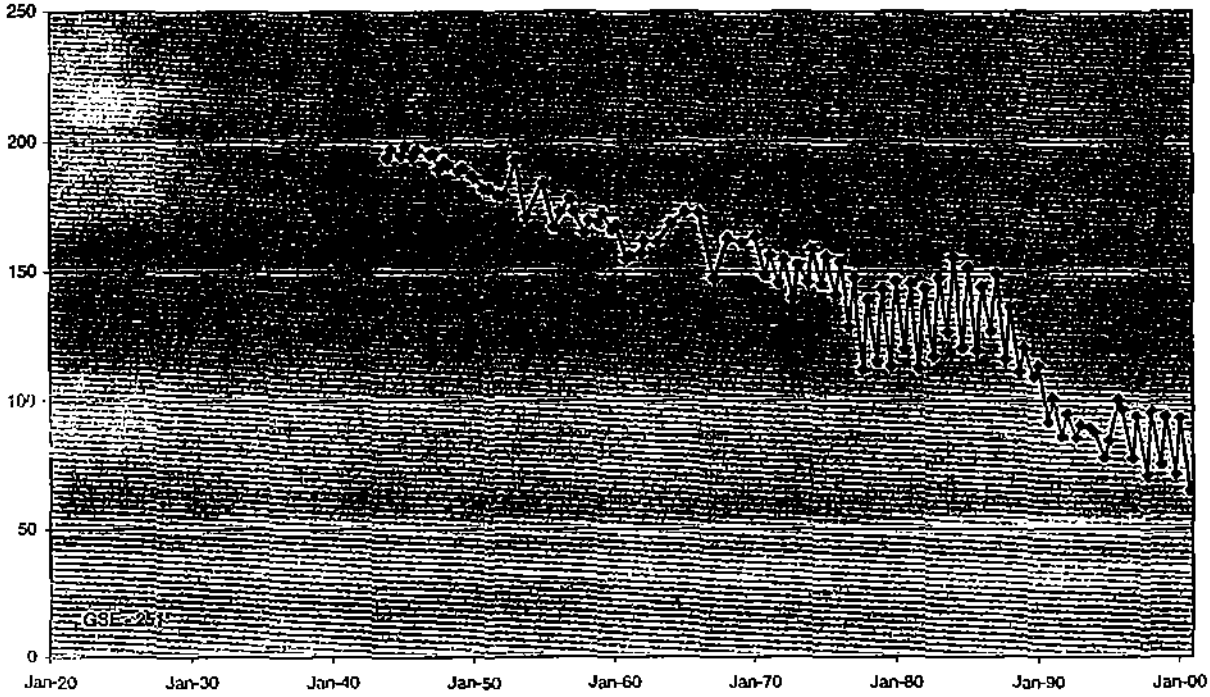
10S/16E-26 B01



10S/17E-12C1



10S/17E-30 B02



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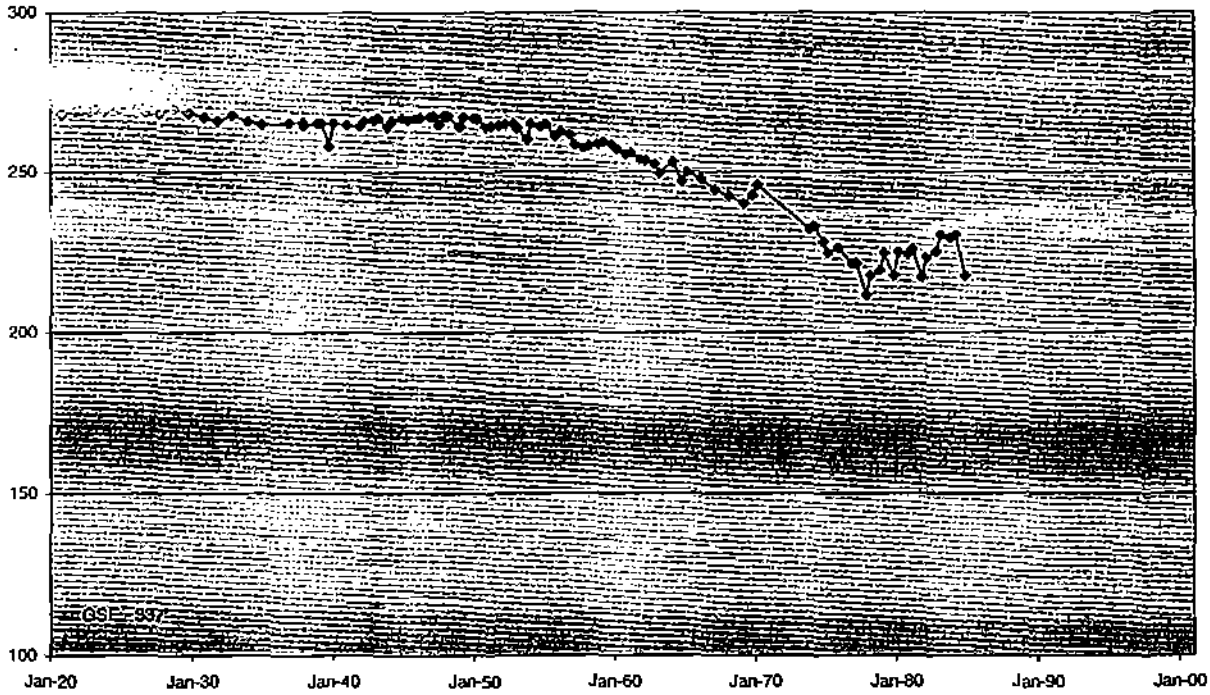

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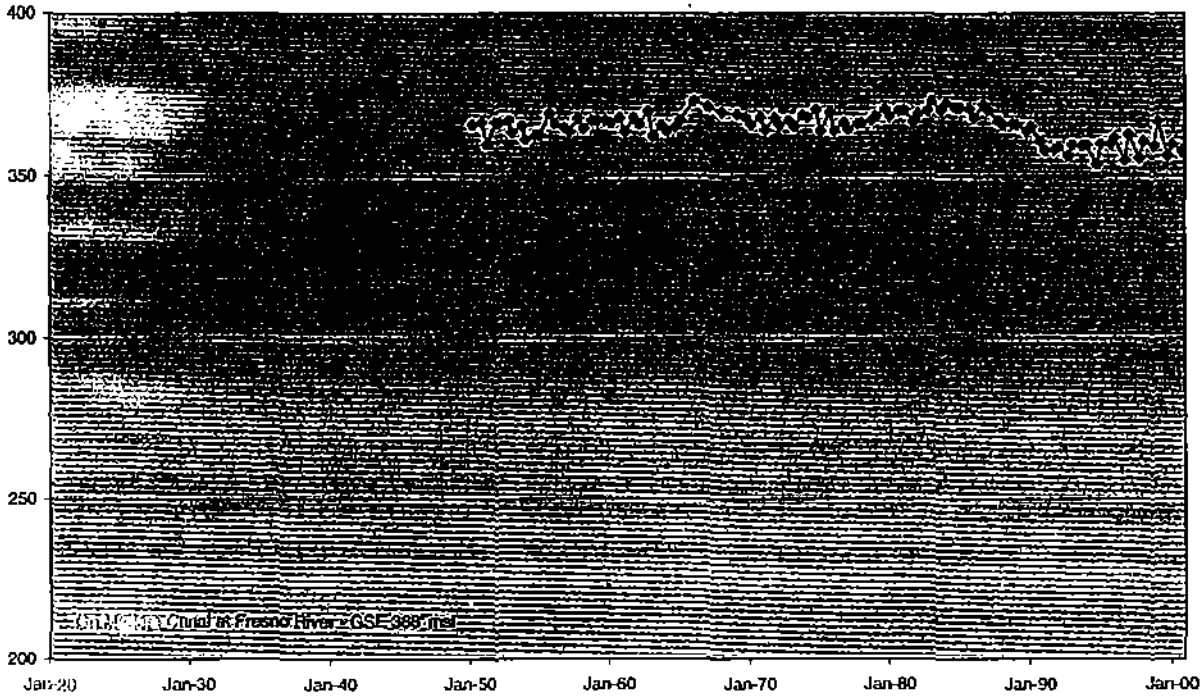

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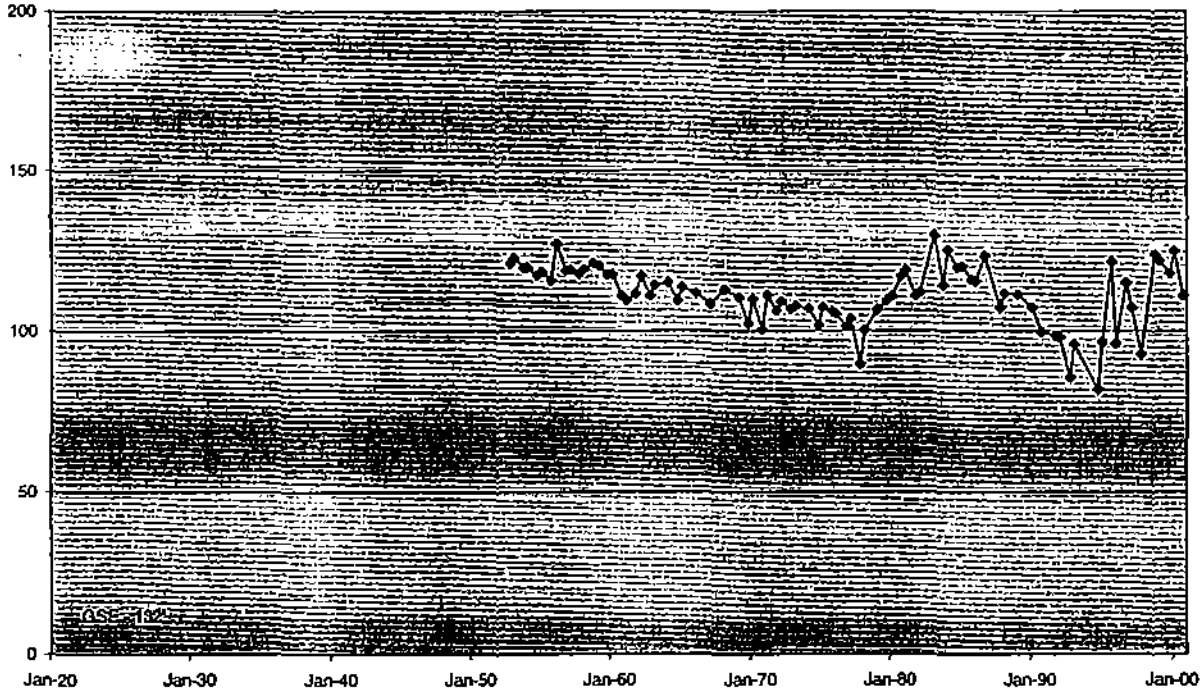

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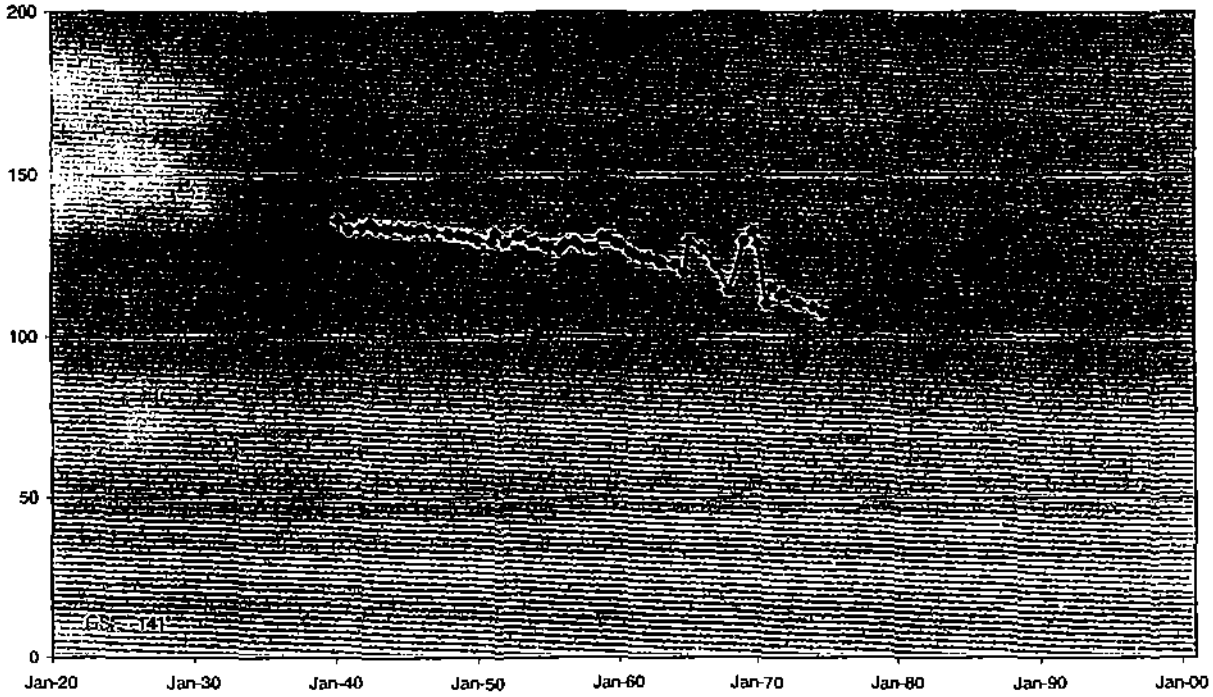

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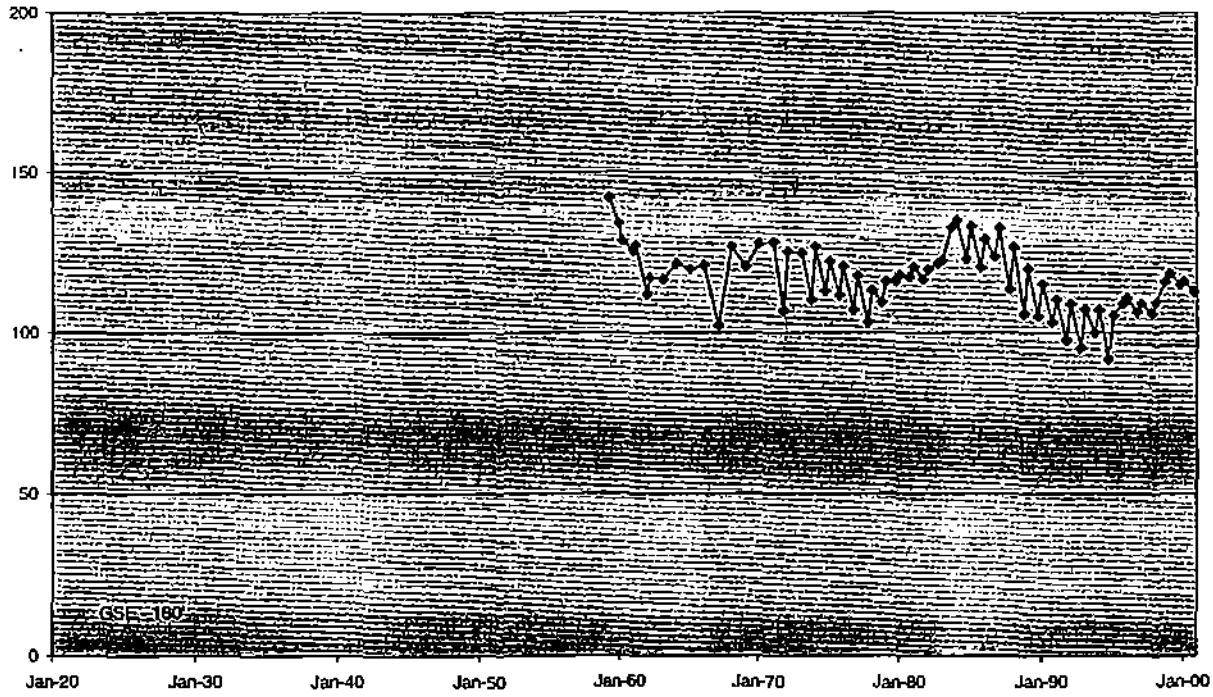

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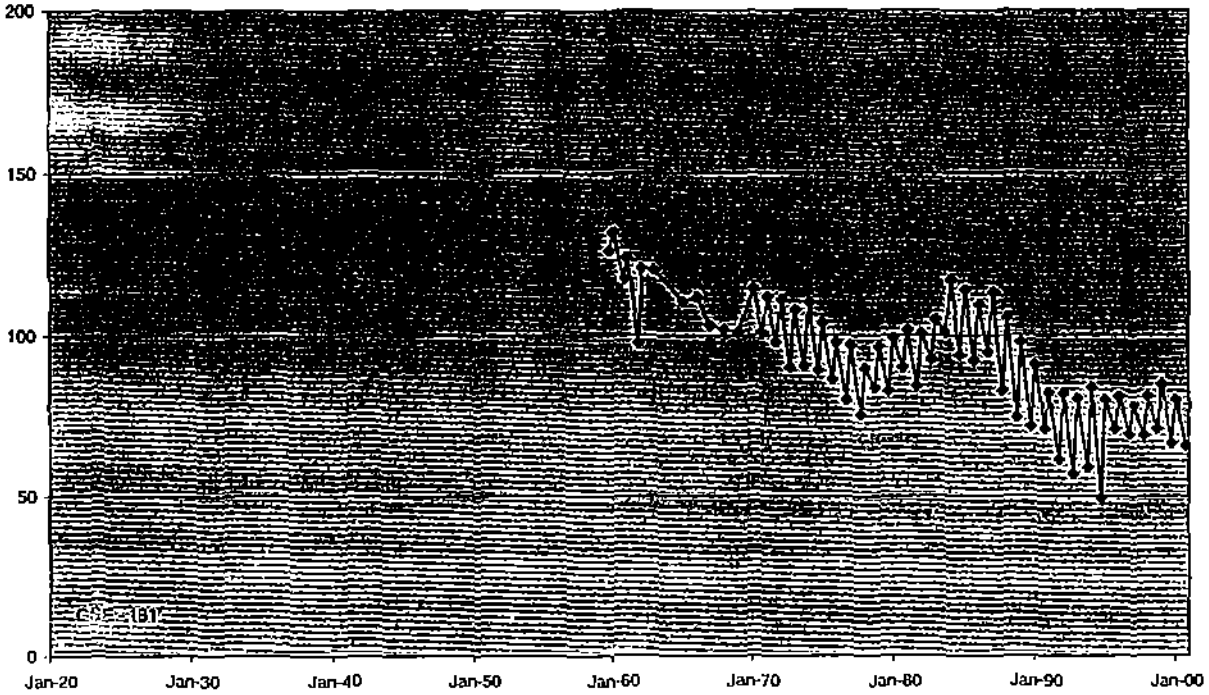

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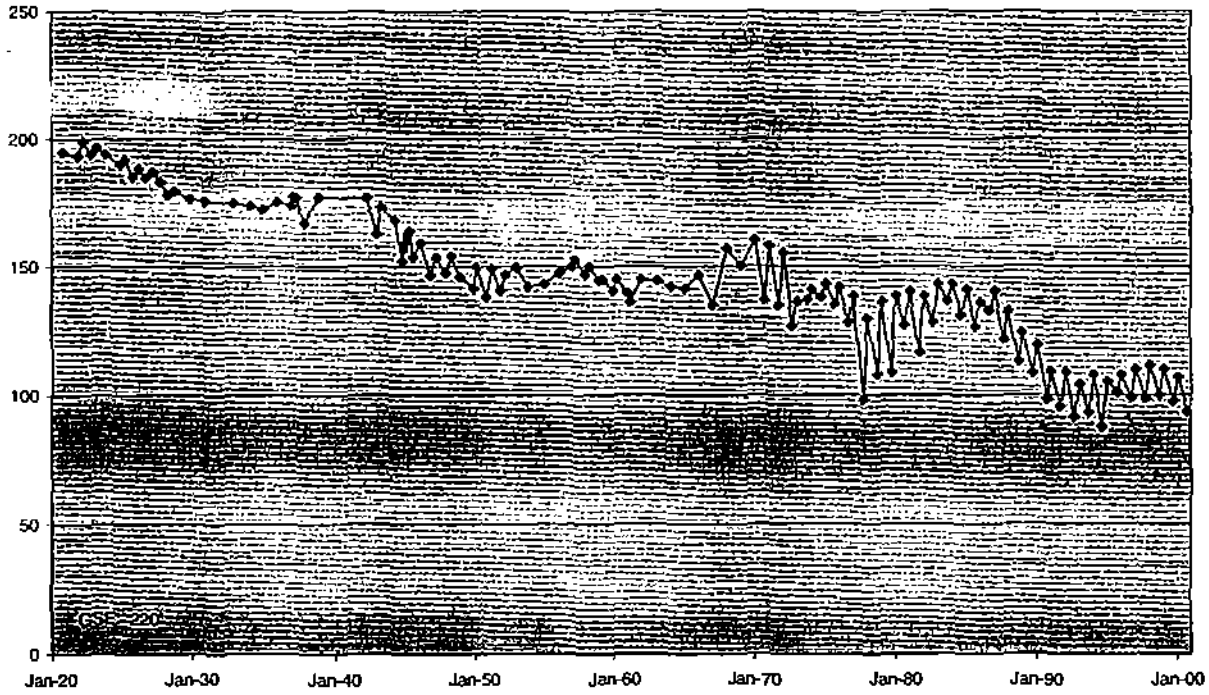

