# Attachment 1.1 – Supporting Documents

# Authorization and Eligibility Requirements

# Madera Region – IRWM Implementation Grant Application

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# Attachment 1.1, Commentary

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## Attachment 1.1 – Authorization and Eligibility Requirements

### Eligible Applicant Documentation

Root Creek Water District (RCWD) has been approved as the applicant for the Madera Regional Water Management Group (Madera RWMG). The project proponents will sign a Memorandum of Understanding (MOU) detailing RCWD's ability to submit on behalf of the Madera RWMG. This MOU allows RCWD to apply and submit for an Integrated Regional Water Management Plan Implementation Grant application with the California Department of Water Resources. Due to the timing of the project proponent agency Board Meetings a signed Memorandum of Understanding (MOU) between the project proponents (Madera County, Madera Irrigation District and the US Forest Service) and the Applicant (Root Creek Water District) will not be available by the IRWMP Application deadline. Based on instruction from DWR staff, the signed MOU will be available by the end of January 2011. See Attachment 1.1, pages 13 & 19 for the draft MOUs.

RCWD is a recognized agency as defined by the IRWMP. RCWD was formed pursuant to and is authorized to operate under the California Water Code section 34000 *et seq*. Therefore, as California Water Districts are considered local agencies, the RCWD is a local agency. RCWD was formed under the Local Agency Formation Commission of Madera, CA on June 17, 1996 (See Attachment 1.1, page 27).

Based on the opinion letter Baker, Manock & Jensen (legal counsel for RCWD), dated May 27, 2003, RCWD has the authority to enter into an agreement with the California Department of Water Resources (See Attachment 1.1, page 37).

### Groundwater Management Plan Compliance

The project proponents included in this Application have individual Groundwater Management Plans. The participants have stated they will comply with their respective plans. The Department of Forestry's project is not located in a groundwater basin. Further explanations are given below.

*B. Ash Slough Arundo Eradication and Sediment Removal*

Madera County has a Groundwater Management Plan in place. It was developed by Todd Engineers, dated January 2002. This plan was adopted by the County in March 2002 (See Attachment 1.1, page 43).

*C. Cottonwood Creek, Dry Creek, and Berenda Creek Arundo Eradication and Sediment Removal*

MID has an adopted AB3030 Groundwater Management Plan developed by Boyle Engineering Corporation dated May 1999. It was amended in November 2000 (See Attachment 1.1, page 177).

*D: Root Creek In Lieu Groundwater Recharge Project*

RCWD has a Groundwater Management Plan in place. It was developed by Provost and Pritchard Engineering Group, dated October 13, 1997 (See Attachment 1.1, page 291) and is compliant with California State Assembly Bill 3030.

*E: Sierra National Forest Fuel Reduction*

The Forest Service is proposing to implement a project that will have a positive impact on groundwater. The Forest Service is not subject to the requirement to prepare and implement a groundwater management plan since its area of jurisdiction is not part of any groundwater basin. If the proposed project is funded the Forest Service will consent to being subject to the region's IRWMP.

**List of projects and consistency with adopted IRWM Plan**

Note that the Madera Region IRWMP was created and adopted prior to the Prop 84 guidelines being put into place. The Plan meets the Prop 50 guidelines under which it was created; however it does not include specific project recommendations as required by the current guidelines. Instead each chapter discusses issues, problems, and potential solutions. The key recommendations in the plan are set forth in Chapter 9, however these are not exhaustive; the individual chapters contain additional recommendations and problems to be addressed. The proposed projects were selected by the RWMG for submission to this grant program because they meet the goals and address the issues set forth in the IRWMP as follows:

*B. Ash Slough Arundo Eradication and Sediment Removal*

This project involves the eradication of Arundo *donax* in Ash Slough, as well as channel restoration through removal of sediment to restore flood flows. This is consistent with the following recommendation of the Madera Region IRWMP:

> 9.2.2.5 Flood Control - The County was put on notice by the Central Valley Flood Protection Board (formerly the Reclamation Board) that deficiencies exist on the

Chowchilla River and Ash and Berenda Sloughs. The County was recently notified by the Board that the County's submitted corrective action plan was acceptable. In addition, the County has requested an extension of time to complete the corrective actions but have not received an answer to the request. If corrections are not made and a reinspection scheduled by the deadline, the project will be considered inactive and will not be eligible for PL84-99 rehabilitation assistance.

- The County should proceed immediately with all corrective actions as outlined in the action plan, including plans for *Arundo donax* mapping and eradication plans, channel restoration, and levee restoration and maintenance."

(Madera Region IRWMP, April 2008, Section 9.2.2.5, page 9-16 – 9-17)

*C. Cottonwood Creek, Dry Creek, and Berenda Creek Arundo Eradication and Sediment Removal*

This project involves the eradication of Arundo donax in Cottonwood Creek Dry Creek and Berenda Creek as well as channel restoration through removal of sediment to restore flood flows. This is consistent with the following section of the Madera Region IRWMP:

The following are the potential flood control programs and projects discussed and deemed potentially viable by the IRWMP consulting team and the Levee Task Force:

- *Arundo donax* mapping and eradication
- Channel restoration
- Levee restoration and maintenance

(Madera Region IRWMP, April 2008, Section 7.3, page 7-11)

*D: Root Creek In Lieu Water Recharge*

The proposed project will be in full compliance with the IRWM Plan. The water supply will be beneficially used for irrigation, and the project will not contribute to groundwater quality degradation. Instead, the project will improve groundwater quality by importing high quality surface water that will result in some groundwater quality improvement. Additionally, the imported water quantities are in excess of the current demand and would therefore aid in the southeastern Madera overdraft issue through "in-lieu" groundwater recharge and actual groundwater recharge through irrigation. The following

is a list IRWMP sections that mention the project or include goals and objectives that are compatible with the project:

- The Executive Summary (page ES-1) states that "*The main objectives of the IRWMP are water resources management optimization, evaluating and increasing water supplies, water quality protection and improvement, and flood control planning*". All of these goals will be met with the proposed project.

- The Executive Summary (page ES-15) states that "*The major water supply issue in the Valley Floor is the continuing overdraft of the groundwater basins*." The project will directly address this issue through importation of surface water that will supplant a minimum of 6,100 AF/year of groundwater pumping.

- Pages 1-1 to 1-4 list several goals for the Valley Floor that are consistent with the project. These goals cover the topics of groundwater overdraft, conjunctive use, groundwater quality improvement, and acquiring new water supplies.

- The 2003 feasibility study for this proposed project is listed in Table 1-1 as a reference used in preparing the IRWMP.

- Section 3.1.1.6 discusses the proposed project including the construction of a turnout on Lateral 6.2 and acquisition of a Section 215 water contract.

- The project is listed in Table 8-1: Potential Water Supply Augmentation and Overdraft Reduction Projects on the Valley Floor (Project No. 7 – Root Creek Water District Surface Water Project).

The RCWD In-Lieu Groundwater Recharge Project is not specifically mentioned in *Chapter 9 – Conclusions and Recommendations* of the IRWMP; however the project is consistent with the theme of several other recommendations in Chapter 9. In addition, the IRWMP recommends that Madera County purchase Section 215 water and develop agreements with MID, Chowchilla Water District and USBR facilities to convey the water (page 9-13). The proposed project is identical except RCWD would import and use the water, instead of Madera County.

*E: Sierra National Forest Fuel Reduction*

The Madera IRWMP discusses several vegetation management and fuel reduction projects and their potential affects to water yield and forest health (pp. 8-28, 8-29). The proposed project will increase forest health and vigor, leading to long term water quality

and quantity benefits. Healthy fire-resistant watersheds are resilient to disturbances such as fire and drought and will continue to provide high quality water through the natural filtering and slow release of water through subsurface flow. Ensuring the protection of these watersheds will also prevent water quality and supply problems associated with post-burn runoff, including water treatment and repair and maintenance to reservoirs and dams. Projects with similar benefits discussed in the Madera Region IRWMP include the Fuel Break Program, Willow Creek Watershed Restoration Project, Crooks Mountain Fuel Break, 601 Community Fuel Break, BLM Neighborhood Fuel Reduction and Chipping, and the Sugar Pine Adaptive Management Project.