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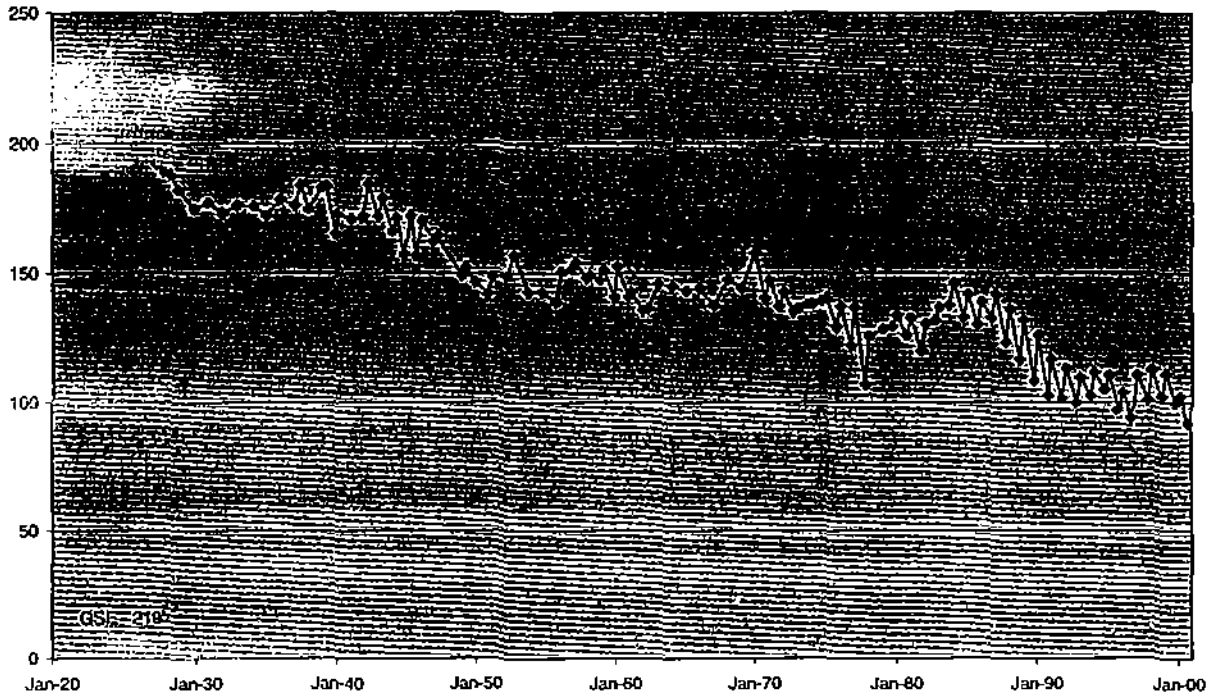

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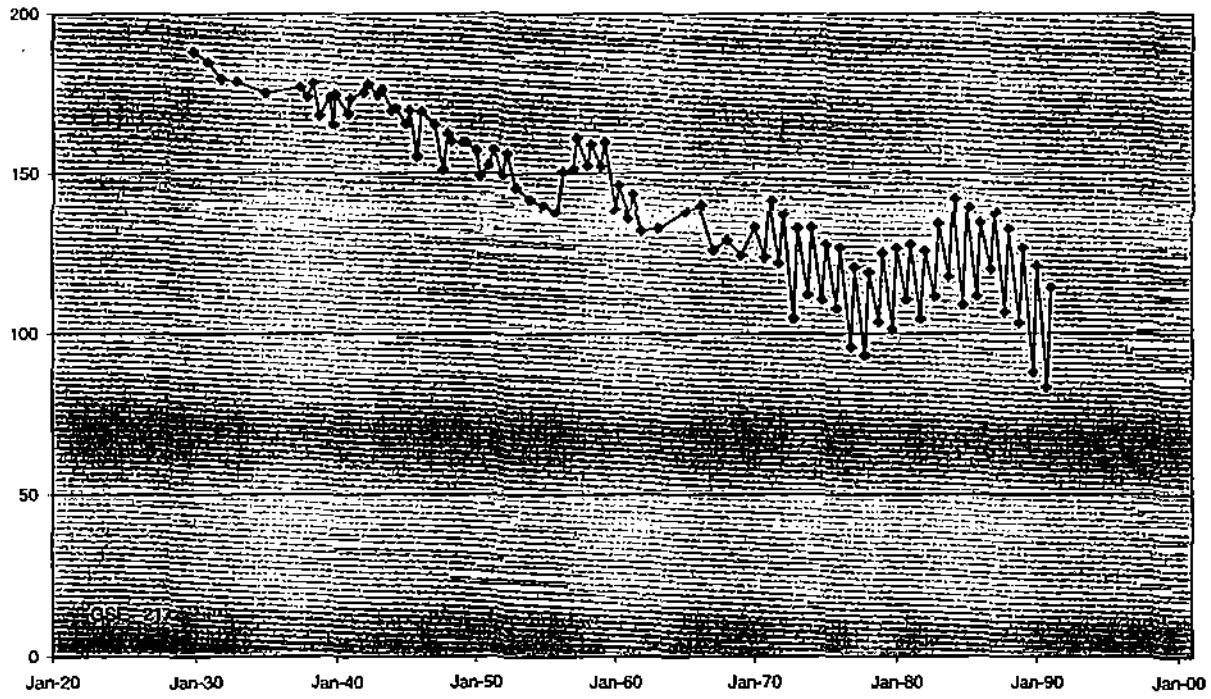

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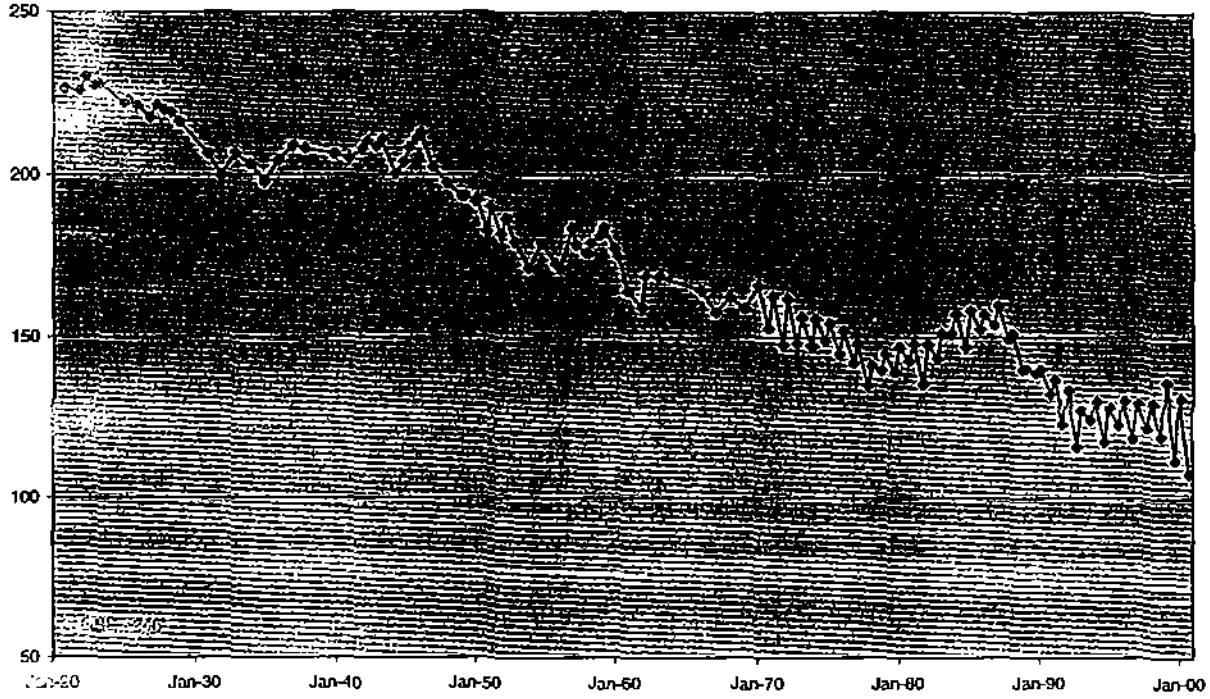

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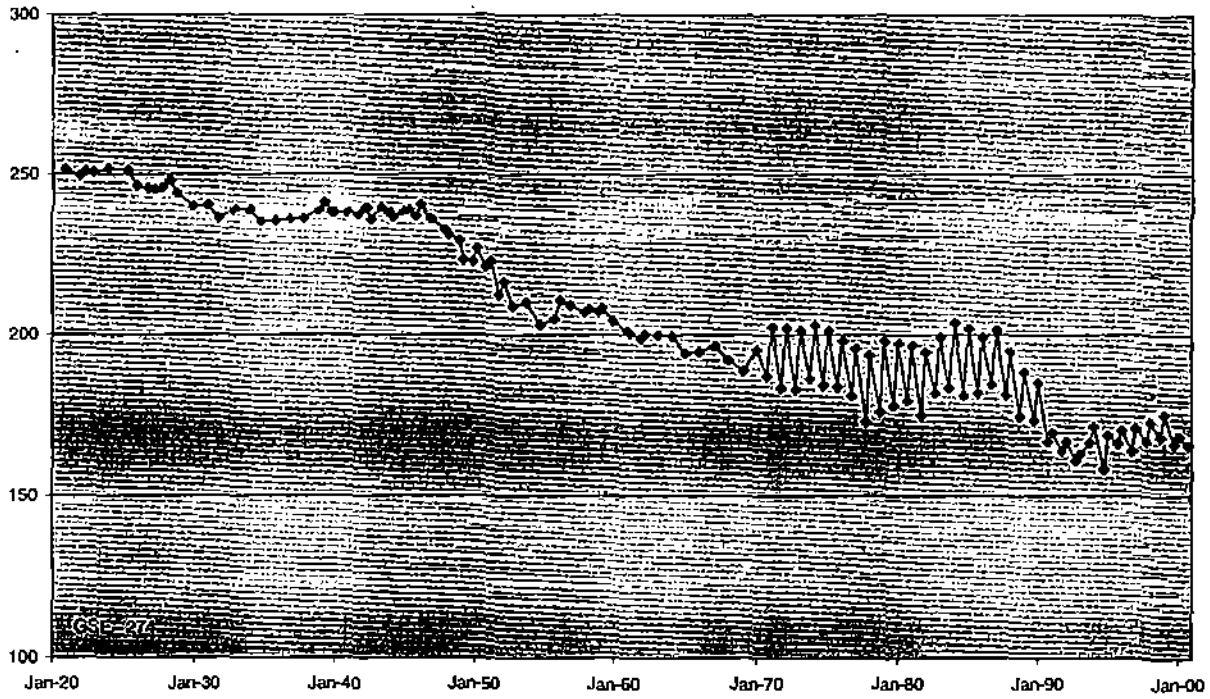

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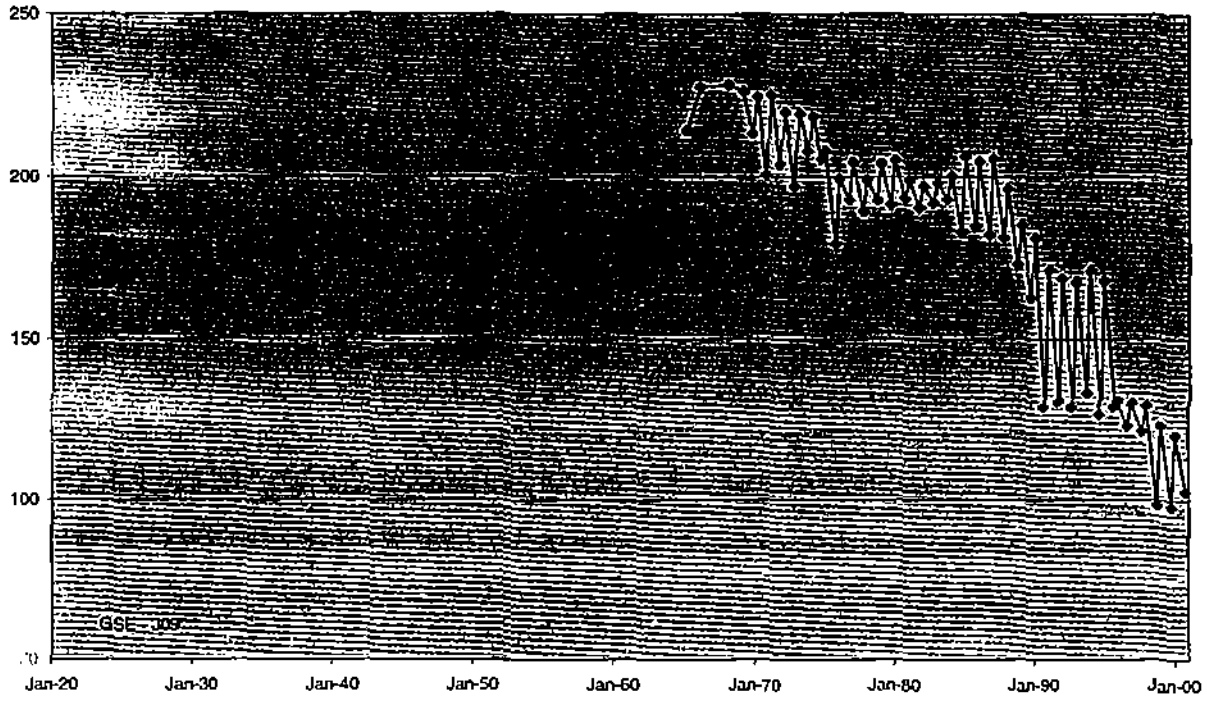

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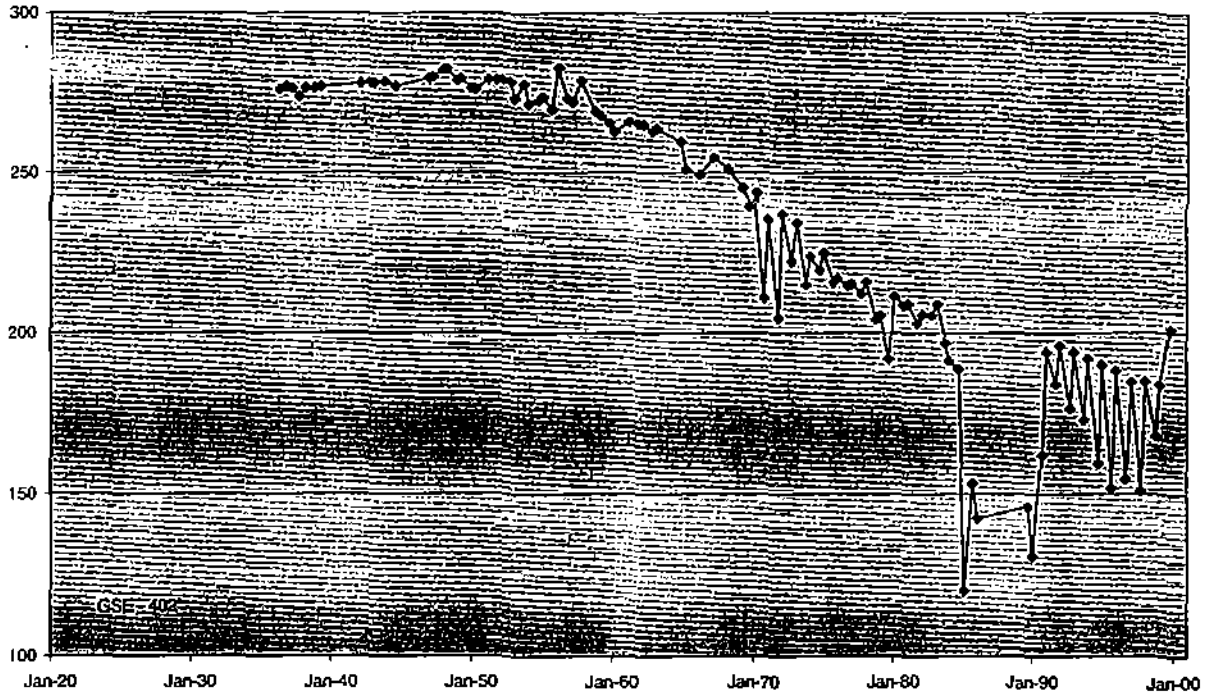

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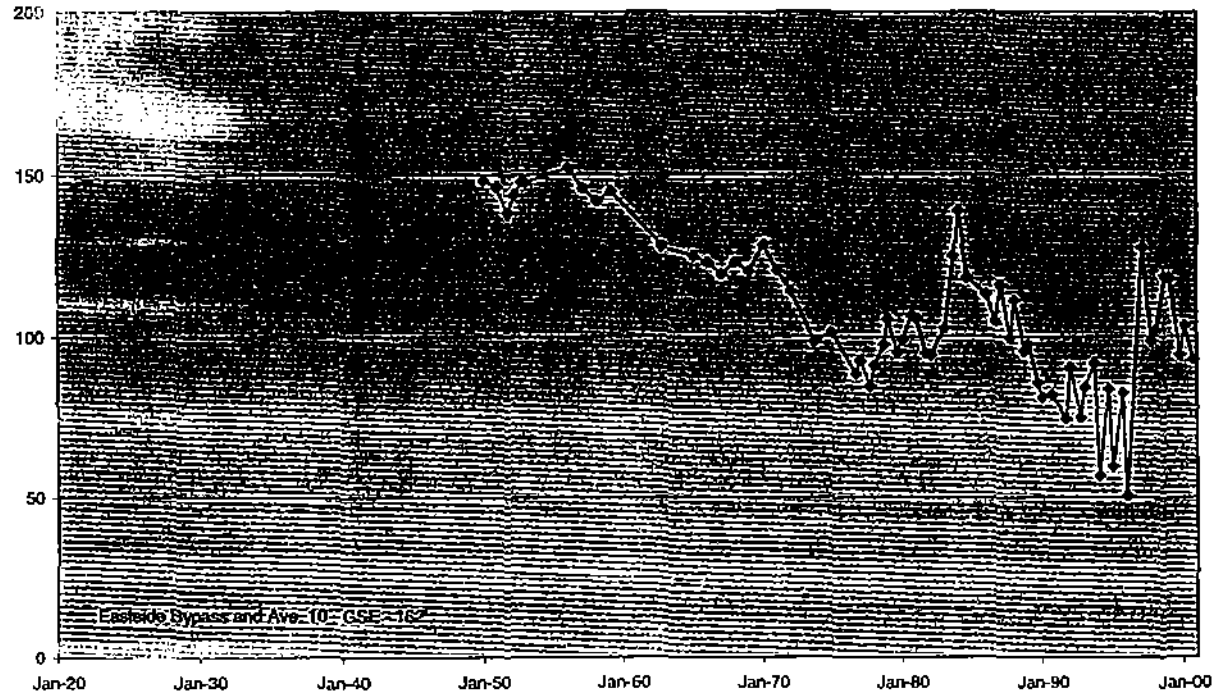

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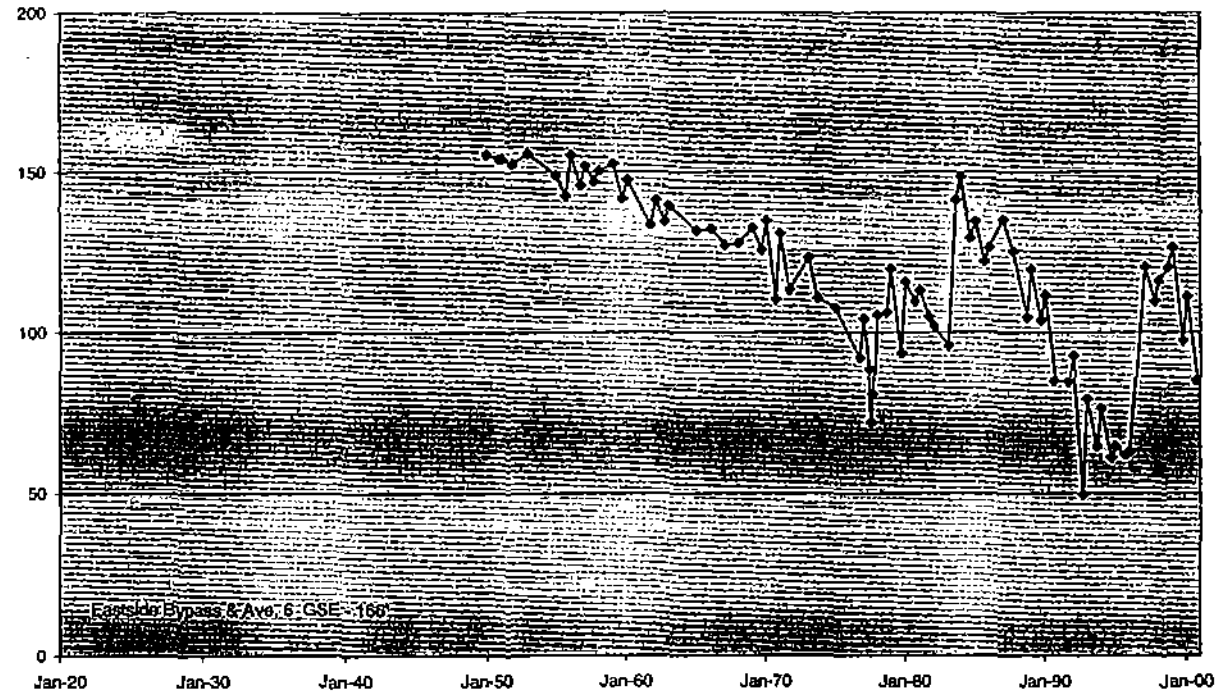

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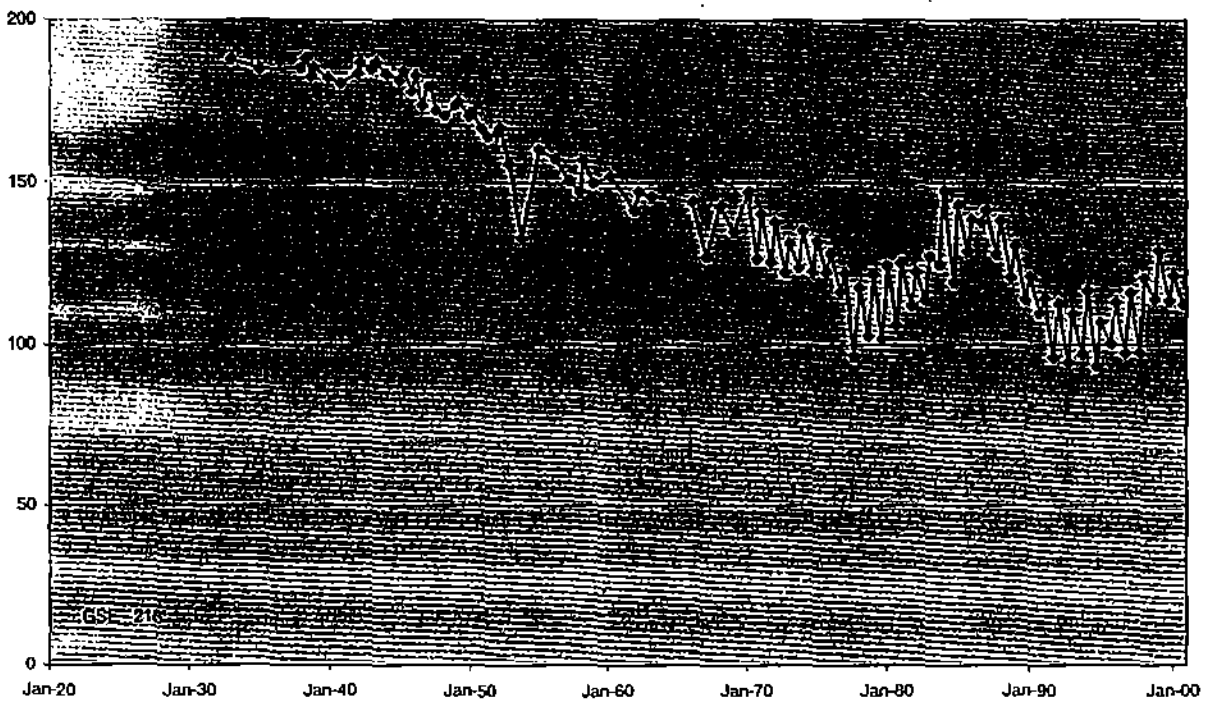