In November 2010, the Madera RWMG approved amendments to the Madera Region IRWMP. The proposed Forest Service project is particularly consistent with the following two additions:

> High severity wildfire can increase the probability and magnitude of flooding, and potentially result in debris flows. Wildfire can leave areas of a watershed completely devoid of vegetation and ground cover. High temperatures can cause physical and chemical changes to forest soils that reduce infiltration and make them more susceptible to erosion. The combined affect results in rapid concentration of runoff (flash flooding) that carries elevated amounts of sediment and debris, potentially plugging culverts, damaging bridges, and filling reservoirs.
>
> Degraded mountain meadow and riparian areas also contribute to elevated flooding. Mountain meadows and floodplains provide natural storage of stormwater and aquifer recharge. Properly functioning meadows store runoff and maintain dry season flows by the slow release of water. Loss of this storage through channel incision reduces the time of concentration for flood flows, increasing both flood volume and height.
>
> (Madera Region IRWMP, November 2010, Section 7.2.2.2 additive)
>
> Pursue opportunities with the USFS for vegetation management projects designed for ecological restoration, wildfire protection, and forest resiliency. Future projects would include fuel treatments, thinning, and noxious weed eradication.
>
> (Madera Region IRWMP, November 2010, Section 9.2.16 additive)

These amendments were made in accordance with the RWMG's approved protocol for amending the IRWMP. See Attachment 1.1, page 323, Approved minutes of RWMG from November 8, 2010.

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# Attachment 1.1, Memorandum of Understanding to Apply for IRWMP Grant - Draft

Between RCWD, MID and Madera County
Between RCWD and National Forest Service

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# Memorandum of Understanding for Grant Administration Between Participants in the Madera Region Integrated Regional Water Management Group

1. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to recognize a mutual understanding among Madera County, Madera Irrigation District, and Root Creek Water District (collectively, the "Project Proponents") regarding the submission and administration of the January 7, 2011 Madera Regional Water Management Group implementation grant application to enhance water resources in the greater Madera County area.

2. RECITALS

2.1 The State of California desires to foster Integrated Regional Water Management (IRWM) planning and encourages local public, non-profit, and private entities to define planning regions appropriate for managing water resources and to integrate strategies within these planning regions.

2.2 In 2009 water management groups in the Madera Region developed a Memorandum of Understand to implement a governance structure for the IRWMP for the Region that meets the requirements set forth in the Integrated Regional Water Management Planning Act of 2002, codified at Water Code sections 10530 et seq., the Water Security, Clean Drinking Water, Coastal and Beach Protection Fund of 2002, codified at Water Code sections 79500 et seq. (Proposition 50), and the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006, codified at Public Resources Code section 75001 et seq. (Proposition 84). The resulting entity is the Madera Regional Water Management Group (the "RWMG")

2.3 A key goal of the RWMG is to facilitate regional water management efforts that provide multiple benefits and include one or more of the following elements: water supply (including without limitation, banking, efficiency, conservation, and reliability), water quality, flood control, and environmental protection and enhancement objectives. The RWMG also seeks to realize regional water management objectives at the least cost possible through mutual cooperation, elimination of redundancy and to enhance regional competitiveness for State and Federal grant funding.

2.4 To implement the RWMG's goals, the RWMG solicited proposals for water management projects that, if funded, will enhance flood control, water supply and groundwater recharge within the Region and enhance the environment. The RWMG reviewed the Project Proposals for consistency

with the IRWMP. The RWMG also held a public hearing to allow Stakeholder comments on any Project Proposals.

2.5 The RWMG then evaluated all proposals timely received and determined, pending final approval of the completed grant application, that five proposals submitted by Project Proponents who are parties to this MOU will be included in the RWMG grant application to the California Department of Water Resources ("DWR") in January 2011. Subsequently, the proponent of one project determined that project planning was not sufficiently advanced for the projected to be included in this grant application.

2.6 The Project Proponents desire to enter into this MOU to allocate administrative responsibility and allocate costs among them.

3. MUTUAL UNDERSTANDING

3.1 Governance. The RWMG as a whole will be responsible for all aspects of governance that are not specifically delegated to the Grant Applicant. The RWMG will determine the final form of the grant application, including whether any project that has been tentatively approved will be deferred to the next grant cycle. If the grant request is not fully funded and the award does not determine the allocation of the granted funds, the RWMG will also determine how the funding reductions are allocated.

3.2 Grant Applicant and Administrator. The DWR regulations require that there be a single grant application from each RWMG made by a single grant applicant and administrator. The Project Proponents agree that RCWD shall serve as the grant applicant and grant administrator. As the grant applicant, RCWD shall be responsible for timely submission of the grant application and for timely replying to any requests from DWR for additional information. RCWD shall also be responsible for organizing the in person presentation of the grant application to DWR if that opportunity is available. As the grant administrator, RCWD shall collect all required financial and project progress information from the Project Proponents and prepare and submit all appropriate reports to DWR or other parties.

3.3 Lead Agency. Each Project Proponent shall be responsible for all environmental review of its proposed project. The Project Proponent shall either act as Lead Agency for CEQA review or appoint another Lead Agency that is qualified to complete the required California Environmental review.

3.4 Disclosure of Information. All Project Proponents acknowledge that the grant administrator will utilize its District Engineer, the firm of Provost & Pritchard Consulting Group, Inc. to provide monitoring and reporting services to comply with all grant terms and conditions. Each Project Proponent agrees and consents to disclosure of all information concerning each project to Provost & Pritchard.

3.5 Project Implementation. Each Project Proponent will be responsible for completing its Project, complying with all applicable laws related thereto, conducting any necessary environmental review thereon, hiring any appropriate consultants to assist in administering the Project, obtaining the matching funds identified for the Project, and providing Project reports to the grant administrator. Each Project Proponent shall track its own project and comply with all reasonable requests of the grant administrator for any information or data reasonably required or helpful to comply with the grant terms. The grant administrator is not responsible for data production or collection for any project implemented by another Project Proponent. All Project Proponents will reasonably cooperate with each other to support all Projects included in the grant application.

3.6 Monitoring. The RWMG will be responsible for monitoring the administration of the grant by the grant administrator and the performance by the Project Proponents in implementing the projects and in reporting to and complying with all reasonable requests of the grant administrator.

3.7 Costs. Each Project Proponent shall be responsible for all costs of implementing its Project and providing all necessary reports and other information to the grant administrator to comply with the terms of the grant. All costs of grant administration not funded by grant funds, shall be shared by the Project Proponents in proportion to the percentage of the total grant awarded to each.

3.8 Amendment of Memorandum of Understanding. This MOU may be amended only by a subsequent written agreement approved and executed by all of the Project Proponents.

3.9 Counterparts. This MOU may be signed in any number of counterparts by the parties, each of which will be deemed to be an original, and all of which together will be deemed to be one and the same instrument.

3.10 Good Faith. Each Project Proponent shall use its best efforts to, in good faith, work towards completion of the objectives of this MOU and the satisfactory performance of its terms. The Project Proponents will

reasonably cooperate with each other to carry out the purpose and intent of this MOU.

3.11 Dispute Resolution. The Project Proponents shall make reasonable efforts to resolve any disputes that may arise from this MOU in a prompt and timely manner utilizing the dispute resolution process set forth in this section. Any Project Proponent claiming a dispute shall give notice of the dispute to the RWMG. The Notice shall include a brief description of the matter in dispute and the relief sought. The RWMG shall promtly notify all Project Proponents of the dispute and schedule an RWMG meeting to resolve the dispute. If the dispute is not resolved by the RWMG the Parties agree to submit to non-binding mediation. The parties to the dispute shall select a neutral mediator by majority vote. If the Parties cannot come to agreement the RWMG will select a neutral mediator. Costs of the mediator shall be borne by the parties in equal shares, with the parties bearing their own costs of participation. If the mediation does not resolve the dispute then the parties to the dispute may pursue any available legal remedy. This dispute resolution process is binding on the Project Proponents only for disputes arising under this MOU. It does not apply to any other disputes between Project Proponents or with other parties.

3.12 Mutual Indemnification. This MOU shall not be construed to shift liability from any given Project Proponent to another for any actions taken in furtherance of this MOU. Each Project Proponent will remain wholly responsible for any actions it takes pursuant to this MOU. Each Project Proponent agrees, to the fullest extent permitted by law, to indemnify, defend, and hold all other Project Proponents and any directors, officers, agents, employees, and insurers thereof from and against any and all claims, judgments, damages, penalties, costs, liabilities, and losses arising out of or related in any way to each Project Proponent's respective activities in furtherance of this MOU.

3.13 Effective Date; Term. This MOU shall be effective upon the date of the last signature by a Project Proponent.

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4. SIGNATORIES TO THE MEMORANDUM OF UNDERSTANDING

NOW THEREFORE, the duly authorized undersigned representatives of each Project Proponent have executed this Memorandum of Understanding as of the date indicated with each signature.

_____
Phil Pierre, President
Root Creek Water District

_____
Date

_____
Carl Janzen, Vice President
Madera Irrigation District

_____
Date

_____
Frank Bigelow, Chairman
Madera Board of Supervisors

_____
Date

**********

Approved as to Form:

_____
Douglas Nelson, Madera County Counsel

_____
Date

Attest:

_____
Tanna G. Boyd, Clerk, Board of Supervisors

_____
Date

Approved as to Form:
Risk Management

_____
_____
_____
Date

DMS: RWMG-Grant Admin MOU 1.3.11

FS Agreement No. ____ - ____ - ____
Cooperator Agreement No. _____

**MEMORANDUM OF UNDERSTANDING**
**Between The**
**ROOT CREEK WATER DISTRICT**
**And The**
**USDA, FOREST SERVICE**
**REGION 5, SIERRA NATIONAL FOREST**

This MEMORANDUM OF UNDERSTANDING (MOU) is hereby made and entered into by and between the Root Creek Water District, hereinafter referred to as "The District," and the USDA, Forest Service, Region 5, Sierra National Forest, hereinafter referred to as the "U.S. Forest Service."

Background:
The State of California desires to foster Integrated Regional Water Management (IRWM) planning and encourages local public, non-profit, and private entities to define planning regions appropriate for managing water resources and to integrate strategies within these planning regions.

In 2009 water management groups in the Madera Region developed a Memorandum of Understanding to implement a governance structure for the Integrated Regional Water Management Plan (IRWMP) for the Region that meets the requirements set forth in the Integrated Regional Water Management Planning Act of 2002, codified at Water Code sections 10530 et seq., the Water Security, Clean Drinking Water, Coastal and Beach Protection Fund of 2002, codified at Water Code sections 79500 et seq. (Proposition 50), and the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006, codified at Public Resources Code section 75001 et seq. (Proposition 84). The resulting entity is the Madera Region Regional Water Management Group (the "RWMG")

A key goal of the RWMG is to facilitate regional water management efforts that provide multiple benefits and include one or more of the following elements: water supply (including without limitation, banking, efficiency, conservation, and reliability), water quality, flood control, and environmental protection and enhancement objectives. The RWMG also seeks to realize regional water management objectives at the least cost possible through mutual cooperation, elimination of redundancy and to enhance regional competitiveness for State and Federal grant funding.

To implement the RWMG's goals, the RWMG solicited proposals for water management projects that, if funded, will enhance flood control, water supply and groundwater recharge within the Region and enhance the environment. The RWMG reviewed the project proposals for consistency with the IRWMP. The RWMG also held a public hearing to allow Stakeholder comments on any project proposals. The RWMG then evaluated all proposals timely received and determined, pending final approval of the

completed grant application, that five proposals be included in the RWMG grant application to the California Department of Water Resources ("DWR") in January 2011. Subsequently, the proponent of one project determined that project planning was not sufficiently advanced for the projected to be included in this grant application.

DWR regulations require that there be a single grant application from each RWMG made by a single grant applicant and grant administrator. The District was selected by the RWMG to be the grant applicant and administrator and, with a separate MOU, the other project proponents (Madera County and Madera Irrigation District) finalized this selection.

Title: Madera IRWMG Implementation Grant Applicant and Administrator for the US Forest Service

**I. PURPOSE:** The purpose of this MOU is to document the cooperation between the parties for purposes of grant application and administration in accordance with the following provisions.

## II. STATEMENT OF MUTUAL BENEFIT AND INTERESTS:

It is in the interest of the US Forest Service and The District to work collaboratively with each other and the Madera IRWMG for the benefit of managing water resources, and to submit projects for consideration in grant funding.

In consideration of the above premises, the parties agree as follows:

## III. THE DISTRICT SHALL:

A. Serve as the grant applicant and grant administrator. As the grant applicant, The District shall be responsible for timely submission of the grant application and for timely replying to any requests from DWR for additional information. The District shall also be responsible for organizing the in person presentation of the grant application to DWR if that opportunity is available.

B. As the grant administrator, The District shall collect all required financial and project progress information from the US Forest Service and prepare and submit all appropriate reports to DWR or other parties.

C. Notify the US Forest Service, in a timely manner, of any requests from the DWR or other entities for information or data pertaining to the US Forest Service projects.

D. Utilize its District Engineer, the firm of Provost & Pritchard Consulting Group, Inc. to provide monitoring and reporting services to comply with all grant terms and conditions.

E. Recognize that the RWMG as a whole will be responsible for all aspects of governance that are not specifically delegated to the Grant Applicant. The RWMG will determine the final form of the grant application, including whether any project that has been tentatively approved will be deferred to the next grant cycle. If the grant request is not fully funded and the award does not determine the allocation of the granted funds, the RWMG will also determine how the funding reductions are allocated.

F. Understand that the RWMG will be responsible for monitoring the administration of the grant by the grant administrator and the performance by the US Forest Service in implementing the projects and in reporting to and complying with all reasonable requests of the grant administrator.

## IV. THE U.S. FOREST SERVICE SHALL:

A. Provide in a timely manner all necessary application materials and information to The District needed for the The District to submit the grant.

B. Upon grant award, provide in a timely manner all necessary financial and project progress information pertaining to the US Forest Service project to The District for its administrative responsibilities to DWR.

C. Be responsible for completing the US Forest Service projects, complying with all applicable laws related thereto, conducting any necessary environmental review thereon, hiring any appropriate contractors to implement the projects, and provide any necessary reports to The District.

D. Track its project and comply with all reasonable requests from The District, or its consultants, for information or data needed to comply with the grant terms.

E. Recognize that the RWMG as a whole will be responsible for all aspects of governance that are not specifically delegated to the Grant Applicant. The RWMG will determine the final form of the grant application, including whether any project that has been tentatively approved will be deferred to the next grant cycle. If the grant request is not fully funded and the award does not determine the allocation of the granted funds, the RWMG will also determine how the funding reductions are allocated.

F. Disclosure of all information concerning its project to the District's engineer, the firm of Provost & Pritchard Consulting Group, Inc.

G. Understand that the RWMG will be responsible for monitoring the administration of the grant by the grant administrator and the performance by the US Forest Service in implementing the projects and in reporting to and complying with all reasonable requests of the grant administrator.

## V. IT IS MUTUALLY UNDERSTOOD AND AGREED BY AND BETWEEN THE PARTIES THAT:

A. PRINCIPAL CONTACTS. Individuals listed below are authorized to act in their respective areas for matters related to this instrument.

**Principal Cooperator Contacts:**

| Cooperator Program Contact | Cooperator Administrative Contact |
|---|---|
| Name: Philip R. Pierre<br>Address: 1396 West Herndon Ave, Ste. 108<br>City, State, Zip: Fresno, CA 93711<br>Telephone: (559) 435-5554<br>FAX: (559) 435-5552<br>Email: philpierre1@earthlink.net | Name: Christopher L. Campbell<br>Address: 5260 North Palm, Ste. 421<br>City, State, Zip: Fresno, CA 93704<br>Telephone: (559) 432-5400<br>FAX: (559) 432-5620<br>Email: ccampbell@bakermanock.com |

**Principal U.S. Forest Service Contacts:**

| U.S. Forest Service Program Manager Contact | U.S. Forest Service Administrative Contact |
|---|---|
| Name: Frank A. Aebly<br>Address: 1600 Tollhouse Rd<br>City, State, Zip: Clovis, CA 93611<br>Telephone: 559-297-0706 ext 4934<br>FAX: 559-294-4809<br>Email: faebly@fs.fed.us | Name: Same<br>Address:<br>City, State,<br>Telephone:<br>FAX:<br>Email: |

B. NON-LIABILITY. The U.S. Forest Service does not assume liability for any third party claims for damages arising out of this instrument.

C. NOTICES. Any communications affecting the operations covered by this agreement given by the U.S. Forest Service or the Root Creek Water District is sufficient only if in writing and delivered in person, mailed, or transmitted electronically by e-mail or fax, as follows:

To the U.S. Forest Service Program Manager, at the address specified in the MOU.

To Phil Pierre, at the Root Creek Water District's address shown in the MOU or such other address designated within the MOU.

Notices are effective when delivered in accordance with this provision, or on the effective date of the notice, whichever is later.

D. PARTICIPATION IN SIMILAR ACTIVITIES. This MOU in no way restricts the U.S. Forest Service or the Root Creek Water District from participating in similar activities with other public or private agencies, organizations, and individuals.

E. ENDORSEMENT. Any of the Root Creek Water District's contributions made under this MOU do not by direct reference or implication convey U.S. Forest Service endorsement of the Root Creek Water District's products or activities.

F. NONBINDING AGREEMENT. This MOU creates no right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity. The parties shall manage their respective resources and activities in a separate, coordinated and mutually beneficial manner to meet the purpose(s) of this MOU. Nothing in this MOU authorizes any of the parties to obligate or transfer anything of value.