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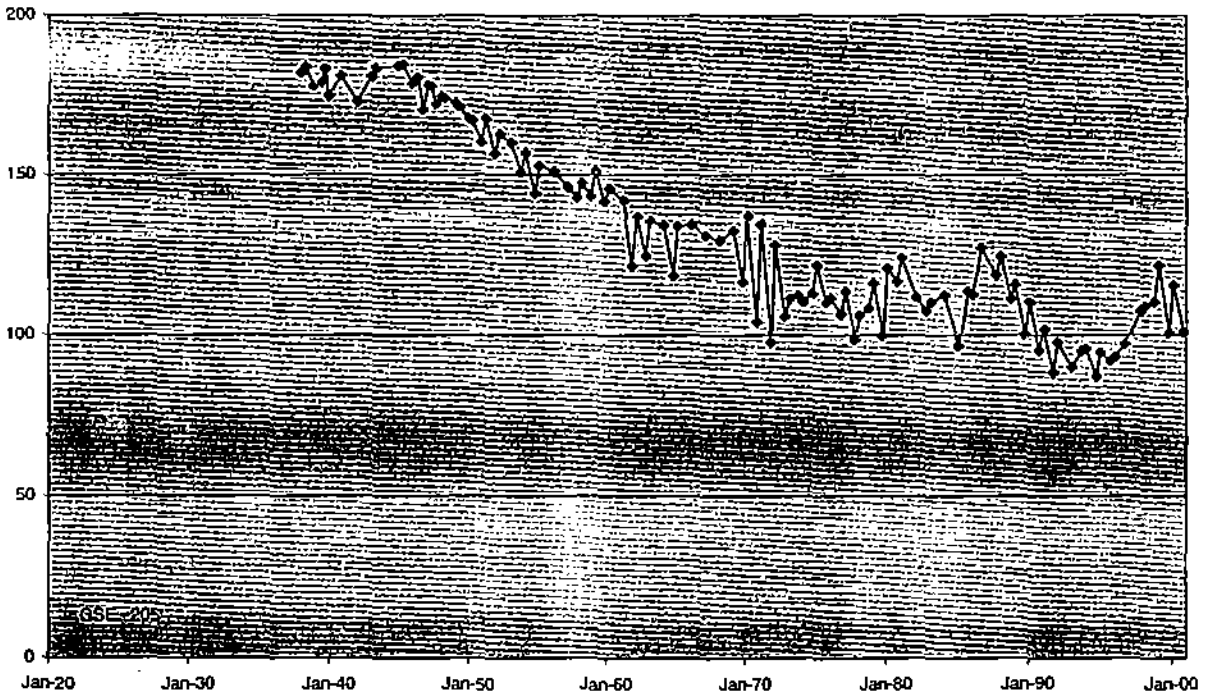

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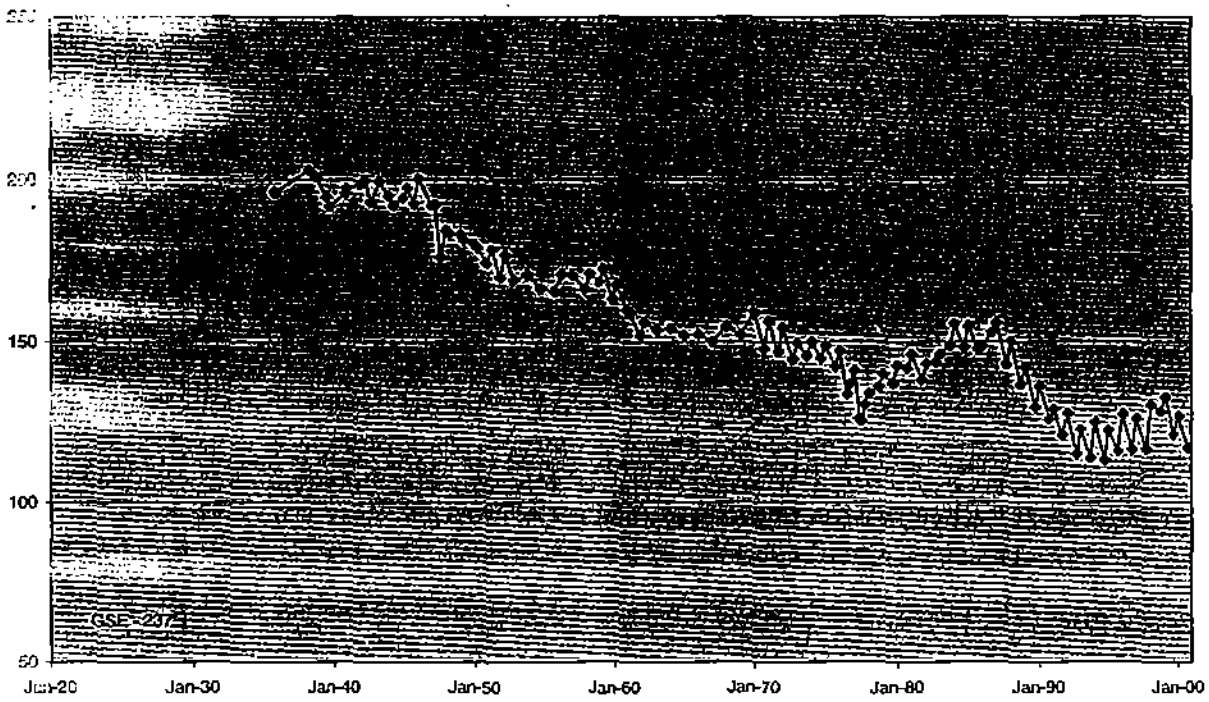

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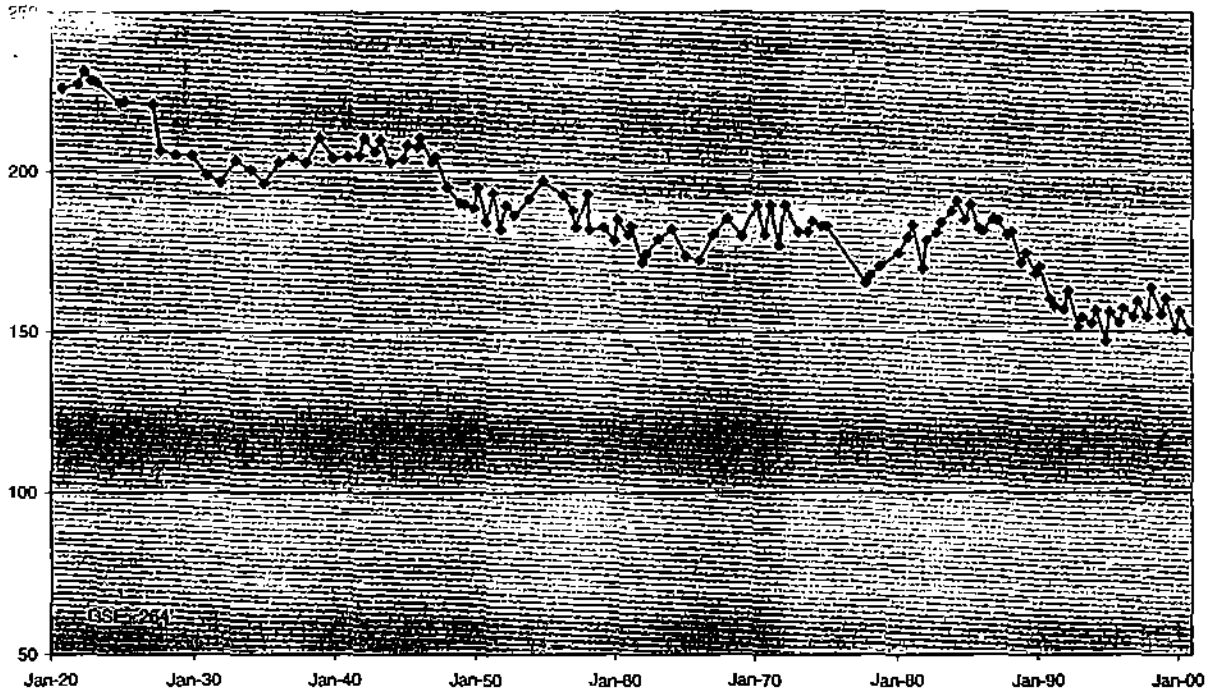

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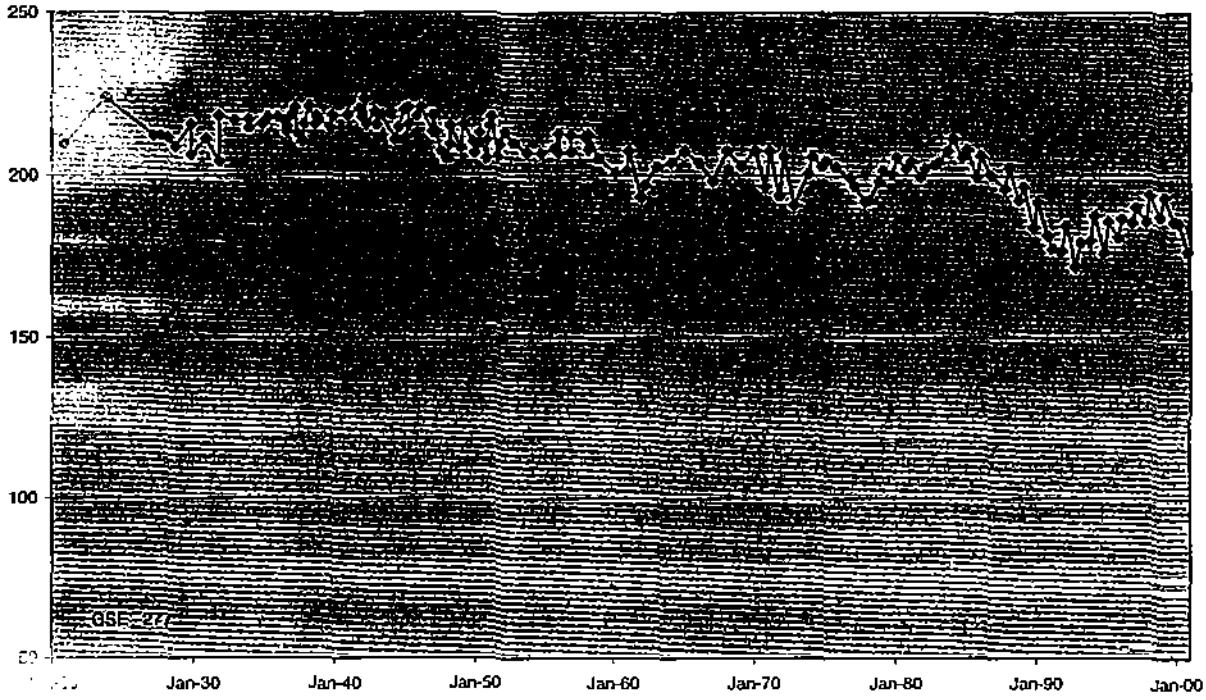

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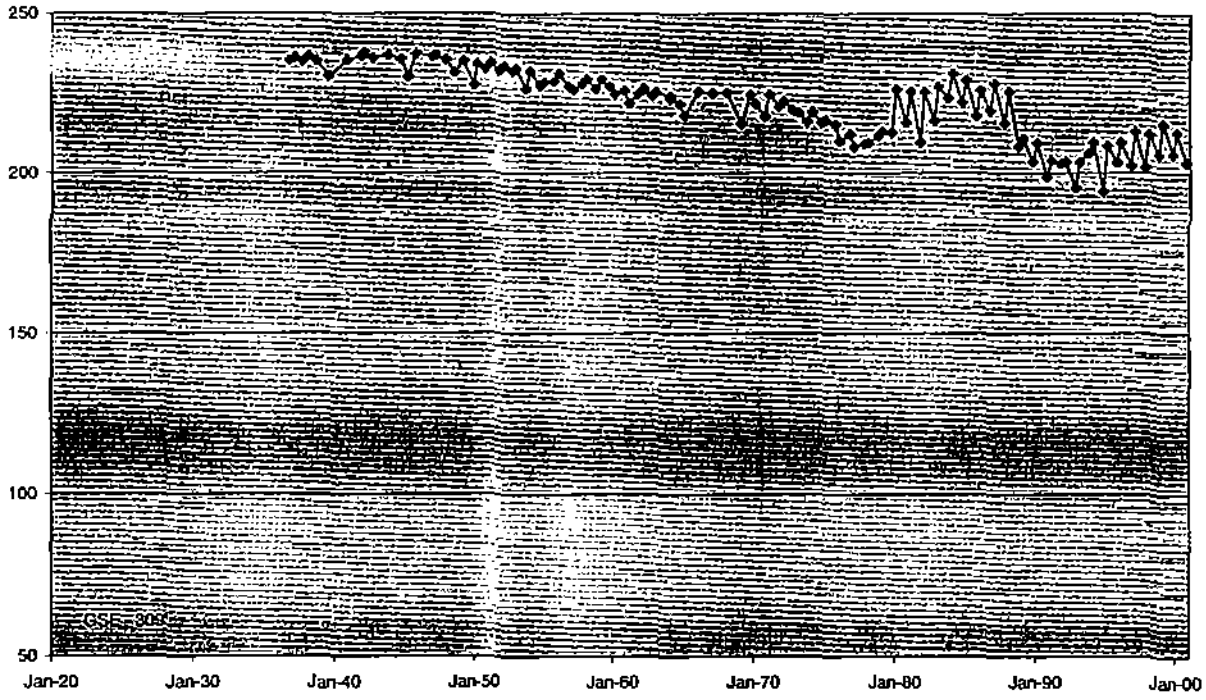

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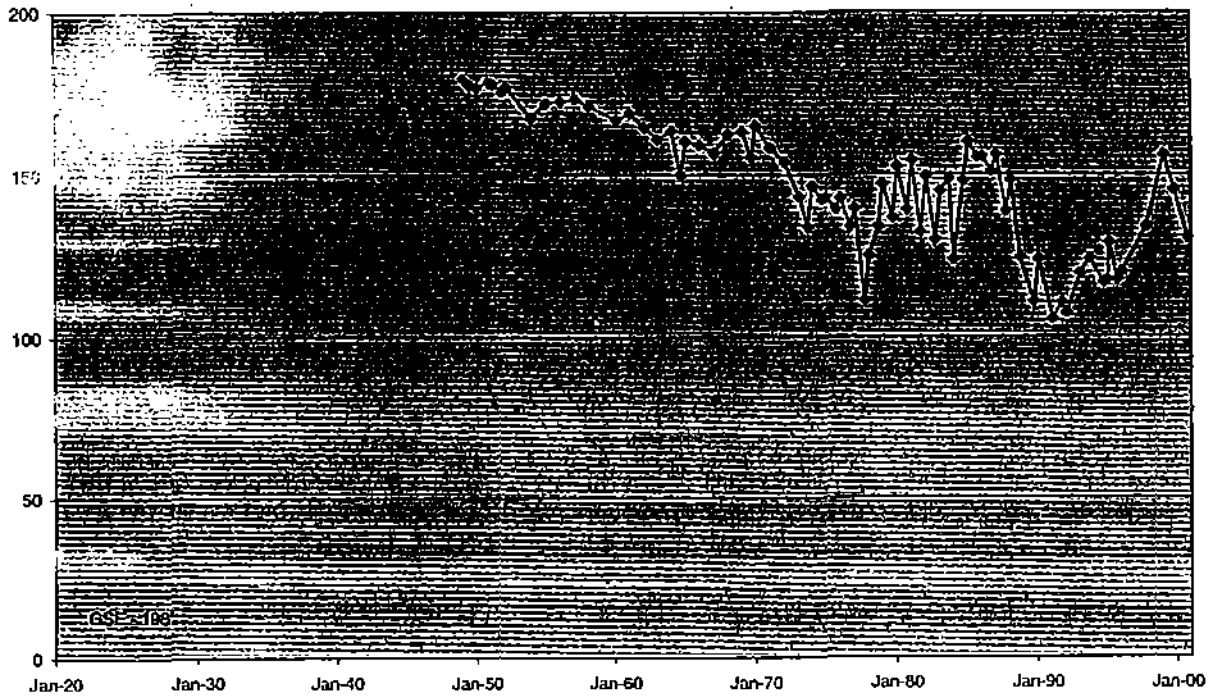

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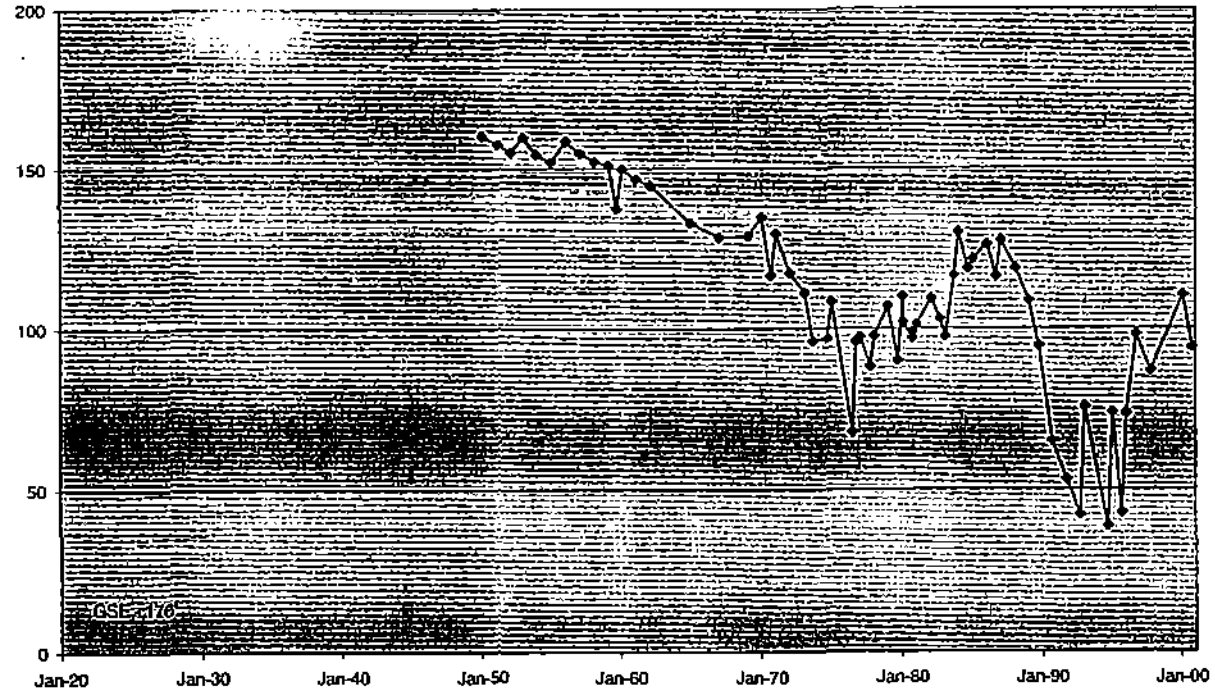

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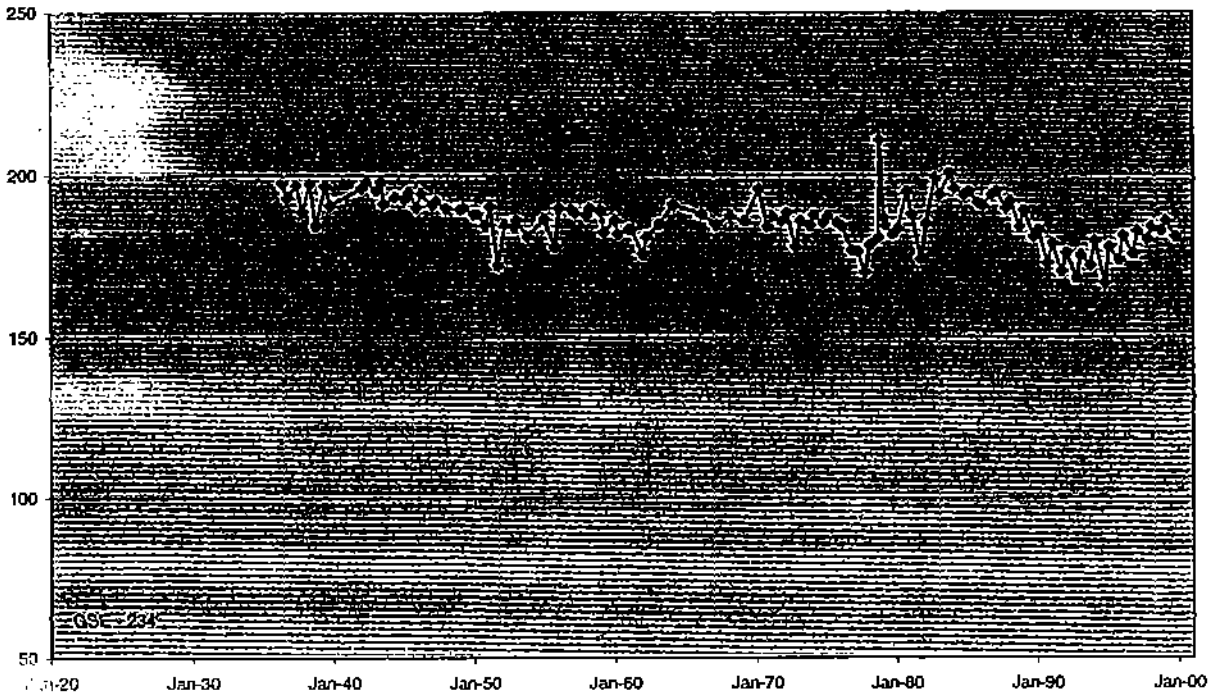

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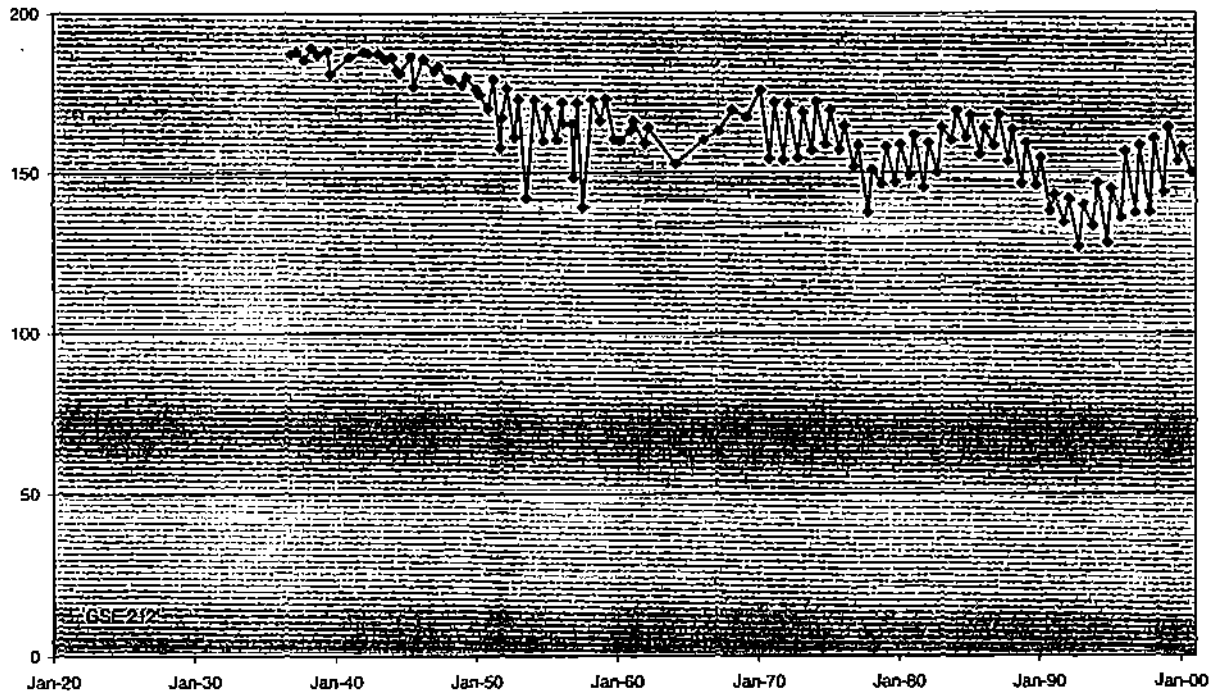

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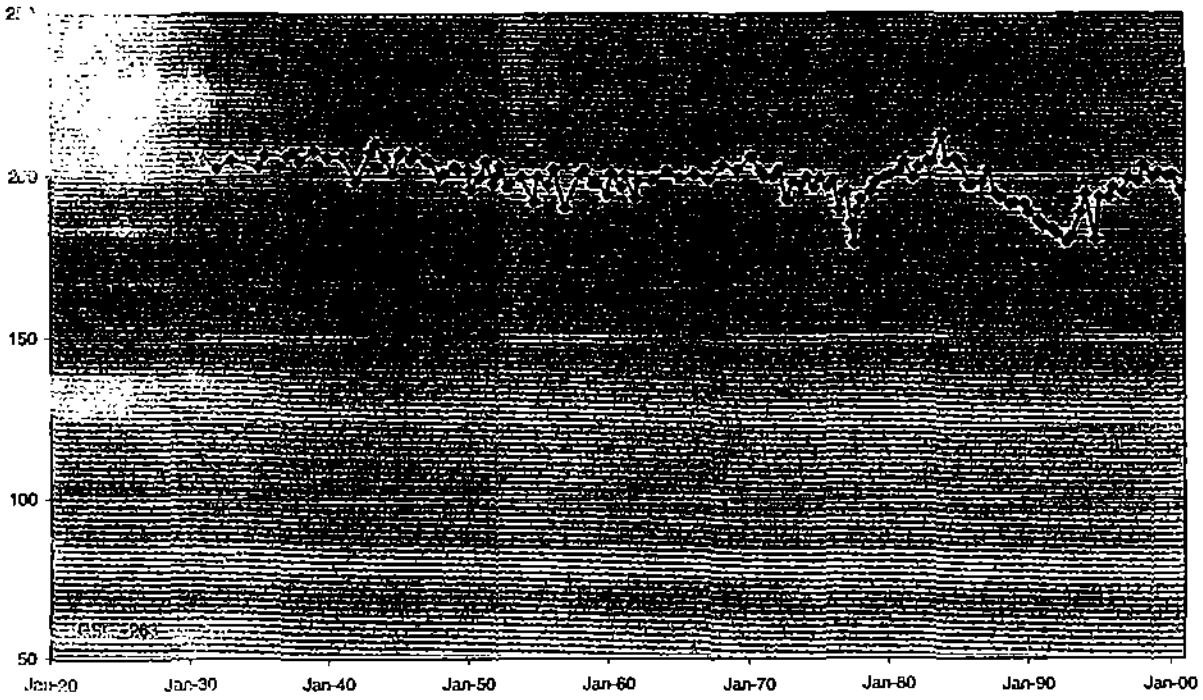

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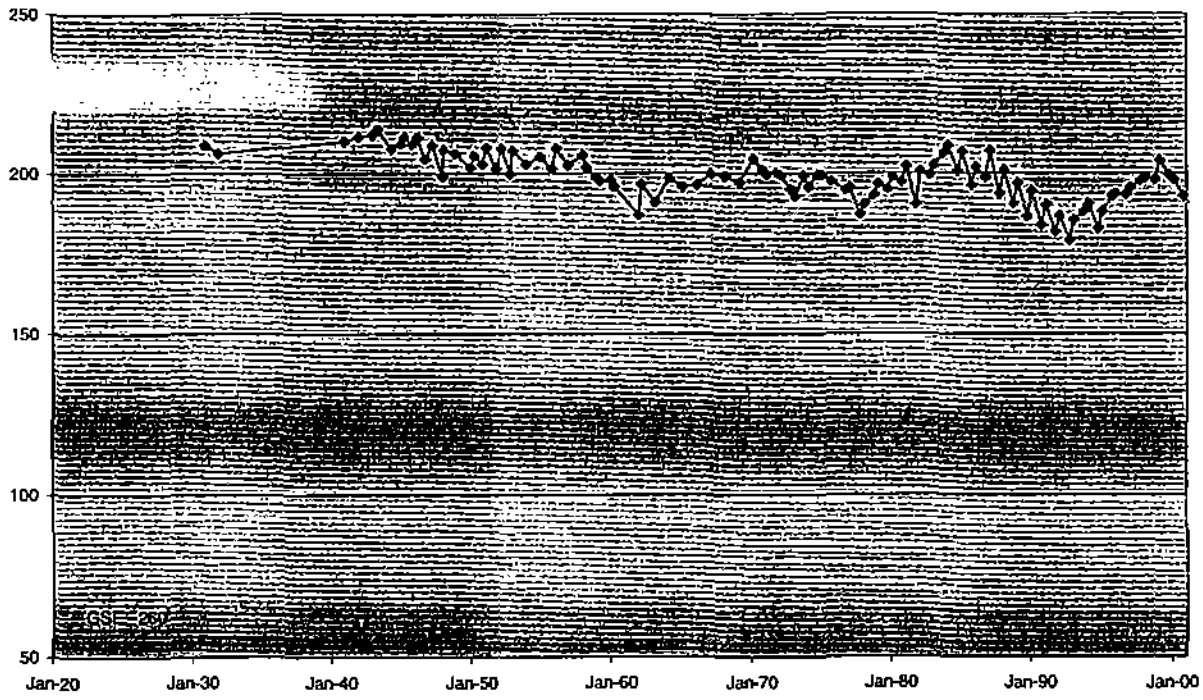
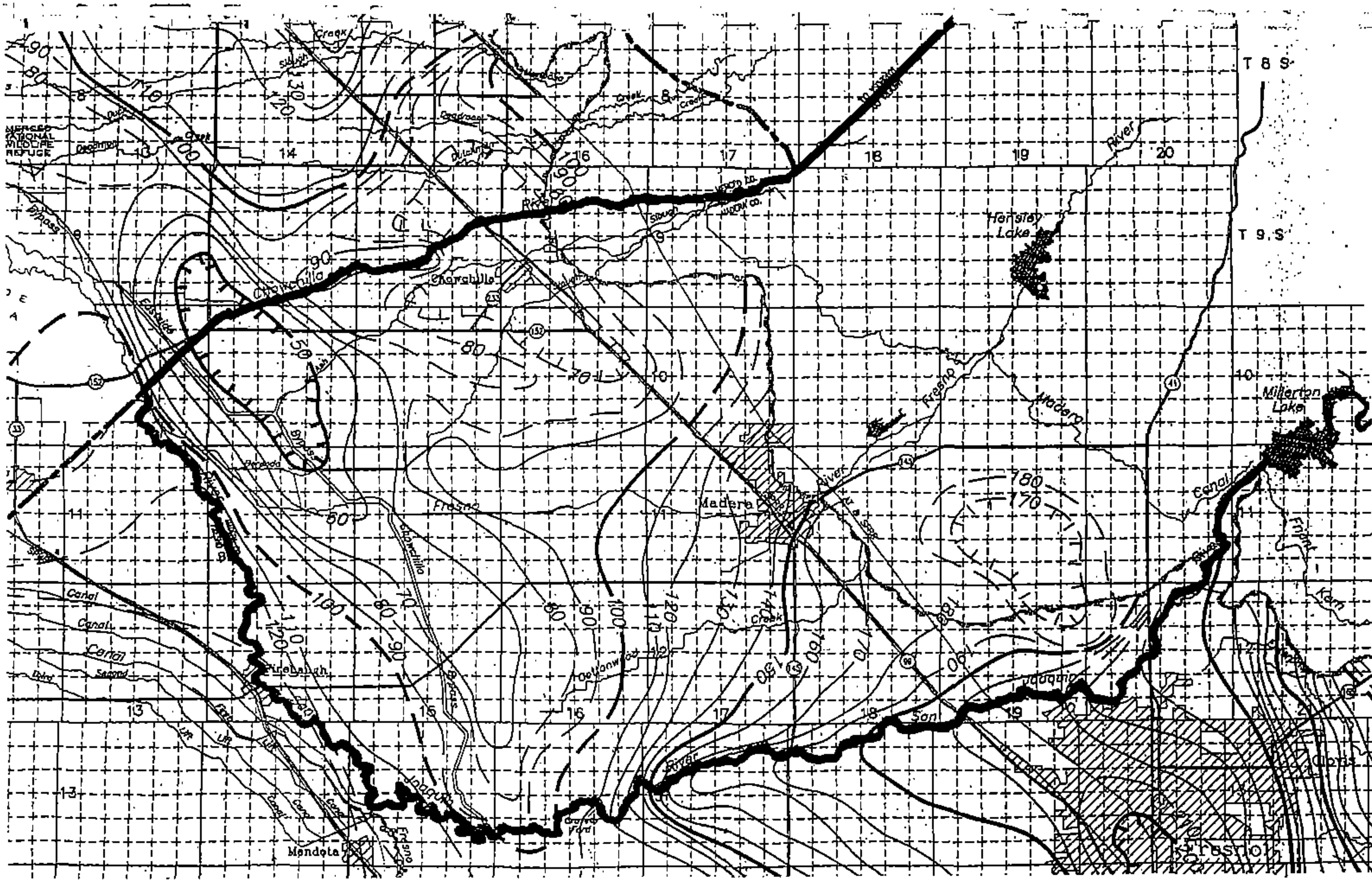
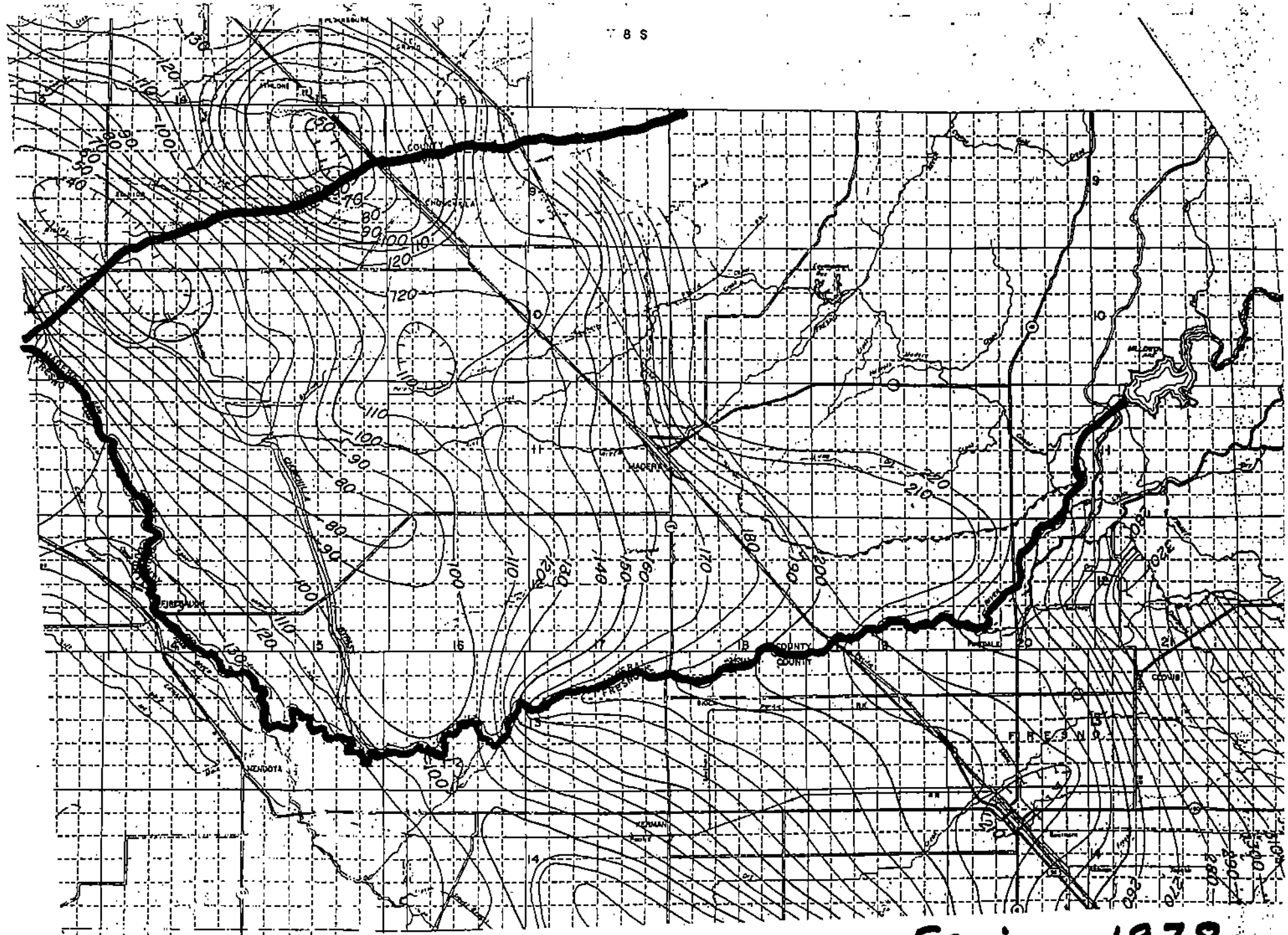


APPENDIX C

Water Level Contour Maps



Spring 1995
Source DWR



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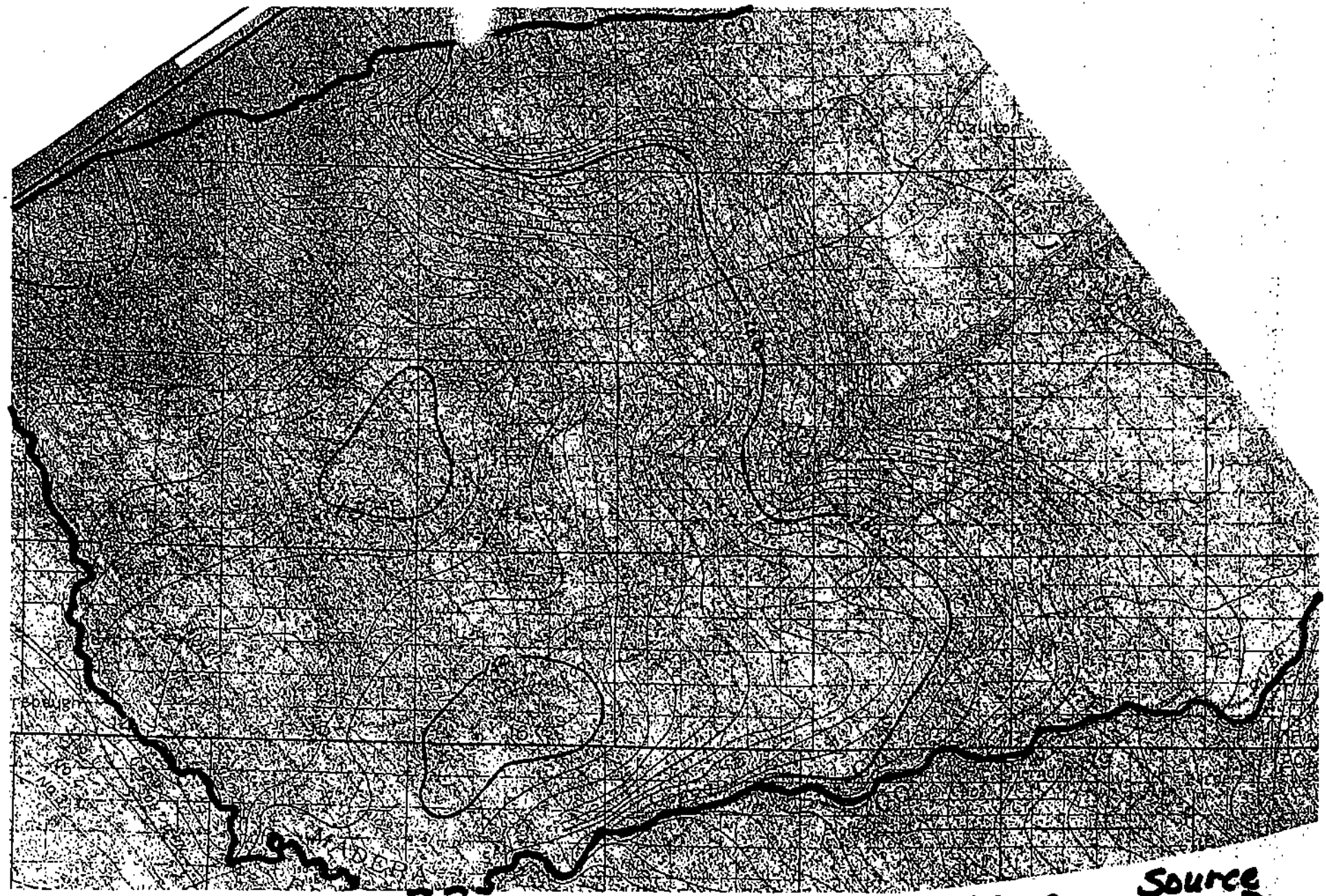
Source DWR



Spring 1958

Source DWR

Madera
Pacific
Gravelly
Ford
Canal
Alisal
Chowchilla
Canal
Slough
Canal
Columbia
Fall 1947 Source DWR

APPENDIX D

Madera County Ordinance 573B

BEFORE
THE BOARD OF SUPERVISORS
OF THE COUNTY OF MADERA
STATE OF CALIFORNIA
ORDINANCE NO. 573B

AN ORDINANCE AMENDING ARTICLE V OF TITLE 13
OF THE MADERA COUNTY CODE RELATING TO GROUNDWATER
EXPORTATION, GROUNDWATER BANKING, AND
IMPORTATION OF FOREIGN WATER

The Board of Supervisors of the County of Madera, State of California, ordains as follows:

SECTION 1:

Article V of Title 13 of the Madera County Code is hereby amended to read as follows:

V. GROUNDWATER EXPORTATION, GROUNDWATER BANKING, AND IMPORTATION OF FOREIGN WATER FOR PURPOSES OF GROUNDWATER BANKING, TO AREAS OF MADERA COUNTY WHICH ARE OUTSIDE OF LOCAL WATER AGENCIES THAT DELIVER WATER TO LANDS WITHIN THEIR BOUNDARIES.

Chapter 13.100

Rules and Regulations Pertaining to Groundwater Banking; Importation of Foreign Water for the Purpose of Groundwater Banking, to Areas of Madera County Which Are Outside of Local Water Agencies That Deliver Water to Lands Within Their Boundaries; and Exportation of Groundwater Outside the County.

Sections:

13.100.010 PURPOSE AND INTENT.

A. Those portions of the County of Madera lying in the floor of the San Joaquin Valley are dependent upon Groundwater from the Madera, Chowchilla and Delta-Mendota Groundwater Basins, as delineated by the State Department of Water Resources, for domestic, municipal, industrial, and agricultural purposes. These Groundwater Basins are severely overdrafted and surface supplies of water are imported by the Chowchilla Water District, Columbia Canal Company, Gravelly Ford Water District, Madera Irrigation District and Root Creek Water District to alleviate, to the extent possible, the existing Groundwater overdraft. In spite of these importations, the Groundwater overdraft still continues.

a building, facility, or well, and other applicable impacts specified in Paragraphs F. and G., above.

I. Groundwater Banking can be reasonable and beneficial if it can be accomplished without:

1. causing or increasing an overdraft of Groundwater underlying the County;

2. adversely affecting the ability of other Groundwater users to use, store, or transmit Groundwater within any aquifer(s) underlying the County (for example by utilizing storage that might otherwise be subject to natural or passive recharge and thus depriving other Groundwater users of their use of the aquifer and the Groundwater derived therefrom);

3. adversely affecting the reasonable and beneficial uses of Groundwater by other Groundwater users within the County;

4. resulting in, expanding, or exacerbating degradation of the quality or quantity of surface or Groundwater within Madera County, or Groundwater basins and aquifers within Madera County;

5. resulting in injury to a water replenishment, storage, restoration, or conveyance project or facility;

6. adversely affecting the surface or subsurface of neighboring or nearby lands, or the trees, vines, or crops growing or to be grown thereon;

7. adversely affecting the economy or environment of the County; or

8. adversely affecting the storage ability on adjacent lands where passive recharge may take place.