Specific, prospective projects or activities that involve the transfer of funds, services, property, and/or anything of value to a party requires the execution of separate instruments and are contingent upon numerous factors, including, as applicable, but not limited to: agency availability of appropriated funds and other resources; cooperator availability of funds and other resources; agency and cooperator administrative and legal requirements (including agency authorization by statute); etc. This MOU neither provides, nor meets these criteria. If the parties elect to enter into an obligation instrument that involves the transfer of funds, services, property, and/or anything of value to a party, then the applicable criteria must be met. Additionally, under a prospective instrument, each party operates under its own laws, regulations, and/or policies, and any Forest Service obligation is subject to the availability of appropriated funds and other resources. The negotiation, execution, and administration of these prospective instruments must comply with all applicable law

Nothing in this MOU is intended to alter, limit, or expand the agencies' statutory and regulatory authority.

G. USE OF U.S. FOREST SERVICE INSIGNIA. In order for the Root Creek Water District to use the U.S. Forest Service insignia on any published media, such as a Web page, printed publication, or audiovisual production, permission must be granted from the U.S. Forest Service's Office of Communications. A written request must be submitted and approval granted in writing by the Office of Communications (Washington Office) prior to use of the insignia.

H. MEMBERS OF U.S. CONGRESS. Pursuant to 41 U.S.C. 22, no U.S. member of, or U.S. delegate to, Congress shall be admitted to any share or part of this instrument, or benefits that may arise therefrom, either directly or indirectly.

I. FREEDOM OF INFORMATION ACT (FOIA). Public access to MOU or agreement records must not be limited, except when such records must be kept confidential and would have been exempted from disclosure pursuant to Freedom of Information regulations (5 U.S.C. 552).

J. U.S. FOREST SERVICE ACKNOWLEDGED IN PUBLICATIONS, AUDIOVISUALS AND ELECTRONIC MEDIA. The Root Creek Water District shall acknowledge U.S. Forest Service support in any publications, audiovisuals, and electronic media developed as a result of this MOU.

K. NONDISCRIMINATION STATEMENT – PRINTED, ELECTRONIC, OR AUDIOVISUAL MATERIAL. The Root Creek Water District shall include the following statement, in full, in any printed, audiovisual material, or electronic media for public distribution developed or printed with any Federal funding.

> ***In accordance with Federal law and U.S. Department of Agriculture policy, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, or disability. (Not all prohibited bases apply to all programs.)***
>
> **To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410 or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.**

If the material is too small to permit the full statement to be included, the material must, at minimum, include the following statement, in print size no smaller than the text:

> ***"This institution is an equal opportunity provider."***

L. TERMINATION. Any of the parties, in writing, may terminate this MOU in whole, or in part, at any time before the date of expiration.

M. DEBARMENT AND SUSPENSION. The Root Creek Water District shall immediately inform the U.S. Forest Service if they or any of their principals are presently excluded, debarred, or suspended from entering into covered transactions with the federal government according to the terms of 2 CFR Part 180. Additionally, should the Root Creek Water District or any of their principals receive a transmittal letter or other official Federal notice of debarment or suspension, then they shall notify the U.S. Forest Service without undue delay. This applies whether the exclusion, debarment, or suspension is voluntary or involuntary.

N. MODIFICATIONS. Modifications within the scope of this MOU must be made by mutual consent of the parties, by the issuance of a written modification signed and dated by all properly authorized, signatory officials, prior to any changes being performed. Requests for modification should be made, in writing, at least 30 days prior to implementation of the requested change.

O. COMMENCEMENT/EXPIRATION DATE. This MOU is executed as of the date of the last signature and is effective through **December 31, 2014**, at which time it will expire, unless extended by an executed modification, signed and dated by all properly authorized, signatory officials.

P. AUTHORIZED REPRESENTATIVES. By signature below, each party certifies that the individuals listed in this document as representatives of the individual parties are authorized to act in their respective areas for matters related to this MOU. In witness whereof, the parties hereto have executed this MOU as of the last date written below.

PHILLIP R. PIERRE, President — Date
Root Creek Water District

SCOTT G. ARMENTROUT, Forest Supervisor — Date
U.S. Forest Service, Sierra National Forest

The authority and format of this instrument have been reviewed and approved for signature.

RAMONA L. ROBERTSON — Date
U.S. Forest Service Grants & Agreements Specialist

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# Attachment 1.1, RCWD Formation Documents

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RECORDING REQUESTED BY
AND MAILED TO:
STELL MANFREDI
NAME: LAFCO
COUNTY GOVERNMENT CENTER
STREET: COUNTY OF MADERA
CITY: MADERA CA

9616855

96 JUN 21 PM 3:18

FEE: No FEE

LOCAL AGENCY FORMATION COMMISSION
CERTIFICATE OF COMPLETION

(TITLE OF DOCUMENT)

This page added to provide adequate space for recording information
(Additional recording fee applies)

COUNTY OF MADERA 9616855

LOCAL AGENCY FORMATION COMMISSION

CERTIFICATE OF COMPLETION

Pursuant to Government Code Section 57200, this Certificate is issued by the Executive Officer of the Local Agency Formation Commission of MADERA, California.

1. The short-form designation, as determined by LAFCO, is Root Creek Water District

2. The name of each district or city involved in this change or organization or reorganization and the kind or type of change or organization ordered for each city or district are as follows:

| City or District | Type of Change of Organization |
|---|---|
| Root Creek Water District | Formation |
| | |
| | |

3. The above listed cities and/or districts are located within the following county(ies): MADERA

4. A description of the boundaries of the above cited change of organization or reorganization is shown on the attached map and legal description, marked Exhibit A and by reference incorporated herein.

5. The territory involved in this change of organization or reorganization is inhabited (inhabited/uninhabited).

6. This change of organization or reorganization has been approved subject to the following terms and conditions, if any: Refer to the attached resolution.

7. The resolution ordering this change or organization or reorganization without election, or confirming an order for this change after confirmation by the voters, was adopted on March 19, 1996 by Madera County Board of Supervisors.

I hereby certify that I have examined the above cited resolution, including any terms and conditions on the map and legal description and have found these documents to be in compliance with LAFCO Resolution No. 96-1, adopted on January 16, 1996.

DATED: June 17, 1996

Stell Manfredi
Executive Officer
County of Madera
Local Agency Formation Commission

BEFORE
THE BOARD OF SUPERVISORS
OF THE COUNTY OF MADERA
STATE OF CALIFORNIA

| | |
|---|---|
| In the Matter of | Resolution No. 96 - 70 |
| APPLICATION FOR THE FORMATION OF THE ROOT CREEK WATER DISTRICT | A RESOLUTION MAKING DETERMINATIONS AND APPROVING THE APPLICATION FOR THE FORMATION OF THE ROOT CREEK WATER DISTRICT |

WHEREAS, a proposal for the formation of the Root Creek Water District was filed with the Executive Officer of the Madera County Local Agency Formation Commission ("LAFCo"), pursuant to Title 5, Division 3, commencing with Section 56000, of the California Government Code; and

WHEREAS, proceedings with regard to said Proposal were conducted by LAFCo in accordance with the Cortese/Knox Local Government Reorganization Act of 1985, as amended, Government Code Sections 56000 et seq.; and

WHEREAS, LAFCo called for and held a public hearing on the Proposal on January 16, 1996; and

WHEREAS, LAFCo approved the proposal for the formation of the Root Creek Water District, subject to certain conditions; and

WHEREAS, this Board, as the conducting authority, called for and held a public hearing on the Proposal on March 19, 1996, and at the hearing this Board heard and received all oral and written protests, objections and evidence which were made, presented or filed, and all persons present were given an opportunity to hear and be heard with respect to this proposal and the report of LAFCo; and

WHEREAS, LAFCo adopted the Executive Officer's recommendation that a Negative Declaration of environmental impact be approved and adopted and found to be in compliance with the California Environmental Quality Act and its implementing regulations and is adequate concerning this District formation.

UNTY COUNSEL
DERA COUNTY

NOW, THEREFORE, BE IT RESOLVED, that based upon said evidence and testimony, the Board of Supervisors of the County of Madera, State of California, hereby finds, determines and orders as follows:

1. That a Negative Declaration of environmental impact be approved, and that Negative Declaration of environmental impact has been discussed in the LAFCo Executive Officer's Report and duly considered by this Board, and that the Negative Declaration is adopted and found to be in compliance with CEQA and is adequate.

2. The Proposal is approved and the boundaries of the proposed district are approved as shown on the attached map and legal description, labeled EXHIBIT "A."

3. The name of the new district shall be "the Root Creek Water District."

4. All other terms and conditions as stated in the Root Creek Water District formation petition (copy attached) are hereby approved and adopted as conditions of the district formation.

5. The County Clerk/Recorder and Registrar of Voters is hereby directed to conduct a landowner-voter election for the formation of said District and the election of Directors of said District, all in accordance with this Resolution and the provisions of the California Water District Law, as amended, Water Code Sections 34000 et seq., and California Elections laws.

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The foregoing Resolution was adopted this 19th day of March 1995 by the following vote:

Supervisor Logoluso voted: Aye

Supervisor Ginsburg voted: Aye

Supervisor Hanhart McIntyre voted: Aye

Supervisor Lopez voted: Aye

Supervisor Baker voted: Absent

Chairman, Board of Supervisors

ATTEST:

Clerk, Board of Supervisors

MADERA COUNTY BOARD OF SUPERVISORS

Approved as to Legal Form:
COUNTY COUNSEL

By

MADERA COUNTY

95-1702
5-08-96

9616555

EXHIBIT A

Page 1 of 3

LEGAL DESCRIPTION
OF
ROOT CREEK WATER DISTRICT

That portion of Sections 33, T.11S., R.20E, Sections 1, 11, 12, 13, 14, 22, 23, 24, 25, 26, 27 & 35 & 36, T.12S., R.19E., & Sections 4, 5, 6, 7, 8, 9, 17, 18, 19 & 30, T.12S., R.20E., M.D.B. & M., described as follows:

Beginning at the North one quarter of said Section 4, said point being on the centerline of State Highway No. 41; thence South along said centerline to the point of intersection with the Easterly prolongation of the North line of Tract No. 67, Rolling Hills Subdivision No. 3, according to the map thereof recorded in Volume 8 of maps at Page 70, Madera County Records; Thence West along said North line & its Easterly prolongation to the Northwest corner of said Tract No. 67; thence South along the West line of said Tract No. 67 to the Southwest corner of said Section 4; thence East along the North line of said Section 9 to the Northwest corner of Tract No. 104, Rolling Hills No. 4, according to the map thereof recorded in Volume 9 of maps at Page 27, Madera County Records; thence South along the West line of said Tract No. 104 to the Southwest corner of said Tract; thence West along the South line of said Section 9 to the Southwest corner thereof; thence West along the South line of said Section 8 to the Southeast corner of the West one half of said Section 8; thence North along the East line of said West one half to the Northeast corner of the South one half of the Southwest one quarter of said Section 8; thence West along the North line of said South one half to the Northwest corner thereof; thence South along the West line of said Section 8 to the Southwest corner thereof; thence East along the North line of the West one half of said Section 17 to the Northeast corner thereof; thence South along the East line of said West one half to the Southeast corner thereof; thence West along the South line of said

EXHIBIT A

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Section 17 to the Southwest corner thereof; thence West along the North line of the Northeast one quarter of said Section 19 to the Northwest corner thereof; thence South along the West line of said Northeast one quarter to the Southwest corner thereof; thence East along the South line of said Northeast one quarter to the Southeast corner thereof; thence South along the East line of said Section 19 to the Southeast corner thereof; thence West along the South line of said Section 19 to the Southeast corner of the Southwest one quarter of the Southeast one quarter of said Section 19; thence North along the East line of said Southwest one quarter to the Northeast corner thereof; thence West along the North line of said Southwest one quarter to the Northwest corner thereof; thence South along the West line of said Southwest one quarter to the Southwest corner thereof; thence South along the East line of the Northwest one quarter of said Section 30 and the East line of Lot 3 of Walker Ranch according to the map thereof recorded in Volume 4 of maps at Page 51, Madera County Records, to the point of intersection with a line parallel with & 200 feet North of the South line of said Lot 3; thence West along said parallel line a distance of 1,524 feet; thence South at right angles to a point on the South line of said Lot 3; thence Southeasterly along the Southwesterly line of said Lot 3 to the Northeast corner of Lot 8 of said Walker Ranch; thence South along the East line of said Lot 8 to the Southeast corner thereof; thence West along the South line of said Lot 8 & its Westerly prolongation to a point on the East line of said Section 25; thence S 0° 49' 26" E along said East line a distance of 606.85 feet to a point on the centerline of the San Joaquin River; thence Westerly along said centerline to a point which lies Southeasterly at right angles to said centerline from the Southeast corner of Lot C of Springer Estate according to the map thereof recorded in Volume 5 of maps at page 40, Madera County Records; thence Northwesterly to said Southeast corner; thence Northerly along the East line of said Lot C to the Northeast corner thereof; thence West along the North line of said Lot C to the Northwest corner thereof; thence Southerly along the West line of said Lot C to the Southwest corner thereof; thence Southeasterly at right angles to the centerline of the San Joaquin River to a point on said centerline; thence Westerly along said centerline to a point on the West line of the East one half of said Section 27; thence North

EXHIBIT A

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9616855

along said West line to the Southwest corner of the North one half of the Northeast one quarter of said Section 27; thence West along the South line of said North one half to the Southeast corner thereof; thence North along the East line of said Section 27 to the Northeast corner thereof; thence West along the South line of said Section 22 to the Southwest corner of the East one half of the East one half of said Section 22; thence North along the West line of said East one half of the East one half to the Northwest corner thereof; thence East along the North line of said Section 22 to the Northeast corner thereof; thence North along the West line of said Section 14 to the Northwest corner thereof; thence North along the West line of the South one half of the Southwest one quarter of said Section 11 to the Northwest corner thereof; thence East along the North line of said South one half to the Southwest corner of the Northeast one quarter of the Southwest one quarter of said Section 11; thence North along the West line of said Northeast one quarter to the Northwest corner thereof; thence East along the North line of the South one half of said Section 11 to the Northeast corner thereof; thence North along the West line of said Section 12 to the Northwest corner thereof; thence East along the South line of said Section 1 to the Southwest corner of the South one half of the East three quarters of said Section 1; thence North along the West line of said South one half of the East three quarters to the Northwest corner thereof; thence East along the North line of said South one half to the Northeast corner thereof; thence North along the West line of said Section 6 to the Northwest corner thereof; thence East along the North line of said Sections 4, 5 & 6 to the Southeast corner of said Section 33; thence North along the West line of the Southwest one quarter of said Section 33 to the Northwest corner thereof; thence East along the North line of said Southwest one quarter to the Northeast corner thereof; thence South along the East line of said Southwest one quarter to the POINT OF BEGINNING.

## Attachment 1.1, Baker, Manock & Jensen Opinion Letter

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KENDALL L. MANOCK
DOUGLAS B. JENSEN
DONALD R. FISCHBACH
JOHN L. B. SMITH
GEORGE L. STRASSER
JOSEPH M. MARCHINI
CRAIG A. HOUGHTON
ANDREW R. WEISS
JAMES E. SHEKOYAN
CARL R. REFUERZO
JOHN G. MICHAEL
CHRISTOPHER L. CAMPBELL
ROBERT D. WILKINSON

JEFFREY A. JAECH
LISA M. MARTIN
GAYLE D. HEARST
GLENN J. HOLDER
MARK B. CANEPA
WILLIAM M. WHITE
KATHLEEN A. MEEHAN
RICHARD S. SALINAS
DAVID E. HOLLAND
CHARLES K. MANOCK
MATTHEW E. HOFFMAN
ALBERT J. BERRYMAN
DEBORAH A. COE

BMJ
Baker, Manock & Jensen
ATTORNEYS AT LAW
A PROFESSIONAL CORPORATION

DIRK B. PALOUTZIAN
OLGA A. BALDERAMA
MATTHEW E. FARMER
JOHN A. BASINGER
C. FREDRICK MEINE III
SUZANNE D. MCGUIRE
WILLIAM E. CHALTRAW, JR.
ERIC C. COLE
ALEXANDER COLLINS, JR.
ELIZABETH K. CAMPAGNE
JOSHUA S. DANIELS

OF COUNSEL
JOHN H. BAKER
JAMES GANULIN
JUDITH L. LUND
BRUCE D. BICKEL

HOWARD M. ZIDENBERG
(1949-1999)

MR. CAMPBELL ELECTRONIC MAIL:
CLC@BMJ-LAW.COM

May 27, 2003

**VIA FACSIMILE AND U.S. MAIL**

Mr. Dennis Mills
PROVOST & PRITCHARD ENGINEERING GROUP
1620 West Mineral King, Suite C
Visalia, California 93291-4435

Re: *Attachment A-13 Applicant Authority*
*Root Creek Water District In Lieu Groundwater Recharge and Storage Project Grant Application*

Dear Mr. Mills:

The following opinions are delivered to you for use as attachment A-13 Applicant Authority for Root Creek Water District's In Lieu Groundwater Recharge and Storage Project Grant Application (the "Application").