J. For Groundwater Banking projects all or a portion of which will be located within areas of the County of Madera which are outside of the boundaries of a Local Water Agency or an incorporated city, it is essential that the County of Madera be the agency that determines whether a permit should be issued to allow Groundwater Banking within such areas (but without affecting the right of such a Local Water Agency or incorporated city to determine whether to issue a permit for Groundwater Banking within the boundaries of such agency or city). Without a permit process which allows public notice, public hearings, and compliance with environmental and other appropriate requirements, there would be no or inadequate local control over such Groundwater Banking, nor a method to insure that Groundwater Banking will meet the requirements of Paragraph I., above.

K. In the absence of regulation by such Local Water Agencies, the County of Madera should exercise its police power to protect the public health, safety, and welfare of the County and its various areas by adopting reasonable regulatory measures in relation to exportation of Groundwater, Groundwater Banking, and the importation of Foreign Water for the purpose of Groundwater Banking. The purpose of this Chapter is to provide Madera County with the regulatory controls over the exportation of Groundwater, Groundwater Banking, and the importation of Foreign Water for the purpose of Groundwater Banking.

L. Local Water Agencies (as defined below) within the County have a Long Term Water Supply (as defined below) to enable them to deliver a reliable supply of surface water to lands within their boundaries, , and have adopted Groundwater Management Plans which may include Groundwater Banking within their boundaries. Such Local Water Agencies therefore control Groundwater Banking as a part of the integrated management of both groundwater and surface water resources within their boundaries. Such Local Water Agencies, being public

agencies, are governed by various statutes and regulations, including CEQA, that assure that all decisions of the governing body regarding matters affecting Groundwater will take into account the environmental effects, both within and outside of its boundaries, of any proposed project that is to take place within its boundaries. This insures that any Groundwater Banking permitted within the boundaries of those agencies will not adversely affect the Groundwater supply or damage neighboring lands' Groundwater extractions, or the environment. The decision of whether or not to permit Groundwater Banking within the boundaries of such agencies should be left in the hands of the elected officials thereof who have close knowledge of the surface and Groundwater supplies within the boundaries of the respective agencies and are in the best position to allow Groundwater Banking within their boundaries. This Chapter, therefore, shall apply only to lands within the County of Madera that overlay the Madera, Chowchilla, or Delta-Mendota Groundwater Basins, but which are outside of the boundaries of a Local Water Agency [illegible] incorporated city.

M. The purpose and intent of this ordinance is not to usurp, hinder, or infringe upon the authority of the Local Water Agencies and their elected officials, to carry out their responsibilities to their constituents.

1. Further, it is clearly understood that such Local Water Agencies engage in Groundwater recharge both directly and indirectly as a normal operational procedure. Nothing in this ordinance shall be interpreted as allowing the County or anyone else to prohibit or hinder such Local Water Agencies' Groundwater recharge operations to benefit their constituents.

2. Further, it is clearly understood that Local Water Agencies routinely import water into the County. Nothing in this ordinance shall be

and protect the public and surrounding properties, and/or the water resources of Madera County. The Plan will also provide details of corrective actions that Applicant will take if any such damage occurs.

D. "Exportation of Groundwater" means the extraction of Groundwater from any well within the boundaries of the County and located on or under lands subject to this Chapter and used on lands which are outside of the boundaries of the County, unless the lands on which the water is being used are contiguous to the lands where the water is extracted, and are owned by the same landowner. Exportation of Groundwater also includes activities by which Groundwater (or surface water or Groundwater for which such Groundwater is or may be exchanged or that may be used to replace such Groundwater) will or may be, through one or more exchanges or transactions (including subsequent Groundwater Banking), directly or indirectly transferred out of the County.

E. "Foreign Water" means water originating outside of Madera County, whether or not conveyed through or pooled with facilities located in or adjacent to Madera County, which is imported into Madera County for purposes of Groundwater Banking.

F. "Groundwater" means water located beneath the land surface that fills the pore spaces of the alluvium, soil, or rock formation in which it is situated.

G. "Groundwater Banking" means the importation of a surface supply of water that is percolated into the subsurface for storage, or placed underground by means of in-lieu recharge, for later extraction by any Person, unless the Board, on application in such form and according to such procedures as shall be adopted by the County Engineer, issues a Certificate of Exemption. A Certificate of Exemption shall be issued if the information and supporting documentation show to the reasonable satisfaction of the Board that the water to be extracted shall only be

delivered, and ultimately used, solely within Madera County. If the percolated or recharged Groundwater (or surface water or Groundwater for which such Groundwater is or may be exchanged or that may be used to replace such Groundwater) will or may be, through one or more exchanges or transactions (including subsequent Groundwater Banking), directly or indirectly transferred out of Madera County, then no Certificate of Exemption shall be issued. For purposes of determining whether extracted water is delivered and used solely within Madera County, the transfer out of Madera County of less than an amount equal to 1% of a Person's annual surface water entitlement, due to the normal operating practices of such Person, shall not be taken into account. Consideration of the application for a Certificate of Exemption shall be contingent upon:

(1) The applicant's payment of such fees as are or may be established and/or modified by resolution of the Board for processing the application for a Certificate of Exemption.

(2) The applicant's written agreement, in the form provided by the County Engineer, to reimburse the County for all fees and costs of engineering, hydrogeological, legal, and other consultants engaged by the County for the purpose of assisting the County in reviewing, evaluating and processing the application for a Certificate of Exemption, and in monitoring the project to confirm that it is continuing to comply with the terms of the Certificate of Exemption.

(3) The applicant's agreement, in the form provided by the County Engineer, to provide such periodic reports, and such supporting data, as

may be required by the County Engineer to confirm compliance with the terms of the Certificate of Exemption.

Notwithstanding any of the foregoing, recharge attributable to normal and customary farming and irrigation practices, and the extraction of such recharged water solely for irrigation on overlying lands, is not Groundwater Banking and no Certificate of Exemption shall be required for such activities. A Certificate of Exemption is not evidence of a Groundwater or other right, but only evidences exemption from the permit requirements of this Chapter. The use of Groundwater by a party holding a Certificate of Exemption remains subject to the state and other laws and regulations applicable to Groundwater generally.

H. "Groundwater Management Plan" means a groundwater management plan adopted pursuant to California Water Code section 10750 *et seq.*

I. "Local Water Agency" means a district or other public agency, a majority of the acreage of which, as of July 11, 2000, was located within Madera County, that has as its primary function the supplying of water for domestic, agricultural, industrial, or municipal purposes to lands within their boundaries, that had, as of July 11, 2000, a Long Term Water Supply, and that had adopted as of July 11, 2000 a Groundwater Management Plan (directly or through a joint powers authority of which it is a party, and whether or not such Plan is subsequently modified, terminated, or rescinded). For purposes of this Chapter, the boundaries of a Local Water Agency shall mean, and all provisions applicable to any exemptions for the operations of such an Agency shall be fully applicable within, the boundaries of such Agency as they existed as of July 11, 2000. For purposes of this Chapter, "Long Term Water Supply" means a contract between the Local Water Agency and the United States Bureau of Reclamation for a Class I supply of

irrigation water, or such other surface supply that the Board may determine, on application by an affected district or other public agency, as having equivalent or better permanence and reliability.

J. "Operations and Maintenance Plan" means a written plan which provides complete details of how the Applicant plans to operate and maintain the project, including any conveyance facilities, after construction is completed, including but not limited to the sources, quantities and qualities of water to be imported, used for recharge, extracted, and/or exported. This Plan must show which entity or entities will assume the responsibility for the operation and maintenance of the project, how such responsibility will be shared; and for each such entity provide an organizational chart detailing the job responsibilities of each position shown.

K. "Person" means an individual, general or limited partnership, limited liability company, corporation, unincorporated association, public agency, or other form of public or business entity.

L. "Plans and Specifications" means written and detailed plans and specifications, in such format and subject to such requirements as may be established and/or modified from time to time by the County Engineer. All Plans and Specifications shall contain certification stamps of a California Registered Civil Engineer and, where applicable, a California Certified Hydrogeologist.

M. "Project Monitoring Plan" means a written plan which details how the Applicant will monitor the surface and subsurface of the project site and of properties outside of the project boundaries for possible impacts from operation of the project, including but not limited to locations, frequencies, and methods for monitoring ground subsidence, Groundwater levels and quality, and for monitoring quantity and quality of imported and extracted water.

N. "Project Plans" means the Damage Prevention Plan, Emergency Action Plan, Operations and Maintenance Plan, Project Monitoring Plan, Project Water Measurement and Water Loss Accountability Plan, Rehabilitation Plan, and Safety Action Plan.

O. "Project Water Measurement and Water Loss Accountability Plan" means a written plan which details how water into and out of the project will be measured and how the Applicant plans to calculate or otherwise account for project water losses. The Plan must provide details of what types of measuring equipment will be used on the project, where it will be installed, and how it will be calibrated and maintained.

P. "Rehabilitation Plan" means, and shall consist of, (i) a statement of planned rehabilitation after the project terminates including methods of accomplishment and timing and how rehabilitation of the site may affect future uses of the property and surrounding areas, (ii) a detailed site plan showing the rehabilitation proposal including new contouring, (iii) a soil salvage plan and, if refill is proposed, the sources thereof, (iv) a schedule to accomplish the rehabilitation work, and if applicable the phases thereof, (v) the disposition of any equipment or structures, (vi) the security to be provided by the applicant to the County to assure performance of the obligations under the rehabilitation plan.

Q. "Safety Action Plan" means a written plan which provides details of all project safety requirements, including those needed to protect the public and surrounding properties. It shall also provide information on which entity or entities will be responsible for implementing the safety requirements for the project, how such responsibility will be shared, and for each such entity provide an organizational chart detailing the job responsibilities of each position shown.

13.100.040 LANDS SUBJECT TO CHAPTER.

This Chapter shall be applicable to all unincorporated-area lands in the San Joaquin Valley floor of the County of Madera which overlay the Madera, Delta-Mendota and Chowchilla Groundwater Basins as delineated by the State Department of Water Resources and which are located outside of the boundaries of (1) a Local Water Agency or (2) an incorporated city. If a portion of a Groundwater Banking project (or other project to which this Chapter applies) lies within such an Agency or city, and a portion lies outside the boundaries of such an Agency or city, then this Chapter shall apply to that portion that lies outside the boundaries of such an Agency or city, and such Agency or city shall have full authority as to that portion that lies within the boundaries of that Agency or city.

SECTION 13.100.050 PERMITS REQUIRED FOR EXPORTATION OF GROUNDWATER BEYOND COUNTY BOUNDARIES, FOR GROUNDWATER BANKING, AND/OR FOR IMPORTATION OF FOREIGN WATER FOR PURPOSES OF GROUNDWATER BANKING, TO AREAS OF MADERA COUNTY WHICH ARE OUTSIDE OF LOCAL WATER AGENCIES THAT DELIVER WATER TO LANDS WITHIN THEIR BOUNDARIES.

A. Except as otherwise provided in this Chapter, no person shall engage in (1) the Exportation of Groundwater,

(2) Groundwater Banking, (3) importation of Foreign Water, for purposes of Groundwater Banking, or (4) any combination of these activities, on or under land subject to this Chapter without first obtaining a permit to do so pursuant to the terms and procedures of this Chapter.

D. While engaging in their normal and/or historical operation of serving their constituents, Local Water Agencies are specifically exempted from the requirements of Paragraph A. above, with respect to such operations.

C. A single permit may be issued under this Chapter for one or more of the activities listed in Paragraph A. above, provided that the permit holder shall be authorized to engage only in those activities or combination of activities specifically authorized by the permit. A permit that authorizes the importation of Foreign Water shall be limited to importation from the sources identified and any importation from other sources is prohibited unless a new or amended permit is granted for such importation.

SECTION 13.100.060 PERMITTING PROCESS

A. APPLICATION FOR PERMIT: Applications for permits under this Chapter shall be made to the County Engineer on forms provided by the County Engineer and shall contain all information and reports required therein. An Application shall be accompanied by a hydrogeologic report ("Report") and Project Plans prepared at the applicant's expense by a qualified California Registered Civil Engineer and a California Certified Hydrogeologist, versed in geologic, hydrogeologic, and hydrologic investigations, which describes hydrogeologic conditions at and in the vicinity of the project site as well as details regarding the proposed project. The Report and Project Plans shall include detailed Plans and Specifications of all project facilities. The Report and Project Plans shall contain the certification stamps of the California Registered Civil Engineer and the California Certified Hydrogeologist responsible for their preparation. The Report and Project Plans shall comply with all requirements, and shall be in such format(s), as may be established and/or modified from time to time by the County

Engineer, and shall include, but not be limited to, the following items as deemed applicable by the County Engineer:

1. The sources of all water to be exported.

2. The quantity and quality of all water proposed to be exported.

3. The locations to which and purposes for which all water is to be exported, including the reasonable and beneficial uses to which the water is to be put.

4. The geologic and hydrologic properties of the aquifers from which all extraction will be made and/or into which recharge will occur and from which extraction will be made, including possibilities or likelihood of subsidence problems.

5. Percolation tests to determine the ability of the aquifer(s) to recharge.

6. An investigation of the vadose zone that evaluates the geologic and hydrologic properties of the soils and subsurface sediments above the water table (including but not limited to clay layers and their effect on percolation), storage capacity, and soil chemistry (including but not limited to the potential for leaching of soil constituents or impacts to vadose zone soils from imported water).

7. The location, size, spacing and depths of all extraction wells.

8. Migration of Groundwater from surrounding locations and anticipated changes in Groundwater migration as a result of the project.

9. The effect on surrounding lands and their Groundwater supplies, including but not limited to impacts on Groundwater levels and flows, Groundwater quality and quantity, and surface water/Groundwater interactions and the water balance of potentially affected areas.

10. The location, plans, and specifications of the proposed project.

11. The quantity of all water proposed to be imported, and the quality standards thereof, including potential for contamination or degradation problems and/or compatibility problems with the receiving waters or vadose zone soils.

12. The quality and quantity of all Groundwater to be extracted.

13. Design of spreading areas.

14. The methods of placement and storage of the water.

15. The sources of all water to be imported.

16. The quantity and quality of all water proposed to be imported.

17. The manner in which all water is to be conveyed to the Groundwater Banking facility, including the specific location of all conveyance facilities, and copies of all permits and agreements showing consent for the use of such conveyance facilities (provided, however, that any consents that may not be granted without an EIR under the California Environmental Quality Act or an EIS under the National Environmental Protection Act may be provided after compliance with such requirements provided that in all events such consents shall be provided within 60 days after the EIR required under Paragraph C. below is certified).

18. The physical, and where applicable the geologic and hydrologic, properties of all conveyance facilities, including possibilities or likelihood of contamination or degradation problems.

19. The effect on lands surrounding or neighboring all conveyance facilities and on their Groundwater or surface water supplies.

20. The effect on all other water supplies into which all proposed Foreign Water may be commingled while being conveyed, such as in a pool or reservoir.

21. The applicant's Damage Prevention Plan.

22. The applicant's Emergency Action Plan.

23. The applicant's Operations and Maintenance Plan.

24. The applicant's Project Monitoring Plan.

25. The applicant's Project Water Measurement and Water Loss Accountability Plan.

26. The applicant's Safety Action Plan.

27. The applicant's Rehabilitation Plan.

28. Such other matters as the County Engineer may require in order to properly evaluate the project and its potential impacts.

29. An agreement ("Reimbursement Agreement"), in the form as may be established and/or modified from time to time by the County Engineer, executed by the applicant agreeing to reimburse the County for all consultant fees and other costs as provided in Paragraph B. below.

30. A letter of credit, bond, or other form of security, as specified by, and in such form and amount as shall be required by, the County Engineer to secure the reimbursement of costs and expenses provided for in the Reimbursement Agreement.

All technical interpretations, analyses and/or conclusions shall be accompanied by all supporting data used in connection therewith. The applicant shall provide as many copies of the Application, Report, and other information submitted as may be requested by the County Engineer.

The Application shall not be deemed received by the County until each of the foregoing items is provided.

B. PAYMENT OF FEES AND REIMBURSEMENT OF COUNTY CONSULTANT AND OTHER COSTS: The applicant at the time of filing shall pay such fees as are or may be established and/or modified by resolution of the Board for processing the application and the giving and publication of required notices. The applicant shall also reimburse the County for all fees and costs of engineering, hydrogeological, legal, and other consultants engaged by the County for the purpose of assisting the County in reviewing, evaluating and processing the Application, and the fees and costs for any environmental investigations, reviews and reports done by or on behalf of the County in connection with the preparation of the EIR or otherwise in compliance with the California Environmental Quality Act.

C. ENVIRONMENTAL IMPACT REPORT: An Application for a permit under this Chapter is deemed to be a "project" under the California Environmental Quality Act ("CEQA") and its implementing regulations ("CEQA Guidelines"). In order to ensure that decision-makers have sufficient information on the potential impacts of such a project, the preparation and certification of an Environmental Impact Report ("EIR") is hereby required for each such project application. The EIR must conform to CEQA, CEQA Guidelines, and all County requirements. The EIR shall be prepared in accordance with the County's CEQA implementation procedures and the County shall be the lead agency for the preparation thereof. As set forth in Paragraph B. above, the fees and costs incurred in connection with the preparation of the EIR shall be paid by the applicant.

D. ADDITIONAL STUDIES AND REQUIREMENTS: If, after accepting the Application referred to in Paragraph A. of this Section 13.100.060, above, the County Engineer or the County Planning Director desires more information in order to comply with the requirements of the California Environmental Quality Act, he or she may require the applicant to

provide that information including but not limited to the preparation by or on behalf of applicant, at applicant's expense, of any additional geologic, hydrogeologic, or hydrologic studies, or other information or studies, that he or she deems reasonably necessary to obtain information needed in order to make a recommendation on the application. Furthermore, at any time after accepting the Application the County Engineer may, in the course of processing the Application, require the applicant to clarify, amplify, correct, or otherwise supplement the information required for the Application. At any time and from time to time, the County Engineer may review the application with other potentially affected County Departments, with the staff of applicable state and federal agencies and with all local agencies and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION: Copies of the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D. of this Section 13.100.060, above, shall be forwarded by the County Engineer to the County Environmental Health Department, and to other affected County departments, including, but not limited to, the Agricultural Commissioner and Planning Director, and other permitting agencies, for review and comments. The County Engineer shall coordinate his or her review of the project, to the extent practicable, with other permitting agencies having jurisdiction over any aspect of the project. After all reviews have been made, and all comments have been received, the County Engineer shall prepare a written report with all comments attached thereto (the "County Engineer's Report"), in which he or she either shall recommend denial of the permit, or granting the permit. Any recommendation to grant the permit shall also contain any recommended conditions for the project and the permit. The County Engineer's Report also shall include

recommendations from the Planning Director concerning the adequacy of the EIR. All documents shall be filed with the Clerk of the Board.

F. NOTICE TO LANDOWNERS: Upon the filing of an application with the County Engineer, the County Engineer shall give written notice to all owners of lands located within six miles of the exterior boundaries of the proposed project site, setting forth the name of the applicant, a description of the project, a description or map of the land involved, and a statement that all documents submitted in connection with the application are public records subject to inspection at the office of the County Engineer. In the case of an application for a permit to export Groundwater, the project site shall mean the entire landholding (whether consisting of one or more parcels in common ownership) upon which any well or other extraction facility is to be located, and all conveyance facilities to be used to convey such water from the extraction site to the Madera County border. In the case of the importation of Foreign Water for purpose of Groundwater Banking, the project site consists of both the Groundwater Banking project site, and all conveyance facilities to be used to convey such imported water from the Madera County border to the Groundwater Banking project site. In addition thereto, the County Engineer shall cause to be published pursuant to Government Code § § 6060 and 6061.3 a notice that the application has been filed, setting forth the name of the applicant, a description of the project, a description or map of the land involved, and a statement that all documents submitted in connection with the application are public records subject to inspection at the office of the County Engineer. The County Engineer shall retain one copy of the application documents, EIR, and any comments or reports thereon and make them available for public inspection and copying in accordance with the Public Records Act.

G. NOTICED PUBLIC HEARING: No permit shall be issued without a noticed public hearing before the Board pursuant to Government Code § § 6060 and 6061.3. The notice shall be given by the Clerk of the Board after completion and filing of the County Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, a description of the project site (as determined under Paragraph F. above), and a general description of the project, and a statement that any interested person may submit evidence at the hearing. At least fifteen days must elapse between filing the documents with the Clerk of the Board and the date of the hearing.

H. PROCEDURES FOR CONDUCTING HEARING: At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from County Departments and State, Regional, or Federal permitting agencies, and the County Engineer's Report shall become evidence. The applicant and members of the public, or their representatives, may testify and introduce evidence in favor of, or in opposition to, the project.

I. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD: The permit may only be approved if the Madera County Board finds that the proposed project will not have detrimental impacts on Madera County. For this purpose, a finding of no detrimental impact shall include but not be limited to the following specific findings:

1. The project will not cause or increase an overdraft on parts or all of the Groundwater basins underlying the County.

2. The project will not adversely affect the ability of other Groundwater users to use, store, recharge, or transmit Groundwater within any aquifer(s) underlying the County (for example by utilizing storage that might otherwise be subject to

natural or passive recharge and thus depriving other Groundwater users of their use of the aquifer and the Groundwater derived therefrom).

3. The project will not adversely affect the reasonable and beneficial uses of Groundwater by other Groundwater users within Madera County.

4. The project will not result in, expand, or exacerbate degradation of the quality or quantity of surface or Groundwater within Madera County, or Groundwater basins and aquifers within Madera County.

5. The project will not result in injury to a water replenishment, storage, restoration, or conveyance project or facility;

6. The project will not adversely affect the economy or environment of the County.

7. The project will not result in land subsidence, uncontrolled movement of contaminated or poor quality Groundwater, or increased soil degradation.

8. The project will not adversely affect the surface or subsurface of neighboring or nearby lands, or the trees, vines, or crops growing or to be grown thereon.

9. The project will not adversely affect the storage or recharge capability on adjacent lands where passive recharge may take place.

10. The project will not adversely affect the existing qualities of any of the underground aquifers within Madera County. Due to the risk of Groundwater contamination from direct injection of water into an underground aquifer, no permit may be issued to any project that will or may use direct injection.

If the Board determines that one or more of the findings required by this Section cannot be made, even after all reasonable mitigation measures are considered, then the Board shall deny

the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

J. DECISION AFTER HEARING. At the conclusion of the hearing, the Board shall approve the application and grant the permit if the Board makes the findings set forth in Paragraph I. of this Section 13.100.060, above, subject to the terms and provisions authorized in Paragraph K. of this Section 13.100.060, below. If the Board is unable to make the findings set forth in said Paragraph I. then the application shall be denied and no permit shall be issued. The Board shall direct that written findings be prepared in conformity with its decision and shall adopt said findings when prepared.