1. **Does the applicant have the legal authority to enter into a funding contract with the State of California?**

Root Creek Water District has the statutory authority to enter into funding contracts with the State of California, pursuant to California Water Code section 35851.

2. **What is the statutory authority under which the applicant was formed and is authorized to operate?**

Root Creek Water District was formed pursuant to and is authorized to operate under California Water Code sections 34000 et seq.

3. **Is the applicant required to hold an election before entering into a funding contract with the State?**

No statutory authority requires Root Creek Water District to conduct an election prior to entering into a funding contract with the State of California.

4. **Does the applicant have the legal authority to levy assessments and charges sufficient to repay any loans that may be needed for project financing (Also, address loan security, Part A-10).**

Root Creek Water District has the legal authority to levy assessments and charges sufficient to repay any loans that may be needed for project financing, pursuant to California Water Code sections 35410.1 and 35470. An assessment levied by Root Creek Water District is a priority lien on the lands benefitted by such assessment.

5. **Will the funding agreement between the applicant and the State of California be subject to review and/or approval by other government agencies?**

No review or approval from any governmental body is required with respect to the funding agreement.

6. **If yes, identify all such agencies (e.g. Local Area Formation Commission, local governments, U.S. Forest Service, California Coastal Commission, California Department of Health Services, etc.)**

Not applicable.

7. **Describe any pending litigation that may impact the financial condition of the applicant, the operation of the water facilities, of the applicant's ability to complete the proposed construction project. If none is pending, so state.**

There is no litigation pending that would impact the financial condition of Root Creek Water District, the operation of the water facilities, or Root Creek Water District's ability to compete the proposed construction project .

The foregoing opinions are rendered solely for Root Creek Water District's benefit in connection with the Application. The foregoing opinions may not be relied upon for any purpose other than in connection with the Application. The opinions expressed are as of the date of this letter, and Baker, Manock & Jensen undertakes no responsibility for updating the opinions expressed herein.

Very truly yours,

BAKER, MANOCK & JENSEN,
a Professional Corporation

By _____
Christopher L. Campbell

By _____
Carl R. Refuerzo

CLC:CRR:pae
cc: Philip R. Pierre

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# Attachment 1.1, Madera County Groundwater Management Plan

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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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# MADERA COUNTY
# AB3030 GROUNDWATER MANAGEMENT PLAN

## List of Tables



## List of Figures



## Appendices

# 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.

| 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

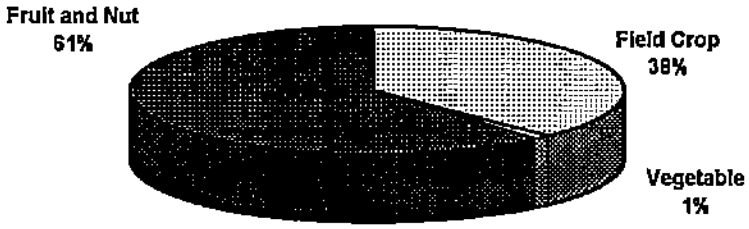
Madera County covers approximately 2,147 square miles (1.4 million acres) in the geographic center of California (Madera County General Plan, 1995). The county consists of three geographic regions, the valley floor in the west, the foothills in the center of the County, and the mountains in the east, 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

**Crop Harvested Acreage - 2000**




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

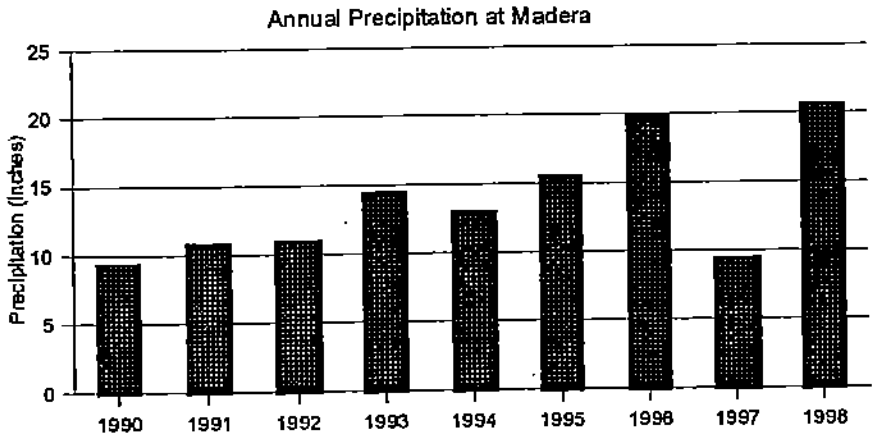
In addition, a small amount of groundwater is pumped for urban use just inside Madera County across the river from the City of Firebaugh. Total urban water use from the main municipal water systems listed above is 17,404 AFY and does not include commercial and residential use from very small water systems 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.

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# 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-36A1 | 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-2? | 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 |
| Parksdale 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 |

1.1 - 97

| System | Well Name/No. | State Well No.[2] | Depth of Perforation | Sample Date | Na | K | Ca | Mg | Cl | $HCO_3$ | $SO_4$ | F | 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 | 4077 | <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

11 - 98

## 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*

1.1 - 99

**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

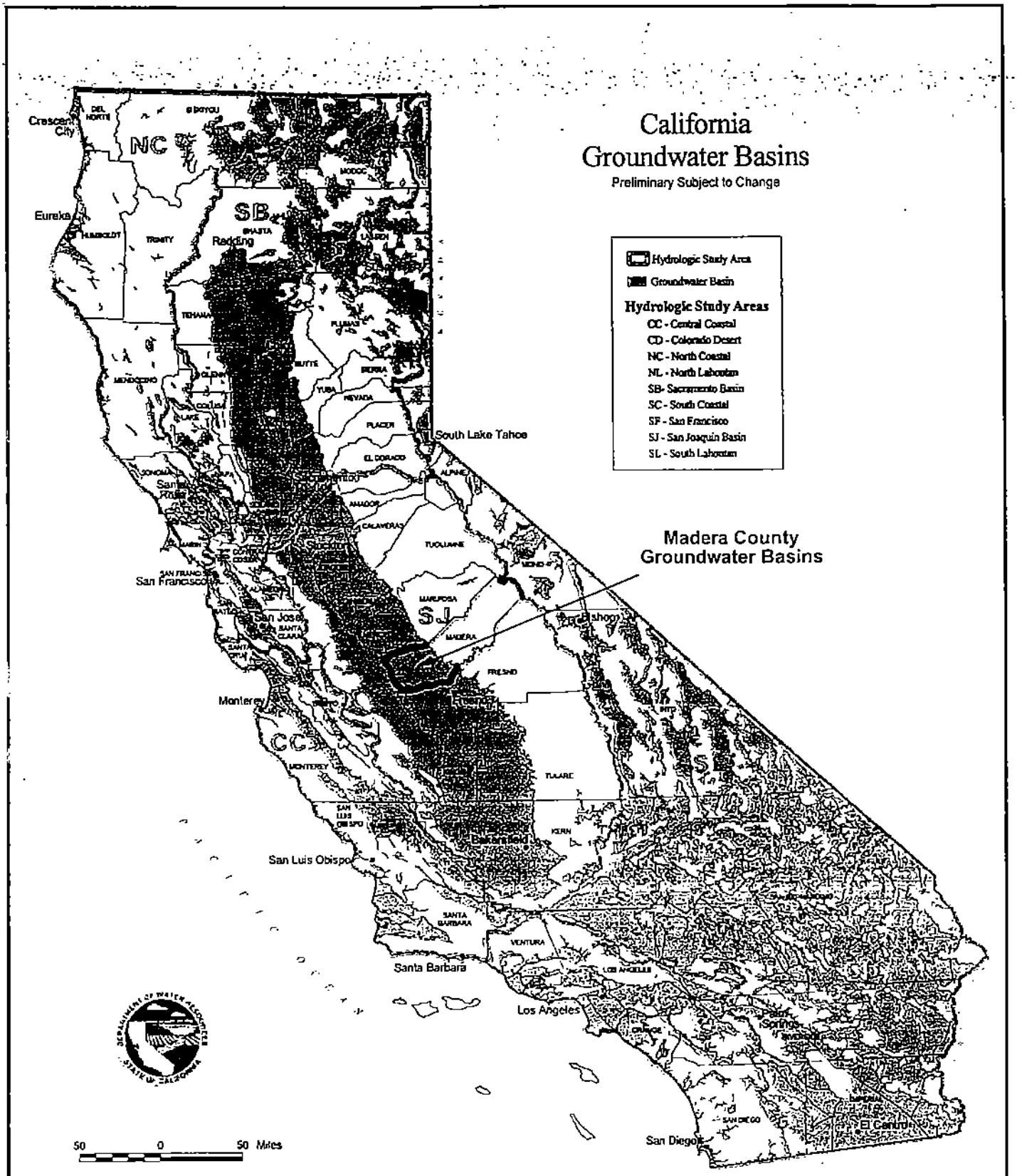
**IV. Local Control of Groundwater Management and Local Water Rights:**
- IV-1. Maintain local groundwater management authority
- IV-2. Ensure the unrestricted, non-export-related private use of groundwater within the County
- IV-3. Support local control through County Ordinances