K. TERMS AND CONDITIONS OF PERMIT: If an application is approved, the Board may impose such terms and conditions and mitigation measures thereon as the Board deems necessary to prevent adverse effects on the aquifer(s); the quality and quantity of the Groundwater supply, adjacent or neighboring lands, or the environment, including a reasonable time limit on the life of the permit and a requirement that the applicant provide such periodic reports to the County as the County Engineer may reasonably require. The terms and conditions of any permit shall also include the following:

1. All reports, data, and information to be provided by the permit holder shall be certified as true, accurate, and complete. If the County Engineer determines, at any time, that reports, data, and/or information provided as part of the application, or provided to the County pursuant to the terms and conditions of the permit, were not true, accurate, and complete, or have been altered so as to misrepresent project impacts, the County may, following notice and hearing, revoke the permit.

2. In addition to the monitoring and reporting requirements approved in the Monitoring Plan, the County Engineer or other County representatives may, at any reasonable time, from time to time, and with or without notice, enter the project site to inspect monitoring procedures, equipment, data collection methodologies and frequencies, and other monitoring components. The County Engineer or County representatives shall also conduct such independent monitoring and other activities as are necessary to reasonably verify compliance with the terms and conditions of the permit, including without limitation the Monitoring Plan.

3. Upon request of the County Engineer, the applicant shall deposit with the County Engineer such amounts as may be requested from time to time in order to compensate the County for any onsite monitoring and/or inspection activities, including ongoing water sampling, that the County Engineer may undertake or cause to be undertaken, whether by County employees or by contractors engaged by, and who shall report to, the County Engineer.

4. For a Groundwater Banking project, the permit may contain any appropriate limitations on extraction of banked water, whether characterized by a maximum ratio of permitted extractions to deposits or otherwise.

L. DECISION OF BOARD FINAL: The decision of the Board in any matter set forth herein, other than criminal penalties, shall be final upon its adoption of written findings.

Any action of the County Engineer that under the express provisions of this Chapter requires a determination of what is "reasonable" shall be made in the first instance by such Engineer, and if appealed to the Board, the decision of the Board likewise shall be final.

M. RE-APPLICATION AFTER BOARD DENIAL: Re-application for a permit that has been denied by the Board may not be filed until one year after the date of denial.

N. INSPECTIONS; NOTICE BY PERMIT HOLDER OF VIOLATIONS: If an application is approved and a permit granted, then the applicant's acceptance of the permit shall constitute the applicant's consent for the County Engineer, or his or her representatives, at any reasonable time, and from time to time, and with or without notice, to enter the project site and make such observations and measurements as are deemed necessary to assure that the project is being carried out under the terms of the permit. The permit holder shall notify the County Engineer in writing within 48 hours of any violation of the terms of any permit (including any permit conditions).

O. PERMIT REVIEWS:

1. The County Engineer, or his or her designee, periodically shall review the operation of the project and its compliance with all applicable terms, conditions, and mitigation measures of the permit. This review, which shall be conducted at the expense of the permit holder, shall be conducted at such intervals as the Board shall establish as a part of the permit's terms, conditions and mitigation measures, but in no case shall the intervals exceed five (5) years in length. Such periodic review shall be conducted in accordance with the procedures adopted therefore by the Board.

2. During each periodic review, the permit holder shall be required to demonstrate compliance with the terms, conditions, and mitigation measures of the permit. By acceptance of the permit, the permit holder agrees to furnish such reasonable evidence of compliance as the County Engineer (or his or her designee), in the exercise of reasonable discretion, may require.

3. In addition to the periodic review, the Board may at any time initiate a review of the permit holder's compliance with the terms, conditions, and mitigation measures applicable to the permit by giving written notice to the permit holder. Within thirty (30) days following receipt of such notice, the permit holder shall submit evidence to the County Engineer (or his or her designee) of the permit holder's compliance with the terms, conditions, and mitigation measures applicable to the permit.

P. REVOCATION OR MODIFICATION OF PERMIT: Upon receiving knowledge of an alleged violation of the Ordinance, and/or the terms of any Permit (including any Permit conditions), the County will provide written notice of the alleged violation to the permit holder or other allegedly violating party. The notice shall detail the alleged violation and require the permit holder to cease and desist immediately upon receipt of the notice from continuing the alleged violations or within five (5) working days demonstrate to the County Engineer that the alleged violating activities in fact do not violate the Ordinance. No civil fines, as set forth below, shall accrue during this notification process. Any violation of the terms, conditions, and/or mitigation measures of the permit not corrected during such five (5) day period will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held by the Board in the manner described in the preceding Paragraphs; provided that nothing in this

Paragraph is intended to deprive the Board of its authority to grant one or more extensions of time within which the permit holder shall be required to cure the violation.

Any change in circumstances which shows that the project as operated may result in any of the kinds of detrimental impacts referred to in Paragraph I. of section 13.100.060 above constitutes independent grounds for revocation of the project's permit, or modification thereof as next set forth.

In lieu of revocation of the permit, the Board may, after a duly noticed public hearing held in the manner described in the preceding paragraphs, modify the permit to include such different, and/or additional, terms, conditions, and/or mitigation measures as the Board determines are necessary and appropriate in light of the change in circumstances then existing. "Change in circumstances" may include, but is not necessarily limited to, changes in the physical characteristics of the project site or surrounding properties, or changes in applicable statutes or regulations affecting the project.

Q. JUDICIAL REVIEW: Any judicial action to set aside, annul, or vacate any decision or action taken by the Board pursuant to this Chapter shall be filed pursuant to California Code of Civil Procedure section 1094.5 and within the time limits prescribed in California Code of Civil Procedure section 1094.6.

SECTION 13.100.070 PENALTIES FOR VIOLATION:

The County may elect to proceed with any or all of the following remedies for violation of this Chapter, in addition to all other remedies provided in this Chapter or provided by law:

A. Civil action against the violator, including injunctive relief.

B. Any person or entity who violates any provision of this Chapter or any term or condition of any permit issued under this Chapter, shall be subject to a civil fine up to $5,000.00

for each separate violation. A person or entity shall be deemed to have committed a separate violation for each and every day or portion thereof during which any such violation is committed, continued, or permitted as well as for each and every separate Groundwater well within or in connection with which any such violations are committed, continued or permitted.

C. Any person who violates any provision of this Chapter, or the terms and/or the conditions of any permit issued pursuant to this Chapter, with intent to do so, shall be guilty of a misdemeanor, punishable by fine not exceeding $1,000.00 per violation, or imprisonment not exceeding six months, or by both such fine and imprisonment; and any person shall be deemed guilty of a separate offense for each and every day, or portion thereof, during which any such violation is committed, continued, or permitted; and for each such day shall be subject to the same punishment as for the original offense.

13.100.080 SEVERABILITY:

If any section, subsection, sentence, clause or phrase of this Chapter is for any reason held to be illegal, invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions hereof. The Board hereby declares it would have passed this Chapter and each section, subsection, sentence, clause or phrase hereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases are declared illegal, invalid or unconstitutional.

SECTION 2:

This Ordinance shall take effect and be in force thirty (30) days after its adoption.

* *

The foregoing Ordinance was adopted this 10th day of April 2006, by the following vote:

Supervisor Bigelow voted: Yes

Supervisor Moss voted: Yes

Supervisor Dominici voted: Yes

Supervisor Silva voted: Yes

Supervisor Gilbert voted: Yes

Chairman, Board of Supervisors

ATTEST:

Clerk, Board of Supervisors

Approved as to Legal Form:

COUNTY COUNSEL

By

TODD ENGINEERS

GROUNDWATER • WATER RESOURCES • HYDROGEOLOGY • ENVIRONMENTAL ENGINEERING

January 14, 2002

To: Distribution List

From: Phyllis Stanin

Re: Transmittal of Final Draft
AB3030 Groundwater Management Plan
County of Madera

Todd Engineers is pleased to transmit the Final Draft AB3030 Groundwater Management Plan to the Water Oversight Committee and Madera County Board of Supervisors. The Final Draft incorporates comments from both the Committee and County staff who reviewed the previous drafts.

The Plan is being distributed to Committee members and the County office of the Board of Supervisors. Board representatives on the committee will receive their copy from the County office. The Final Draft will be made available to the public for review. After receiving comments from the public, the Board of Supervisors will consider the Plan for adoption.

We commend the cooperative efforts of Committee members, County staff, and the Board for developing this plan to actively manage their groundwater resources for the future.

2200 Powell Street, Suite 225 • Emeryville, CA 94608-1809 • 510/595-2120 • Fax 510/595-2112

cc: Wayne

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San Joaquin Valley Groundwater Basin
Madera Subbasin

- Groundwater Subbasin Number: 5-22.06
- County: Madera
- Surface Area: 394,000 acres (614 square miles)

Basin Boundaries and Hydrology

The San Joaquin Valley is surrounded on the west by the Coast Ranges, on the south by the San Emigdio and Tehachapi Mountains, on the east by the Sierra Nevada and on the north by the Sacramento-San Joaquin Delta and Sacramento Valley. The northern portion of the San Joaquin Valley drains toward the Delta by the San Joaquin River and its tributaries, the Fresno, Merced, Tuolumne, and Stanislaus Rivers. The southern portion of the valley is internally drained by the Kings, Kaweah, Tule, and Kern Rivers that flow into the Tulare drainage basin including the beds of the former Tulare, Buena Vista, and Kern Lakes.

The Madera subbasin consists of lands overlying the alluvium in Madera County. The subbasin is bounded on the south by the San Joaquin River, on the west by the eastern boundary of the Columbia Canal Service area, on the north by the south boundary of the Chowchilla Subbasin, and on the east by the crystalline bedrock of the Sierra Nevada foothills. Major streams in the area include the San Joaquin and Fresno Rivers. Average annual precipitation is 11 inches throughout the majority of the subbasin and 15 inches in the Sierran foothills

Hydrogeologic Information

The San Joaquin Valley represents the southern portion of the Great Central Valley of California. The San Joaquin Valley is a structural trough up to 200 miles long and 70 miles wide. It is filled with up to 32,000 feet of marine and continental sediments deposited during periodic inundation by the Pacific Ocean and by erosion of the surrounding mountains, respectively. Continental deposits shed from the surrounding mountains form an alluvial wedge that thickens from the valley margins toward the axis of the structural trough. This depositional axis is below to slightly west of the series of rivers, lakes, sloughs, and marshes, which mark the current and historic axis of surface drainage in the San Joaquin Valley.

Water Bearing Formations

Hydrogeologic units in the Madera Subbasin consist of unconsolidated deposits of Pleistocene and Holocene age. These deposits are divided into continental deposit of Tertiary and Quaternary age, and continental deposits of Quaternary age. Continental deposits of Quaternary age include older alluvium, lacustrine and marsh deposits and younger alluvium. The continental deposits of Quaternary age crop out over most of the area and yield probably more than 95 percent of the water pumped from wells.

Although younger alluvium and flood-basin deposits yield small quantities of water to wells, the most important aquifer in the area is the older alluvium. It consists mostly of intercalated lenses of clay, silt, sand, and some gravel.

The lacustrine and marsh deposits (which contain the E-clay) do not crop out in the area but occur within the older alluvium and underlie the western portion of the subbasin at depths ranging between 150 and 300 feet (DWR 1981). These deposits restrict the vertical movement of ground water and divide the water-bearing deposits into confined and unconfined aquifers. Continental deposits of Tertiary and Quaternary age include the Ione Formation which outcrops on the Subbasin's eastern margin. This unit may yield small quantities of water to wells but is not an important aquifer.

The estimated average specific yield of this groundwater subbasin is 10.4 percent (based on DWR San Joaquin District internal data and that of Davis 1959).

Restrictive Structures

Groundwater flow is generally southwestward in the eastern part of the subbasin and to the northwest in the southern portion, away from the recharge area along the San Joaquin River. During 1999, a groundwater mound occurred in the northwest portion of the subbasin with accompanying depressions to the north and south, and a large depression in the subbasin's southeast corner (DWR 2000). Based on current and historical groundwater elevation maps, groundwater barriers do not appear to exist in the subbasin.

Groundwater Level Trends

Changes in groundwater levels are based on annual water level measurements by DWR and cooperators. Water level changes were evaluated by quarter township and computed through a custom DWR computer program using geostatistics (kriging). On average, the subbasin water level has declined nearly 40 feet from 1970 through 2000. The period from 1970 through 1978 showed steep declines totaling about 30 feet. The nine-year period from 1978 to 1987 saw stabilization and rebound of about 25 feet, taking the water levels close to where they were in 1970. 1987 through 1996 again showed steep declines, bottoming out in 1996 at about 45 feet below 1970 levels. Water levels rose about 8 feet from 1996 to 2000. Water levels declines have been more severe in the eastern portion of the subbasin from 1980 to the present, but the western subbasin showed the strongest declines before this time period.

Groundwater Storage

Estimations of the total storage capacity of the subbasin and the amount of water in storage as of 1995 were calculated using an estimated specific yield of 10.4 percent and water levels collected by DWR and cooperators. According to these calculations, the total storage capacity of this subbasin is estimated to be 18,500,000 af to a depth of 300 feet and 40,900,000 af to the base of fresh groundwater. These same calculations give an estimate of 12,600,000 af of groundwater to a depth of 300 feet stored in this subbasin as of 1995 (DWR 1995). According to published literature, the amount of stored groundwater in this subbasin as of 1961 is 24,000,000 af to a depth of $\leq$ 1000 feet (Williamson 1989)

Groundwater Budget (Type B)

Although a detailed budget was not available for this subbasin, an estimate of groundwater demand was calculated based on the 1990 normalized year and data on land and water use. A subsequent analysis was done by a DWR water budget spreadsheet to estimate overall applied water demands, agricultural groundwater pumpage, urban pumping demand and other extraction data.

Natural recharge was estimated to be 21,000 af. Artificial recharge and subsurface inflow were not determined. Applied water recharge was calculated to be 404,000 af. Annual urban extraction and annual agricultural extraction were estimated as 15,000 af and 551,000 af, respectively. There were no other extractions, and subsurface outflow was not determined.

Groundwater Quality

Characterization. The majority of this subbasin is generally a calcium-sodium bicarbonate type, with sodium bicarbonate and sodium chloride at the western margin of the subbasin along the San Joaquin River (Mitten 1970). TDS values range from 100 to 6,400 mg/L, with a typical range of 200 to 400 mg/L. The Department of Health Services, which monitors Title 22 water quality standards, reports TDS values in 40 wells ranging from 100 to 400 mg/L, with an average value of 215 mg/L. EC values range from 180 to 600 μmhos/cm, with an average value of 251 μmhos/cm (based on 15 wells).

Impairments. There are localized areas of high hardness, iron, nitrate, and chloride. One well is currently undergoing GAC filtration for the removal of EDB/DBCP (Glos 2001).

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	44	0
Radiological	44	0
Nitrates	43	1
Pesticides	46	3
VOCs and SVOCs	45	0
Inorganics – Secondary	44	7

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range: 40 – 4,750	Average: 750 – 2,000
	Total depths (ft)	
Domestic		
Municipal/Irrigation	Range: 100 - 600	

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR (incl. Cooperators)	Groundwater levels	378 Semi-annually
Department of Health Services (including cooperators)	Title 22 water quality	127 Varies

Basin Management

Groundwater management:	Discussions taking place between purveyors to create draft AB3030 Plan.
Water agencies	
Public	Gravelly Ford W.D., Madera I.D.; Root Creek W.D.
Private	None

References Cited

California Department of Water Resources (DWR), San Joaquin District. Unpublished Land and Water Use Data.

_____. Well completion report files.

_____. 1981. *Depth to Top of Corcoran Clay.* 1:253,440 scale map.

_____. 1995. Internal computer spreadsheet for 1990 normal computation of net water demand used in preparation of DWR Bulletin 160-93.

_____. 2000. *Spring 1999, Lines of Equal Elevation of Water in Wells, Unconfined Aquifer*. 1:253,440 scale map sheet.

Davis, GH, Green, JH, Olmstead, SH, and Brown, DW. 1959. *Ground Water Conditions and Storage Capacity in the San Joaquin Valley, California.* US Geological Survey Water Supply Paper No. 1469. 287p.

Glos, Kurt., Water Quality Specialist II, City of Madera. 2001. Response to DWR questionnaire. March 14.

Mitten, HT, LeBlanc, RA, and Bertoldi, GL. 1970. *Geology, Hydrology, and Quality of Water in the Madera Area, San Joaquin Valley, California.* USGS. Open-File Report 6410-03.

Williamson, Alex K, Prudic, David E, and Swain, Lindsay A. 1989. *Groundwater flow in the Central Valley, California.* US Geological Survey Professional Paper 1401-D. 127 p.

Additional References

California Department of Water Resources (DWR). 1980. Bulletin 118-80, *Ground Water Basins in California*.

_____. 1994. Bulletin 160-93. *California Water Plan Update, Vol. 1*.

Errata

Changes made to the basin description will be noted here.

APPENDIX E

2009 WATER QUALITY REPORT

June 15, 2010

TO: CITY OF MADERA WATER CUSTOMERS

SUBJECT: 2009 CITY OF MADERA WATER SYSTEM CONSUMER CONFIDENCE REPORT

Este informe contiene información muy importante sobre su agua potable. Traduzcalo, o habla con alguien que lo entiende bien.

The City of Madera is required by California State Department of Health Services to report annually to all customers regarding water quality. The enclosed report summarizes water quality sample results for 2009. You may also view this report on the City of Madera's web site "www.cityofmadera.org." All samples were collected from eighteen groundwater wells. Minimum, maximum, and average values are listed for all elements that were detected.

Significant time and expense by the City ensures that consumers are provided with water that meets or exceeds drinking water standards. The City's stringent testing program is in full compliance with State and Federal requirements.

Questions regarding this report should be directed to Marvin Ward, Water Quality Specialist, of the City Water Quality Division at (559) 661-5465.

Matt L. Bullis
Public Works Operations Director

City of Madera
Source Water Assessment

A source water assessment was conducted for the City of Madera water system and is on going as water wells are being developed. A completed copy of this report may be viewed at City of Madera, Public Works Department 1030 South Gateway Drive Madera, CA 93637 or, a copy may be requested by contacting:

Marvin Ward, Water Quality Specialist
(559) 661-5465

The following chart summarizes potential sources of contamination, in the vicinity of each water well, that could effect water quality:

Activities	Water Wells
Airports - Maintenance/fueling areas	#26
Automobile - Body shops, Historic gas stations, Machine shops, Junk/scrap salvage yards	#25
Automobile – Gas stations	#17, #18, #20, #21, #22, #26
Automobile - Repair shops	#18, #25
Boat services/repair/refinishing, sewer collection systems, pesticide/fertilizer/petroleum storage & transfer area	#18, #31
Chemical/petroleum processing/storage, dry cleaners, injection wells/dry wells/sumps	#28
Dry cleaners, injection wells/dry wells/sumps	#28
Fertilizer/pesticide/herbicide application, storm drain discharge points	#29, #31, 32, #33, #34
Grazing (>5 large animals or equivalent per acre)	#23
Historic waste dumps/landfills	#25, #26
Housing – high density (>1 house / 0.5 acres)	#15, #16, #17, #21, #22, #23, #24, #25, #29, #31, #32, #33, #34
Known contaminant plumes	#27
Metal plating/finishing/fabricating	#26, #27, #30
Military installations	#24
Transportation corridors - Road right - of - ways (herbicides use areas)	#15, #16, #17, #29

DISCUSSION OF VULNERABILITY

There are no current Maximum Contaminant Level (MCL) exceedance noted in the State Department of Health Services Water Quality Inquiry (WQI) database for City of Madera Water Wells: 15, 16, 17, 18, 20, 22, 23, 24, 25, 26, 28, 29, 30, 31, 32 , 33 and 34. However, documentation that the following elements have been found in Water Wells 21, 27 and 33 are included in the database:

Water Well	Chemical	Sample Date	Level Detected	MCL	DLR
#21	DBCP	9/25/2009	0.081 ug/L	0.20 ug/L	0.01ug/L
#27	DBCP	11/17/2009	0.23 ug/L	0.20 ug/L	0.01ug/L
#27	EDB	11/17/2009	0.32 ug/L	0.05 ug/L	0.02ug/L
#33	DBCP	3/6/2009	0.15 ug/L	0.20 ug/L	0.01ug/L

ADDITIONAL COMMENTS:

Water Well 21 A routine water well sample collected on 5/11/00 was positive for Dibromochloropropane (DBCP). A confirmation sample was collected on 6/11/00. The average of the two samples exceeded the MCL. This well was then tested for DBCP monthly for six months, quarterly for six months and is now being tested annually. None of the water samples collected from Well #21 after 6/11/00 have exceeded the MCL for DBCP.

Water Well 27 This water well is equipped with a granular activated carbon filtration system. This system has four vessels containing approximately 20,000 pounds of carbon each. Raw water from the well is filtered to remove all (DBCP) and Ethylene Dibromide (EDB) before it enters the City water distribution system. DBCP and EDB results for samples collected on 9/26/06 were for unfiltered water only. DBCP or EDB is non-detect in water routinely sampled from downstream of the filtration system.

Water Well 33 A water sample was collected 3/1/2005 during initial drilling and was detected for DBCP. This well was put into service on 8/18/2006 is tested quarterly and has never exceeded the MCL for DBCP.