**V. Conservation and Reuse:**
- V-1. Promote countywide water conservation
- V-2. Support incentive programs to enhance efficient use of water in the County

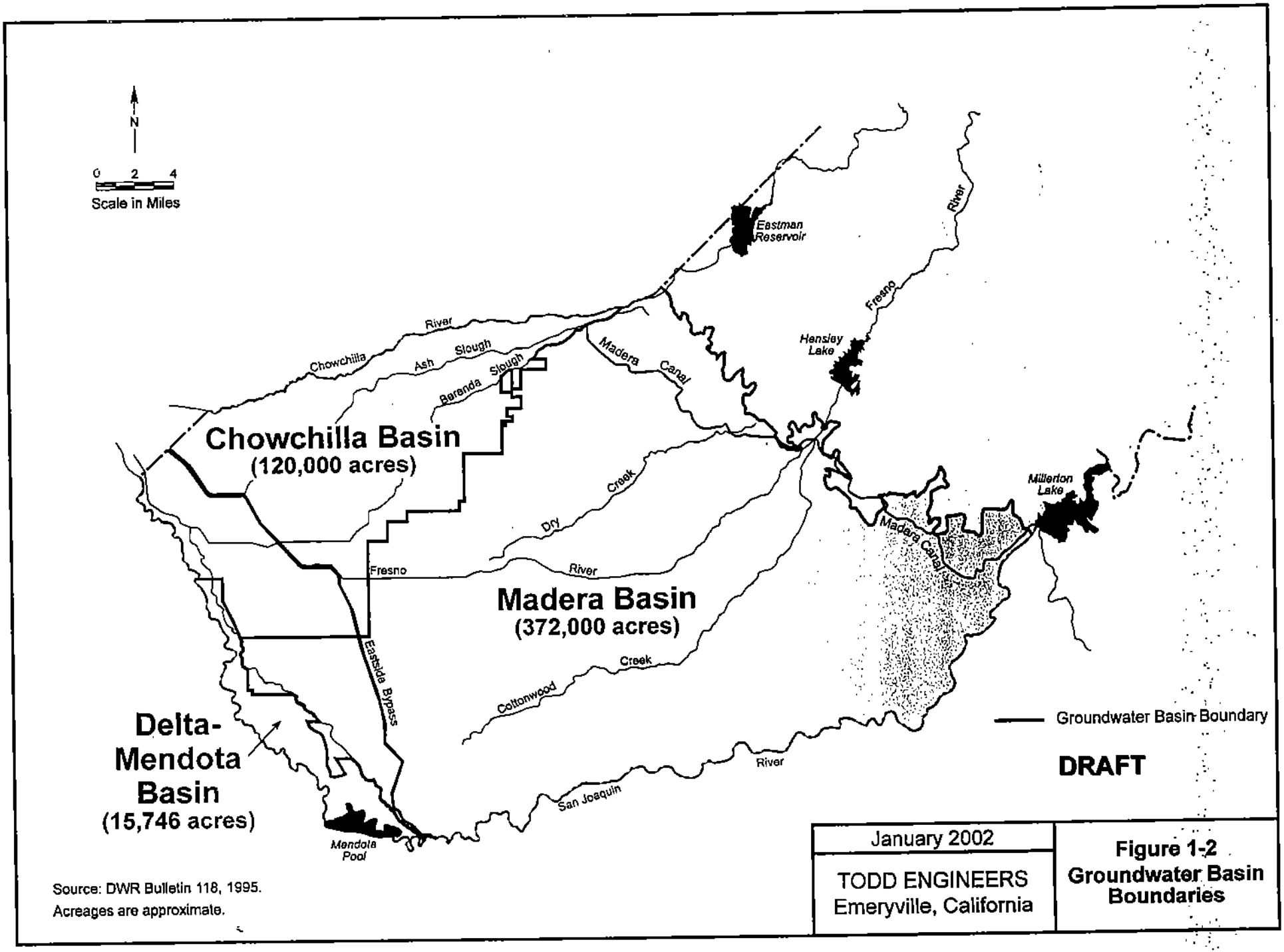
**VI. Groundwater Monitoring Programs:**
- VI-1. Monitor the County's groundwater for quantity and quality