Primary Standards	MCL	PHG (MCLG)	RANGE OF DETECTION		AVERAGE	U.O.M.		TYPICAL SOURCE OF CONTAMINANT
Arsenic	50.00	NA	N/D	TO	6.60	1.27	ug/L	Erosion of natural deposits; runoff from orchards; glass and electronics production wastes.
Barium	1000.00	2000.00	N/D	TO	180.00	18.95	ug/L	Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits.
Nitrate (as NO3)	45.00	45.00	2.30	TO	25.00	8.13	mg/L	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits.
Dibromochloropropane (DBCP)*	2.00	NA	N/D	TO	9.70	0.72	ug/L	Banned nematocide that may still be present in soils due to runoff/leaching from former use on soybeans, cotton, vineyards, tomatoes, and tree fruit.
Ethylene dibromide (EDB)*	0.500	0.10	ND	TO	3.20	0.18	ug/L	Discharge from petrolium refineries, underground gas tank leaks, banned nematocides that may be still present in soils do to runoff and leaching from grain and fruit crops.
Secondary Standards								
Chloride	500.00		15	TO	42.00	21.68	mg/L	Runoff/leaching from natural deposits; seawater influence.
Color	15.00		ND	TO	10.00	0.53	Units	Naturally-occurring organic materials
Iron	5.00		ND	TO	4.00	0.21	ug/L	Leaching from natural deposits; industrial wastes
Manganese	0.05		ND	TO	28.00	1.47	ug/L	Leaching from natural deposits; industrial wastes
Odor	3.00		ND	TO	1.00	0.16	units	Naturally occurring organic materials.
pH (Laboratory)	6.5 - 8.5		7.30	TO	8.00	7.79	Std. Units	
Specific Conductance	1600.00		180.00	TO	560.00	271.05	umho/cm	Substances that form ions when in water; seawater influence.
Total Filterable Residue (TDS)	1000.00		160.00	TO	380.00	205.79	mg/L	Runoff/Leaching from natural deposits
Sulfate	500.00		3.20	TO	16.00	6.70	mg/L	Runoff/leaching from natural deposits; industrial wastes.
Lab Turbity	5.00		ND	TO	1.20	0.21	NTU	
Toatal Chromium	50.00		ND	TO	4.00	0.32	ug/L	
Secondary Standards								
Bicarbonate	N/A		72.00	TO	240.00	112.26	mg/L	
Calcium	N/A		13.00	TO	51.00	21.05	mg/L	

Secondary Standards (cont.)								
Calcium	N/A		13.00	TO	51.00	21.05	mg/L	
Copper	Al=15	170	90th percentile	0.15			mg/L	Internal corrosion of household plumbing systems, erosion of natural deposits, leaching from wood preservatives.
fluoride	20000.00	1000.00	ND	TO	2.30	1.62	ug/L	Erosion of natural deposits.
Lead	Al=15	200	90th percentile	<.005			mg/L	Internal corrosion of household plumbing systems, discharge from industrial manufacturers, erosion of natural deposits.
Magnesium	N/A		4.30	TO	15.00	6.52	mg/L	
Potassium	N/A		ND	TO	7.60	3.14	mg/L	
Sodium	N/A		18.00	TO	44.00	24.95	mg/L	
Total Alkalinity	N/A		59.00	TO	200.00	92.63	mg/L	
Total Hardness (as CaCO3)	N/A		50.00	TO	190.00	74.22	mg/L	
MBAS	0.50		ND	TO	0.059	0.003	mg/L	Municipal and industrial waste discharges
Organics								
Bromoform	N/A	0.5	ND	TO	1.20	0.06	ug/L	
Tetrachloroethylene (PCE)	50.00	600.00	ND	TO	7.50	0.00	ug/L	Discharge from factories, dry cleaners and auto shops(metal degreaser)
Radioactivity								
Gross Alpha	15.00		ND	TO	8.31	1.45	pCi/L	Erosion of natural and man-made deposits
Radium 228	19.00		ND		1.14	0.06	pCi/L	Erosion of natural and man-made deposits
Uranium	20.00		-0.05	TO	8.41	0.86	pCi/L	Erosion of natural deposits
Unregulated Organics								
2-Chlororthylvinylether	N/A							
Methyl Ethyl Ketone	N/A	5.00	ND	TO	16.00	0.89	ug/L	
Vanadium	N/A	50.00	10.00	TO	27.00	18.24	ug/L	
Total Trihalomethanes (TTHM)	N/A	80.00	ND	TO	0.038	0.07	ug/L	By-product of drinking water chlorination

Unregulated Inorganics							
Hexavalent Chromium VI	N/A	ND	TO	2.50	0.71	ug/L	N/A

2009 total coliform bacteria samples were taken at all water well sites and no total coliform bacteria was detected.

The State allows City to monitor for some contaminants less than once per year because the concentration of these contaminants do not change frequently. Some of the above data, though representative, is more than one year old, the data ranges from 1996 to 2007.

ABBREVIATION KEY

MCL = Maximum Contaminant Level
mg/L = Milligrams per Liter or parts per million
ug/L = Micrograms per Liter or parts per billion
NTU = Nephelometric Turbidity Units
PHG = Public Heath Goal
PHG = Public Heath Goal
N/A = Not Aplicable
pCi/L = Picocuries per Liter
N/D = Non-Detect
U.O.M. = Unit of Measurement
TON = Threshold odor number
TON = Threshold odor number

REQUIRED PUBLIC NOTICE

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders,some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their heath care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline 1(800) 426-4791.

DEFINITIONS

Maximum Contaminant Level or (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs(or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Primary Drinking Water Standard or PDWS: MCLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

Public Health Goals or PHG: The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Maximum Contaminant Level Goal or MCLG: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

HEALTH EFFECTS FOR INORGANIC CONTAMINANTS

Nitrate: Nitrate in drinking water at levels above 45 mg/L is a health risk for infants of less than six months of age.
Such nitrate levels in drinking water can interfere with the capacity of the infant's blood to carry oxygen, resulting in a serious illness; symptoms include shortness of breath and blueness of the skin. Nitrate levels above 45 mg/L may also affect the ability of the blood to carry oxygen in other individuals, such as pregnant women and those with certain specific enzyme deficiencies. If you are caring for an infant, or you are pregnant, you should ask advice from your health care provider.

ARSENIC: While drinking water meets the current standard for arsenic, it does contain low levels of arsenic. The standard balances the current understanding of arsenic's possible health affects against the cost of removing arsenic from drinking water. The California Department of Health Services continues to research the health affects of low levels of arsenic, wich is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

TREATMENT

Chlorination: Each well site has a chlorine generation system which produces a 0.8% chlorine solution and doseage to the distribution system is set at 0.25 Parts Per Million.

GAC Filtration: Water Well No. 27 has a Granular Activated Carbon Filtration system. This system utilizes four vessels with approximately 20,000 pounds of Carbon each. Water passes through this filtration system where Dibromochloropropane(DBCP) and Ethylene dibromide(EDB) is removed. When this well is in use, it is tested weekly to ensure the effectiveness of the filter.

REQUIRED PUBLIC INFORMATION

1. The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.
2. Contaminants that could be present in source water include:

    (a) Microbial contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
    (b) Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
    (c) Pesticides and herbicides, that may come from a variety of sources such as agriculture, urban water runoff, and residential uses.
    (d) Organic chemical contaminants, including synthetic and volatile organic chemicals, that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.
    (e) Radioactive contaminants, that can be naturally-occurring or be the result of oil and gas production and mining activities.

3. In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency(USEPA) and the State Department of Health Services (DHS) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection or public health.

APPENDIX F

ORDINANCES AND RESOLUTIONS

This appendix includes the following resolutions:

Resolution 95-52 (Water Shortage Response Plan)
Resolution 10-118 (Rate Update)

Appendix G
City Council Resolution Adopting Water Shortage Contingency Plan

RESOLUTION NO. 95-52

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MADERA, CALIFORNIA ADOPTING A WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, California Water Code Sections 10620 et seq. require the adoption of a Water Shortage Contingency Plan (the "Plan") as a component of an Urban Water Management Plan; and

WHEREAS, such legislation requires that once adopted that a copy of the Plan be filed with the California Department of Water Resources; and

WHEREAS, the City of Madera in compliance with such legislation has drafted a proposed Plan and circulated it for public review and held a duly noticed public hearing on such proposed Plan; and

WHEREAS, a copy of the proposed Plan is on file in the office of the City Clerk and referred to for further particulars.

NOW THEREFORE, THE COUNCIL OF THE CITY OF MADERA does hereby resolve, find and order as follows:

1. The Water Shortage Contingency Plan is hereby adopted.

2. The City Administrator is hereby authorized and directed to file this Plan with the California Department of Water Resources.

3. The City Administrator is hereby authorized to declare,

when necessary, a Water Shortage Emergency and implement this Water Shortage Contingency Plan.

4. The City Administrator shall recommend to the City Council additional procedures, rules, and regulations to carry out effective and equitable allocation of water resources during a water shortage.

5. This resolution is effective immediately.

* * * * * * * * * * *

PASSED AND ADOPTED by the City Council of the City of Madera this 5th day of April, 1995, by the following vote:

AYES: Councilmembers Nabors, Wells, Armentrout, Scalzo, Perez.

NOES: None.

ABSENT: None.

Mayor of the City of Madera

ATTEST:
EVONNE STEPHENSON,
CITY CLERK

By Evonne Stephenson

APPROVED AS TO LEGAL FORM:
JOSEPH A. SOLDANI
CITY ATTORNEY

By Joseph A. Soldani

Appendix H
City of Madera Water Shortage Contingency Plan

CITY OF MADERA
DEPARTMENT OF PUBLIC WORKS
AMENDMENT TO URBAN WATER MANAGEMENT PLAN

TITLED

WATER SHORTAGE CONTINGENCY PLAN

a Component of the City of Madera Urban Water Management Plan

CITY OF MADERA
205 West 4th Street
Madera, CA 93637
Phone: (209) 661-5466
FAX: (209) 661-0760

Prepared by:

David L. Chumley, Director of Public Works
Al Holguin, Water Specialist (Contact Person)

ADOPTED BY RESOLUTION NUMBER 95-52
April 5, 1995

TABLE OF CONTENTS

SECTIONS

TABLES

DROUGHT STAGES

ATTACHMENTS

SECTION 1 COORDINATED PLANNING

California Water Code Section 10620 (d) (2) : Each urban water supplier shall coordinate the preparation of its urban shortage contingency plan with other urban water suppliers and public agencies in the area, to the extent practicable.

1.1 WATER SOURCE

All City of Madera water supply is from groundwater wells. The same water strata is shared in common with other special districts and agricultural interests. These districts serve less than 3,000 customers and are not required to prepare a Water Shortage Contingency Plan. Copies of the City Plan will be made available to these special districts.

1.2 DISASTER PLANNING

The City of Madera Water Shortage Contingency Plan will be provided to the Madera County Office of Emergency Services for their information. Through a correlated effort between the City and County, the City Plan may become a part of the Madera County Disaster Plan.

1.3 CITY OF MADERA WATER SHORTAGE COORDINATION

The City Water Shortage Response Team is chaired by the Water Division Supervisor. The team includes representatives from Engineering, Fire, Building, Parks and Administration. The team met and reviewed the Draft Water Shortage Contingency Plan prior to presentation to City Council. During water shortages stages 1, or 2, the team will meet at the beginning of the heavy pumping season and as often as necessary thereafter. In the more critical stages of 3, or 4, the team will meet as needed to handle changing conditions.

1.4 PUBLIC MEETINGS

On April 5, 1995 a Public Meeting was held on the development of this Water Shortage Contingency Plan. City Staff proposed water usage limitations for each water shortage stage. The final version of this Plan was adopted by the Madera City Council on April 5, 1995.

SECTION 2 PAST, CURRENT AND PROJECTED WATER USE

California Water Code Section 10631 (e) (1) : Past, current and projected water use and to the extent records are available, a breakdown of those uses on the basis of residential single family, residential multifamily, industrial, commercial, governmental and agricultural use.

2.1 WATER USE HISTORY

The Historical Water Use Data in Table 1 was provided by the City of Madera Water Division.

TABLE 1 HISTORICAL WATER USE DATA

FISCAL YEAR	BILLION GALLONS
1989/1990	3.395
1990/1991	3.101
1991/1992	3.126
1992/1993	3.053
1993/1994	3.528

2.2 PROJECTED WATER USE

The Projected Water Use Table 2 was created by using a five year moving average based upon past water use shown in Table 1 . This approach compensates for the summertime temperature variations which are experienced from year to year. Those years with extreme 100+ degree temperatures for long periods of time, particularly in early Spring and/or late Fall will result in significant increases in water usage. Unusually cool summers will result in much lower annual statistics. The following are projections in billion gallons per year:

TABLE 2 PROJECTED WATER USE

FISCAL YEAR		
1993/1994	3.528	(Actual)
1994/1995	3.209	(Projected)
1995/1996	3.203	(Projected)
1996/1997	3.223	(Projected)
1997/1998	3.243	(Projected)
1998/1999	3.281	(Projected)

2.3 WATER CUSTOMER CATEGORIES

Water connections depicted in Table 3 are based upon June 30, 1994 data. The City of Madera historically required installation of meters only if customers were considered to be large volume users. Effective January 1, 1992 all new services were required to be equipped with meters.

TABLE 3 CUSTOMER TYPES, FLAT RATE AND METERED CONNECTIONS

Customer Type	Flat Rate	Metered	Total
Residential (Single & Multiple Families)	7, 805	28	7, 833
Industrial	30	15	45
Commercial	685	130	815
Governmental	60	17	77
Total	8, 580	190	*8, 770

* Does not include City facilities such as Parks, Airport, Buildings, Landscaped areas, etc.

SECTION 3 WORST CASE WATER SUPPLY AVAILABILITY FOR FY 94/95 THROUGH 97/98

California Water Code Section 10631 (e) (2) : An estimate of the minimum water supply available at the end of 12,24 and 36 months, assuming the worst case water supply shortages.

3.1 WATER SUPPLY SOURCE

The City of Madera's current water supply is provided by 11 groundwater wells with a maximum pumping capacity of 1,098,780 gallons per hour. These wells are strategically located to maintain pressure levels and to provide adequate fire flows. They also provide backup capability for one another during P.G.E. outage, mechanical failure or other downtime.

In addition, well #26 at the airport is capable of pumping 108,000 gallons per hour. This flow is mainly for emergency fire flow purposes at the Airport Business Park. The well is to far from the majority of the City to benefit routine daily consumption needs.

3.2 CURRENT AND FUTURE AVAILABLE WATER SUPPLY

Table 4, (page 5) shows the 1993/1994 maximum gallons per hour (G.P.H.) available to be 1,110,840. The estimated peak G.P.H. pumped was 1,002,420 . This represents a minimal estimated peak reserve pumping capacity of 9.76%. "Worst Case" water supply situations are estimated for each of the next four years.

TABLE 4

ESTIMATED WORST CASE WATER SUPPLY

	F.Y. 93/94	F.Y. 94/95	F.Y. 95/96	F.Y. 96/97	F.Y. 97/98
	ACTUAL	ACTUAL	PROJECTED	PROJECTED	PROJECTED
WELL #	G.P.M. (1)	G.P.M. (1)	G.P.M.	G.P.M. (2)	G.P.M.
15	2, 112	1, 915	1, 915	1, 723	1, 723
16	N/A	1, 150	1, 150	1, 035	1, 035
17	1, 323	1, 178	1, 178	1, 061	1, 061
18	1, 818	1, 718	1, 718	1, 547	1, 547
20	1, 807	1, 807	1, 807	1, 627	1, 627
21	1, 546	1, 326	1, 326	1, 194	1, 194
22	2, 394	2, 316	2, 316	2, 085	2, 085
23	2, 046	1, 856	1, 856	1, 671	1, 671
24	1, 988	1, 400	1, 400	1, 260	1, 260
25	1, 980	1, 797	1, 797	1, 618	1, 618
26	FIRE FLOW WATER WELL AT AIRPORT (3)				
28	1, 500	1, 850	1, 850	1, 665	1, 665
29	N/A	N/A	1, 300	1, 170	1, 170
30	N/A	N/A	2, 000	1, 800	1, 800
MAX. G.P.M.					
AVAILABLE	18, 514	18, 313	21, 613	19, 456	19, 456
MAX G.P.H.					
AVAILABLE	1, 110, 840	1, 098, 780	1, 296, 780	1, 167, 360	1, 167, 360
MAX. G.P.D.					
AVAILABLE	26, 660, 160	26, 370, 720	31, 122, 720	28, 016, 640	28, 016, 640
ESTIMATED					
PEAK G.P.H.					
PUMPED	1, 002, 420	1, 014, 780	1, 055, 371 (4)	1, 097, 585 (4)	1, 141, 488 (4)
PEAK G.P.D.					
PUMPED	16, 277, 000	17, 860, 000	18, 574, 400 (4)	19, 317, 376 (4)	20, 090, 071 (4)
ESTIMATED	9. 76 % (5)	7. 64 % (6)	18. 62 %	5. 98 %	2. 22 %
PEAK	1, 807 G.P.M.	1, 400 G.P.M.	4, 024 G.P.M.	1, 163 G.P.M.	432 G.P.M.
RESERVE	108,420 G.P.H.	84,000 G.P.H.	241, 440 G.P.H.	69, 780 G.P.H.	25, 920 G.P.H.

REVISED 4/14/95

1) Based on Annual P.G.E. water flow test results.
2) The Projected 1996/97 "Worst Case" is based on a 10% pumping efficiency loss. This would occur if pumps in each well had to be lowered due to a declining water table and/or bowls loose efficiency due to wear.
3) Well #26 at the airport is mainly for emergency fire flow purposes only. It is capable of pumping 1,800 gallons per minute.
4) Projected gallons used per hour/day were increased by 4%.
5) Well #20 was off and represented 9.76% of total available capacity on the peak water use day of the year. This critical situation lasted for approximately two hours on that day (See Table 5, page 6). If it had been needed, there would have been 0% reserve.
6) Well #24 was off and represented 7.64% of total available pumping capacity on the peak water use day of the year. This critical situation lasted for approximately 4 hours on that day (See Table 6, page 7). If it had been needed, there would been 0% reserve.

TABLE 5

CITY OF MADERA
HOURLY WATER WELL USE
PEAK DAY FOR F.Y. 1993/94
JULY 14, 1993 WEDNESDAY (16,277,000 GALLONS PUMPED)

WELL	(a.m.)												(p.m.)										*PEAK HOURS*	
	1	2	3	4	5	6	7	8	9	10	11	noon	1	2	3	4	5	6	7	8	9	10	*11*	*midnight*
#15	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	*ON*	*ON*
#16	OFF FOR REPAIR																							
#17	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*
#18	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	*ON*	*ON*
#20	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
#21	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	*ON*	*ON*
#22	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	*ON*	*ON*
#23	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	ON	ON	ON	*ON*	*ON*
#24	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*
#25	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*
#26	FIRE FLOW WATER WELL AT AIRPORT																							
#27	OFF LINE DUE TO HIGH EDB LEVELS																							
#28	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*

TABLE 6

CITY OF MADERA
HOURLY WATER WELL USE
PEAK DAY FOR F.Y. 1994/95
JULY 14, 1994 WEDNESDAY (17,860,000 GALLONS PUMPED)

WELL	(a.m.)											noon	(p.m.)							*PEAK HOURS*				midnight
	1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	*8*	*9*	*10*	*11*	
#15	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON	*ON*	*ON*	*ON*	*ON*	ON
#16	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*	*ON*	*ON*	ON
#17	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*	*ON*	*ON*	ON
#18	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	*ON*	*ON*	*ON*	*ON*	OFF
#20	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	*ON*	*ON*	*ON*	*ON*	ON
#21	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*	*ON*	*ON*	ON
#22	ON	ON	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	ON	ON	ON	OFF	OFF	OFF	ON	*ON*	*ON*	*ON*	*ON*	ON
#23	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*	*ON*	*ON*	ON
#24	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
#25	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*	*ON*	*ON*	ON
#26	**FIRE FLOW WATER WELL AT AIRPORT**																							
#27	**OFF LINE DUE TO HIGH EDB LEVELS**																							
#28	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	*ON*	*ON*	*ON*	*ON*	ON

SECTION 4 STAGES OF ACTION

California Water Code Section 10631 (e) (3): Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

4.1 WATER PURVEYOR RESPONSIBILITIES

The City of Madera has a legal responsibility to provide potable water to the community which complies with all health and safety standards. In order to minimize the social and economic impact of water shortages, the city will manage water supplies prudently. This plan is designed to provide a minimum of 50 percent of normal supply during a critical or extended water shortage. Triggering levels are established to ensure that water use reduction goals are achieved. Deficit reduction objectives are shown in Drought Stages 1, 2, 3 and 4. (Pages 10-14)

4.2 WATER USE REDUCTION TRIGGERS

The City's only water source is groundwater. Rationing stages may be triggered by steadily decreasing standing groundwater levels, drier than normal weather conditions, or both. The City's Drought Stage Initiating Conditions are shown in Drought Stages 1, 2, 3 and 4. (Pages 10-14)

SECTION 5 MANDATORY PROHIBITIONS ON WATER USE

California Water Code Section 10631 (e) (4) : Mandatory provisions to reduce water use which include prohibitions against specific wasteful practices, such as gutter flooding.

The City has previously adopted "No Water Waste Regulations" which are contained in the Madera Municipal Code, Title 5, Chapter 5. Some modifications to these regulations will be required by the City Council for Stages #3, and #4 . Required consumer actions are shown in Drought Stages 1, 2, 3 and 4. (Pages 10-14)

SECTION 6 CONSUMPTION LIMITS

California Water Code Section 10631 (e) (5) : Consumption limits in the most restrictive stages. Each urban water supplier may use any type of consumption limit in its water shortage contingency plan that would reduce water use and is appropriate for its area. Examples of consumption limits that may be used include, but are not limited to, percentage reductions in water allotments, per capita allocations, an increasing block rate schedule for high usage of water with incentives for conservation, or specific uses.

The majority of water services in the City of Madera are not metered. Large Commercial and Industrial users are metered. Consumption limits are shown in Drought Stages 1, 2, 3 and 4 under Public Agency Actions. (Pages 10-14)

SECTION 7 PENALTIES OR CHARGES FOR EXCESSIVE USE

California Water Code Section 10631 (e)(6) Penalties for excessive use.

The City of Madera Penalties For Non-Compliance of Water Use Regulations are shown in Drought Stages 1, 2, 3 and 4. (Pages 10-14)

SECTION 8 ANALYSIS OF REVENUE AND EXPENDITURE IMPACTS

California Water Code Section 10631 (e) (7) : An analysis of the impacts of the plan on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

Drought Stages 1, 2, 3 and 4 provide information on projected revenue impacts. Existing Water Revenues will cover expenditures for Stages #1 and #2. Water User rates are reviewed annually to determine need for increases. When a Water Shortage Emergency is declared for Stages #3, or #4, Water Revenues will be reviewed and adjusted if necessary.

SECTION 9 WATER USE MONITORING PROCEDURES

California Water Code Section 10631 (e) (9) : A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency plan.

All of the City of Madera water wells are linked to a telemetry monitoring system. This system shows the number of gallons which are being pumped. These figures are read and recorded on a daily basis and then this data is transferred to a computer disk for future reference or comparisons. Water-Use Monitoring Procedures are also shown in Drought Stages 1, 2, 3 and 4. (Pages 10 - 14)

STAGE #1 EXISTING CONDITIONS

DROUGHT STAGE INITIATING CONDITIONS

Continued decrease of water table due to weather conditions and overdraft pumping.

DEFICIT REDUCTION OBJECTIVE

Limit the additional volume of water consumed to the percentage of annual population increase.

WATER USE MONITORING PROCEDURES

In Drought Stage #1, water production figures are recorded daily and totals are incorporated into the City of Madera Water Production report.

PUBLIC AGENCY ACTIONS AND PROJECTED EXPENDITURES

1. Public Works Department initiates annual water conservation program with two Water Patrol personal enforcing regulations 80 hours per week from April 1st to October 31st. **(COST $14,065)**
2. Voluntary water conservation measures are requested.
3. Prepare and mail Annual Water Use Regulations to all customers. **(COST $2,500)**
4. Check ground water levels quarterly.
5. **PROJECTED TOTAL COST ($16,565)**

REQUIRED CONSUMER ACTIONS

1. Outside irrigation limited to 3 days per week.
2. No hosing of paved surfaces.
3. No irrigation between 11 a.m. and 7 p.m.
4. No water is allowed to run into street or gutter.
5. Water leaks must be repaired within 5 days of citation.
6. Evaporative coolers must be equipped with water re-circulating devices.
7. No washing down of buildings other than for painting or other maintenance.
8. No continuous flow for recreational purposes
9. Require new commercial car washes to re-circulate their water.

PENALTIES FOR NON COMPLIANCE

VIOLATION #1. Written warning issued.
VIOLATION #2. $ 15.00 surcharge on next water bill.
VIOLATION #3. $ 30.00 surcharge on next water bill.
VIOLATION #4. $ 45.00 surcharge on next water bill and installation of a water meter at customers expense, and/or discontinuance of water service.

STAGE #2 POTENTIAL MODERATE SHORTAGE

DROUGHT STAGE INITIATING CONDITIONS

Weather forecasts predict a continuing trend of drier than normal conditions with a further deterioration of groundwater levels.

DEFICIT REDUCTION OBJECTIVE

Decrease water use by 5% to 10%.

WATER USE MONITORING PROCEDURES

Water production figures are recorded daily, totals are incorporated into the City of Madera Water Production report and daily production figures are reported to the Water Supervisor. The supervisor will compare the weekly production figure to the amount pumped during Stage #1 conditions. The targeted weekly reduction goal of 5% to 10% will be verified.

PUBLIC AGENCY ACTIONS AND PROJECTED EXPENDITURES

1. Publish and mail Annual Water Use Regulations. **(COST $2,500)**
2. Public Works Department initiates its annual water conservation program.
3. Add a third Water Patrol person to increase enforcement of regulations to 120 hours per week. **(COST $21,100)**
4. Increase public information campaign by explaining five stage rationing plan and forecasting future actions. To be distributed by mail to all customers. **(COST $2,500)**
5. Work with news media to publicize water saving recommendations and daily consumption figures.
6. Disseminate water saving technical information to specific customer types. **(COST $500)**
7. Recruit and train volunteers for speakers bureau.
8. Distribute water conservation kits to all customers which include shower head/faucet restrictors, toilet flush tank displacement devices and leak detection tablets. **(COST $5,000)**
9. Check ground water levels monthly.
10. **PROJECTED TOTAL (COST $31,600)**

REQUIRED CONSUMER ACTIONS

Voluntarily reduce water consumption by stricter adherence to Water Use Regulations.

PENALTIES

1. Same as Stage One.
2. Follow up letter after the 2nd violation.
3. Educational visit and warning after the 3rd violation.
4. Staff contact with water customer to resolve violation concerns and shut water service off, if necessary, with a reconnecting fee of $25.00 after the 4th violation.

STAGE #3 SERIOUS SHORTAGE

DROUGHT STAGE INITIATING CONDITIONS

Weather forecasts predict a continuing trend of drier than normal conditions. Standing ground water level has decreased to the point where City wells are in jeopardy of breaking suction.

DEFICIT REDUCTION OBJECTIVE

Decrease water use by 10% to 35%

WATER USE MONITORING PROCEDURES

In Drought Stage #3, water production figures are recorded daily, totals are incorporated into the City of Madera Water Production report and daily production figures are reported to the Water Supervisor and Public Works Director. The supervisor will compare the weekly production figure to the amount pumped during Stage #1 conditions. The targeted weekly reduction goal of 10% to 35% will be verified. Weekly Water User reports will be forwarded to the Public Works Director, the Water Shortage Response team, City Administrator and the Madera City Council.

PUBLIC AGENCY ACTIONS AND PROJECTED EXPENDITURES

1. Same as Drought Stage #2, items 1 through 8. **(COST $ 26,600)**
2. Implement the City of Madera Resolution which Declares a Water Shortage Emergency.
3. Review Water Revenues and adjust, if necessary, to cover increased P.G.E. and other costs.
4. Conduct public information campaign with regular media stories, public service announcements, paid announcements and direct mail to publicize the severity of the drought conditions. **(COST $5,000)**
5. Hire a part-time employee to coordinate the Water Conservation Program. Duties will include educating the public by presenting educational programs to schools, service clubs, large water users and other groups. **(COST $4,000)**
6. Distribute landscape conservation, drought tolerant garden and efficient irrigation information.
7. Publicize Stage 4 reduction requirements which will become necessary if conditions worsen.
8. Eliminate water use for fire hydrant flushing other than absolutely necessary for maintenance or fire flow requirements.
9. Discontinue irrigation of selected turf areas at parks and school sites which would not create hazards to users.
10. Require Ultra Low Flow (ULF) toilets, water efficient shower heads and faucet aerators prior to sale of any property.
11. Require hot water re-circulating systems or on demand water heaters in new construction.
12. Initiate a high visibility ULF toilet replacement program to encourage the general public to take similar action. i.e.: Homes of elected officials/City Staff, parks restrooms, City Hall and other facilities. **(COST $5,000)**
13. Lower the bowls, if necessary, on City Water Wells. **(COST FOR 5 WELLS $25,000)**
14. Check groundwater levels weekly.
15. **PROJECTED TOTAL COST ($65,600)**

Continued on page 13

REQUIRED CONSUMER ACTIONS

1. Stricter adherence to Water Use Regulations and outside watering is limited to two days a week.
2. Water served to restaurant customers only upon request for conservation and public awareness of drought conditions.
3. Existing commercial car washes required to install water re-circulating equipment.

PENALTIES

Same as Stage #2 except:
VIOLATION #2. $30.00 surcharge on next water bill and educational visit from City staff.
VIOLATION #3. $45.00 surcharge on next water bill; possible installation of a water meter, flow restriction device on service connection or discontinuance of service if situation is not resolved.

STAGE #4 CRITICAL EMERGENCY SHORTAGE

DROUGHT STAGE INITIATING CONDITIONS

Customer demands and system pressure requirements cannot be met.

DEFICIT REDUCTION OBJECTIVE

Decrease water use by 35% to 50%.

WATER USE MONITORING PROCEDURES

During Drought Stage #4 production figures will be reported to the supervisor twice daily and to the Public Works Director and Water Shortage Response team on a daily basis to ensure that the reduction goal of 35% to 50% is being met. Reports will also be provided to the City Administrator and City Council.

PUBLIC AGENCY ACTIONS AND PROJECTED EXPENDITURES

1. Same as Drought Stage #3. **(COST $ 65,000)**
2. Implement the City of Madera Water Quality Emergency Notification Plan. This may include boil water notices and chlorinating of the distribution system due to low pressure. **(COST $10,000)**
3. Moratorium on new water services until shortage ends.
4. Discontinue irrigation of park and school district athletic fields.
5. Rate increases to finance system improvements.
6. Require all homes and businesses to install low flow shower heads and toilet flush tank displacement devices and repair all leaks. Employ seasonal compliance officer for random inspections. **(COST $7,000)**
7. Check ground water levels weekly.
8. **PROJECTED TOTAL COST ($82,600)**

REQUIRED CONSUMER ACTIONS

1. Install low flow shower heads and toilet flush tank displacement devices.
2. Outside watering limited to one day per week.

PENALTIES

Same as Stage #3 and City Council considers increasing surcharges for violation of Water use regulations.

SECTION 10 IMPLEMENTATION OF THE PLAN

California Water Code Section 10631 (e) (8) : A draft water shortage contingency resolution or ordinance to carry out the urban water shortage contingency plan.

The Madera City Council has adopted this Water Shortage Contingency Plan by Resolution Number: 95-52.

SECTION 11 PLAN ADOPTION STANDARDS

California Water Code Section 10621 (a) : Each urban water supplier shall, not later than January 31, 1992, prepare, adopt, and submit to department an amendment to its urban water management plan which meets the requirements of subdivision (e) of Section 10631.

The City of Madera prepared this Water Shortage Contingency Plan during February, 1995. The Plan was adopted on April 5, 1995. The Plan includes all the information necessary to meet the requirements of subdivision (e) of California Water Code Section 10631.

California Water Code Section 10642 : Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to California Water Code Section 6066 of the Government Code. A privately owned water supplier shall provide and equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

A public meeting date and location of copies of the draft Water Shortage Contingency Plan for public review were properly noticed in the Madera Tribune newspaper. Copies of the draft plan were available for public review at the City Department of Public Works, City Clerk's office and the Public Library. The City held a public meeting on April 5, 1995 on the Water Shortage Contingency Plan.

ATTACHMENT "A" RELEVANT SECTIONS OF THE CALIFORNIA GOVERNMENT & CALIFORNIA WATER CODES

Sections of the California Government Code

Section 6061. Publication of notice pursuant to this section shall be for one time.

Section 6066. Publication of notice pursuant to this section shall be once a week for two successive weeks. Two public notices in a newspaper published once a week or more often with at least five days intervening between respective publication dates, not counting such publication dates, are sufficient. The period of notification commences upon the first day of publication and terminates at the end of the fourteenth day including therein the first day.

Sections of the California Water Code
Chapter 3 - Water Shortage Emergencies

Section 350. The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, may declare a water shortage emergency condition to prevail within the area served by such distributor wherever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.

Section 351. Excepting in event of a breakage or failure of a dam, pump, pipe line or conduit causing an immediate emergency, the declaration shall be made only after a public hearing at which consumers of such water supply shall have an opportunity to be heard to protest against the declaration and to present their respective needs to said governing board.

Section 352. Notice of the time and place of hearings shall be published pursuant to Section 6061 of the Government Code at least seven days prior to the date of hearing in a newspaper printed, published, and circulated within the area in which the water supply is distributed, or if there is no such newspaper, in any newspaper printed, published, and circulated in the county in which the area is located.

Section 353. When the governing body has so determined and declared the existence of an emergency condition of water shortage within its service area, it shall thereupon adopt such regulations and restrictions on the delivery of water and the consumption within said area of water supplied for public use as will in the sound discretion of such governing body conserve the water supply for the greatest public benefit with particular regard to domestic use, sanitation, and fire protection.

Section 354. After allocating and setting aside the amount of water which in the opinion of the governing body will be necessary to supply water needed for domestic use, sanitation, and fire protection, the regulations may establish priorities in the use of water for other purposes and provide for the allocation, distribution, and delivery of water for such other purposes, without discrimination between consumers using water for the same purpose or purposes.

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Sections of the California Water Code
Chapter 3 - Water Shortage Emergencies
-continued-

Section 355. The regulations and restrictions shall thereafter be and remain in full force and effect during the period of the emergency and until the supply of water available for distribution within such area has been replenished or augmented.

Section 356. The regulations and restrictions may include the right to deny such applications for new or additional service connections, and provisions for their enforcement by discontinuing service to consumers willfully violating the regulations and restrictions.

Section 357. If the regulations and restrictions on delivery and consumption of water adopted pursuant to this chapter conflicts with any law establishing the rights of individual consumers to receive either specific of proportionate amounts to the water supply available for distribution within service area, the regulations and restrictions adopted pursuant to this chapter shall prevail over the provisions of such laws relating to water rights for the duration of the period of emergency; provided, however, that any distributor of water which is subject to regulation by the State Utilities Commission shall before making such regulations and restrictions effective secure the approval thereof of the Public Utilities Commission.

Section 358. Nothing in this chapter shall be constructed to prohibit or prevent review by any court or competent jurisdiction of any finding or determination by a governing board of the existence of an emergency or of regulations or restrictions adopted by such board, pursuant to this chapter, on the ground that any such action is fraudulent, arbitrary, or capricious.

ATTACHMENT "B" "SAMPLE" RESOLUTION TO DECLARE A WATER SHORTAGE EMERGENCY

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

PURSUANT to California Water Code Section 350 et seq.*, the Council has conducted duly noticed public hearings to establish the criteria under which a water shortage emergency may be declared.*

WHEREAS*, the Council finds, determines and declares as follows:*

(a) Weather forecasts predict a continuing trend of warmer, drier than normal conditions.

(b) Ground Water depths have decreased to the level that a significant number of the City wells are breaking suction.

(c) Impending low system water pressure threatens fire protection, health, and sanitation.

(d) For the foregoing reasons, when the amount of water supply available to the City for service to customers falls below Stage #2 triggering levels established in Section #4 of the Water Shortage Contingency Plan, the City has determined that the water supply may not be adequate to meet the ordinary demands and requirements for fire protection, consumers, and sanitation and this condition is likely to exist until precipitation an inflow dramatically increase or the water wells are lowered to deeper depths.

NOW, THEREFORE, BE IT RESOLVED *that the City Council of the City of Madera hereby directs the City Administrator to find, determine, declare and conclude that a water shortage emergency exists that threatens the adequacy of water supply for human consumption, sanitation and fire protection requirements, until the City's water supply is deemed adequate. After the declaration of a water shortage emergency, the City Administrator is directed to determine the appropriate Rationing Stage and implement the City's Water Shortage Contingency Plan.*

FURTHERMORE*, the Council shall periodically conduct proceedings to determine additional restrictions and regulations which may be necessary to safeguard the adequacy of the water supply for domestic, sanitation and fire protection requirements.*

RESOLUTION NO. 10-118

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MADERA, CALIFORNIA APPROVING THE NEW WATER RATES EFFECTIVE JULY 2010.

WHEREAS, the Council considered a utility rate analysis proposal prepared for the City by an independent consultant dated April of 2010; and

WHEREAS, the Council has caused notices to be sent to all affected customers regarding the proposal to amend the rates for water use at least 45 days in advance of a noticed public hearing held on June 2, 2010; and

WHEREAS, the Council finds that no majority protest was presented against the proposed water use rates during the public hearing and finds that the proposed rates shall be made effective July 1, 2010;

NOW THEREFORE, THE COUNCIL OF THE CITY OF MADERA does hereby find, resolve, and order:

1. The above recitals are true and correct.

2. The monthly rates to be charged for water use enumerated in Attachment A to this resolution are adopted.

3. All other resolutions which may be in conflict to this resolution are repealed.

4. This resolution shall be effective immediately upon adoption.

PASSED AND ADOPTED by the City Council of the City of Madera this 2nd day of June, 2010 by the following vote:

AYES: Council Members Svanda, Poythress, Bomprezzi, Armentrout.

NOES: None.

ABSTENTIONS: None.

ABSENT: Council Member Mindt.

GARY L. SVANDA, Mayor

ATTEST:

SONIA ALVAREZ, City Clerk

CITY OF MADERA INCORPORATED March 27, 1907 CALIFORNIA

APPROVED AS TO LEGAL FORM:
CITY ATTORNEY

By: RICHARD K. DENHALTER
6/3/10

Summary of Proposed Water Rates

Rate Structure (a)	Unit	Current 09/10	Proposed Rates 10/11	11/12	12/13	13/14	14/15
			Current Rate Structure		Cost-of-Service Rate Structure (1" Meter, 18 ccf/mo.)		
Single-Family Rates							
Single Family - Typical Mo. Bill	*$/per customer*	*$23.39*	*$24.32*	*$25.30*	*$23.47*	*$24.41*	*$25.38*
Single Family (Flat Rate)	*$/per customer*	$16.73	$17.40	$18.10	$9.18	$9.54	$9.93
Irrigation Rate (for lot size > 5,000 sf) [1]	*$/per 100 sf*	$0.24	$0.25	$0.26	*NA*	*NA*	*NA*
Volume Charge	*$/ccf*	*NA*	*NA*	*NA*	$0.79	$0.83	$0.86
Metered Customers (1" Meter)							
Single Family Residential *(Average Consumption)*	*$/per customer*	$16.73	$17.40	$18.10	$23.47	$24.41	$25.38
Meter Rates							
5/8" Meter	*$/per customer*	$2.82	$2.93	$3.05	$6.57	$6.83	$7.11
3/4" Meter	*$/per customer*	$2.82	$2.93	$3.05	7.44	$7.74	$8.05
1" Meter	*$/per customer*	$2.82	$2.93	$3.05	9.18	$9.54	$9.93
1 1/2" Meter	*$/per customer*	$2.82	$2.93	$3.05	13.52	$14.06	$14.63
2" Meter	*$/per customer*	$2.82	$2.93	$3.05	18.74	$19.49	$20.27
3" Meter	*$/per customer*	$2.82	$2.93	$3.05	30.90	$32.14	$33.43
4" Meter	*$/per customer*	$2.82	$2.93	$3.05	48.29	$50.22	$52.23
6" Meter	*$/per customer*	$2.82	$2.93	$3.05	91.74	$95.41	$99.22
8" Meter	*$/per customer*	$2.82	$2.93	$3.05	143.88	$149.64	$155.62
Volume Charge	*($/per ccf)*	$0.69	$0.72	$0.75	$0.79	$0.83	$0.86

CITY OF MADERA
WATER RATE STUDY
MULTIPLE FAMILY RESIDENTIAL BILL OF COMPARISON FOR FY 2012/2013

Monthly Use (ccf)	Water Rates for 2" Meter Customers			
	Present 09/10 Rates	Proposed 12/13 Rates	Difference	
			Amount	Percent
0	$53.40	$13.52	($39.88)	-74.7%
5	53.40	17.49	(35.91)	-67.2%
10	53.40	21.46	(31.94)	-59.8%
15	53.40	25.43	(27.97)	-52.4%
20	53.40	29.40	(24.00)	-44.9%
25	53.40	33.37	(20.03)	-37.5%
30	53.40	37.34	(16.06)	-30.1%
35	53.40	41.31	(12.09)	-22.6%
40	53.40	45.28	(8.12)	-15.2%
45	53.40	49.25	(4.15)	-7.8%
50	53.40	53.22	(0.18)	-0.3%
55	53.40	57.19	3.79	7.1%
60	53.40	61.16	7.76	14.5%
65	53.40	65.13	11.73	22.0%
70	53.40	69.10	15.70	29.4%
75	53.40	73.07	19.67	36.8%
80	53.40	77.04	23.64	44.3%
85	53.40	81.01	27.61	51.7%
90	53.40	84.98	31.58	59.1%
95	53.40	88.95	35.55	66.6%
100	53.40	92.92	39.52	74.0%
105	53.40	96.89	43.49	81.4%
110	53.40	100.86	47.46	88.9%
115	53.40	104.83	51.43	96.3%
120	53.40	108.80	55.40	103.8%

Monthly Ave.

PRESENT (2009/2010) RATES

Single Parcel Monthly Charge (per DU)	$10.68

PROPOSED (2012/2013) RATES

1" Meter Charge (per customer)	$13.52
Volume Charge (per ccf)	0.79

RESOLUTION NO. 10-119

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF MADERA, CALIFORNIA APPROVING THE NEW SEWER RATES EFFECTIVE JULY 2010.

WHEREAS, the Council considered a utility rate analysis proposal prepared for the City by an independent consultant dated April of 2010; and

WHEREAS, the Council has caused notices to be sent to all affected customers regarding the proposal to amend the rates for sewer use at least 45 days in advance of a noticed public hearing held on June 2, 2010; and

WHEREAS, the Council finds that no majority protest was presented against the proposed sewer use rates during the public hearing and finds that the proposed rates shall be made effective July 1, 2010;

NOW THEREFORE, THE COUNCIL OF THE CITY OF MADERA does hereby find, resolve, and order:

1. The above recitals are true and correct.

2. The monthly rates to be charged for sewer use enumerated in Attachment A to this resolution are adopted.

3. All other resolutions which may be in conflict to this resolution are repealed.

4. This resolution shall be effective immediately upon adoption.

5. The political subdivisions of Parksdale and Parkswood will only be subject to the four percent increase in the sewer rate.

PASSED AND ADOPTED by the City Council of the City of Madera this 2nd day of June, 2010 by the following vote:

AYES: Council Members Svanda, Poythress, Bomprezzi, Armentrout.

NOES: None.

ABSTENTIONS: None.

ABSENT: Council Member Mindt.

GARY L. SVANDA, Mayor

ATTEST:

SONIA ALVAREZ, City Clerk

CITY OF MADERA INCORPORATED March 27, 1907 CALIFORNIA

APPROVED AS TO LEGAL FORM:
CITY ATTORNEY

By: RICHARD K. DENHALTER

6/3/10

Summary of Proposed Residential Sewer Rates

Rate Structure		Current	Proposed Rates				
		09/10	10/11	11/12	12/13	13/14	14/15
			Current Rate		Cost-of-Service Rate Structure		
Non-Metered Flat Rates (per customer)							
Single Family Residential	*$/acct.*	$19.88	$20.68	$21.50	$24.51	$25.49	$26.51
Multiple Family Residential							
Flat Rate (per account)	*$/acct.*	*NA*	*NA*	*NA*	$1.03	$1.07	$1.11
Flat Rate (per dwelling unit)	*$/DU*	17.83	$18.54	$19.28	14.96	$15.56	$16.19
Typical Flat Rate per unit (in a Fourplex)	*$/DU* [1]	17.83	18.54	19.28	15.22	$15.83	$16.46
Commercial (Metered) Rates [2]							
Flat Rate *(per account)*		*NA*	*NA*	*NA*	$1.03	$1.07	$1.11
Commercial Rate (per hcf of water use)							
Low-Strength (Group 2)	*$/hcf*	$1.50	$1.56	$1.62	$1.04	$1.08	$1.12
Medium-Strength (Group 3)	*$/hcf*	1.50	1.56	1.62	1.53	1.59	1.65
High-Strength (Group 4)	*$/hcf*	1.50	1.56	1.62	2.71	2.82	2.93
Minimum Commercial Charge	*$/acct.*	1.50	1.56	1.62	24.51	25.49	26.51

[1] *Based on four (4) MFR unit per account; the flat rate per account is divided equally among all units in the apartment complex.*

[2] *Current Flat rates should be decreased by* -3.6%