**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

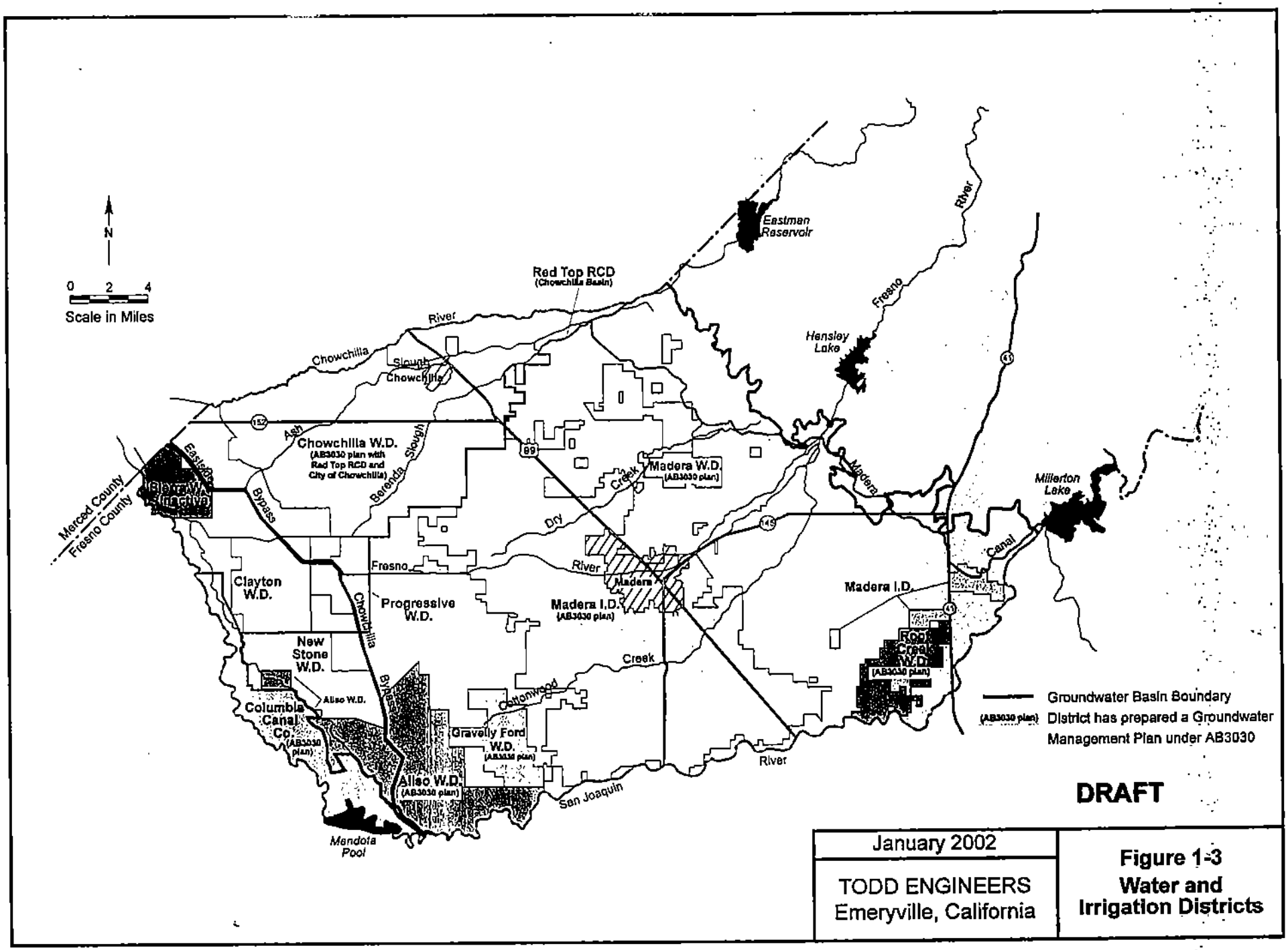


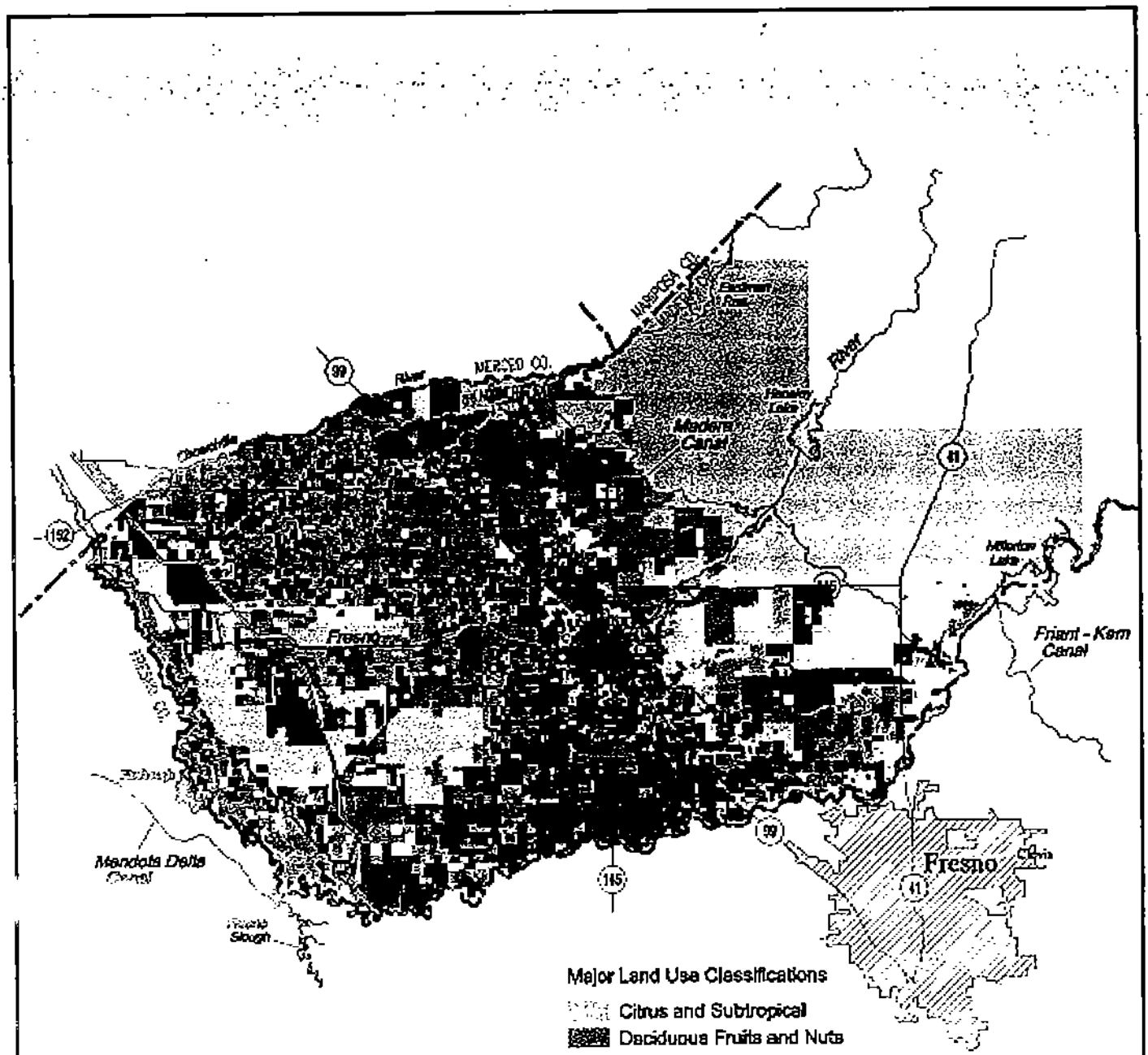

| | |
|---|---|
| September 2001 | **Figure 1-1** |
| TODD ENGINEERS<br>Emeryville, California | **Madera County Groundwater Basins** |




Source: DWR Bulletin 118, 1995.
Acreages are approximate.

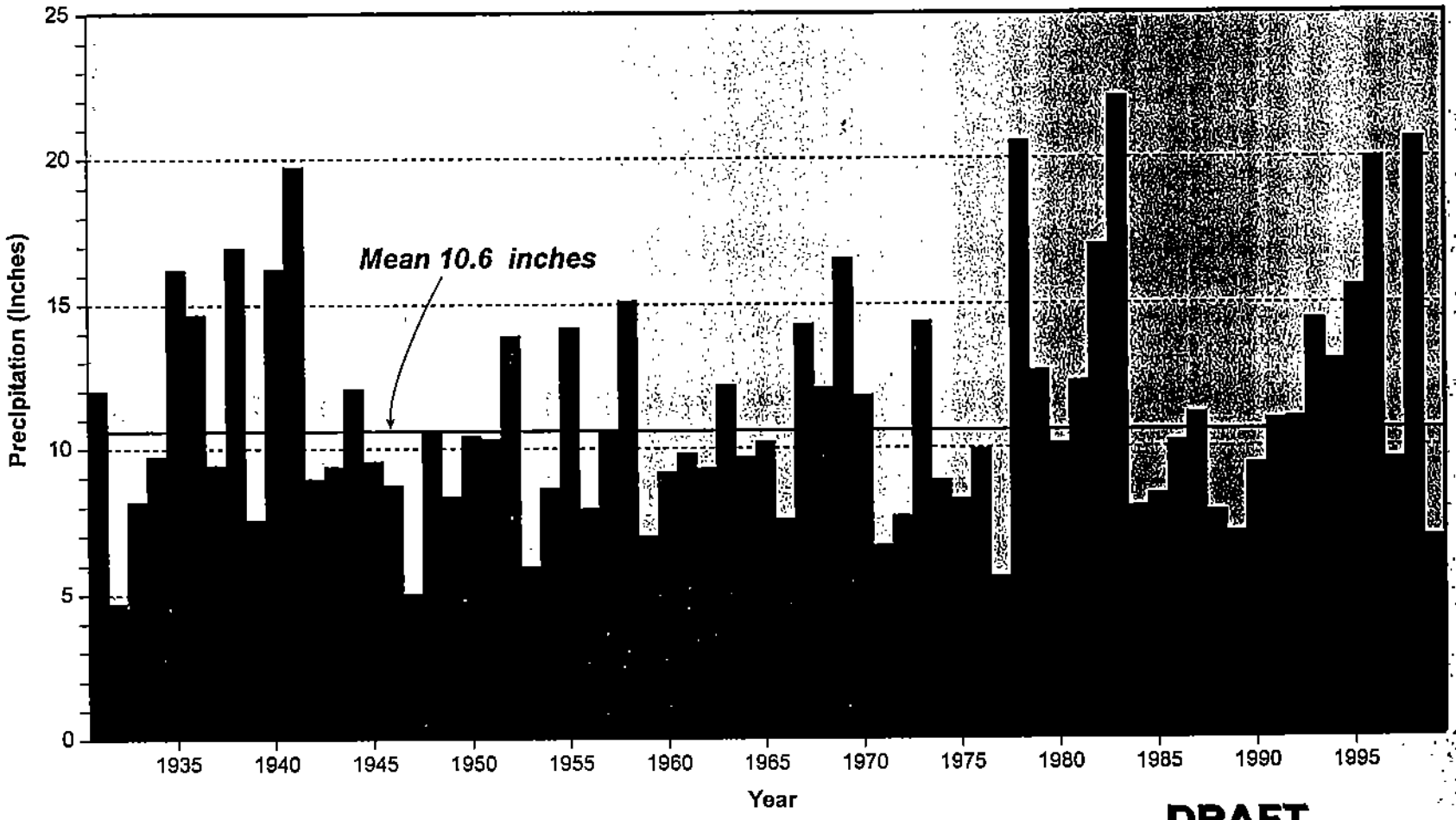
| January 2002 | Figure 1-2 Groundwater Basin Boundaries |
|---|---|
| TODD ENGINEERS Emeryville, California | |


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
Eastside Bypass
Merced County
Fresno County
Madera W.D.
(AB3030 plan)
Madera Creek
Dry Creek
Millerton Lake
Madera Canal
Fresno
Clayton W.D.
Progressive W.D.
Madera I.D.
(AB3030 plan)
Madera I.D.
Chowchilla Bypass
New Stone W.D.
Also W.D.
Columbia Canal Co.
(AB3030 plan)
Cottonwood Creek
Gravelly Ford W.D.
(AB3030 plan)
Also W.D.
(AB3030 plan)
San Joaquin River
Mendota Pool
Groundwater Basin Boundary
(AB3030 plan) District has prepared a Groundwater Management Plan under AB3030
DRAFT
January 2002
TODD ENGINEERS
Emeryville, California
Figure 1-3
Water and Irrigation Districts




Source: DWR, 1995.

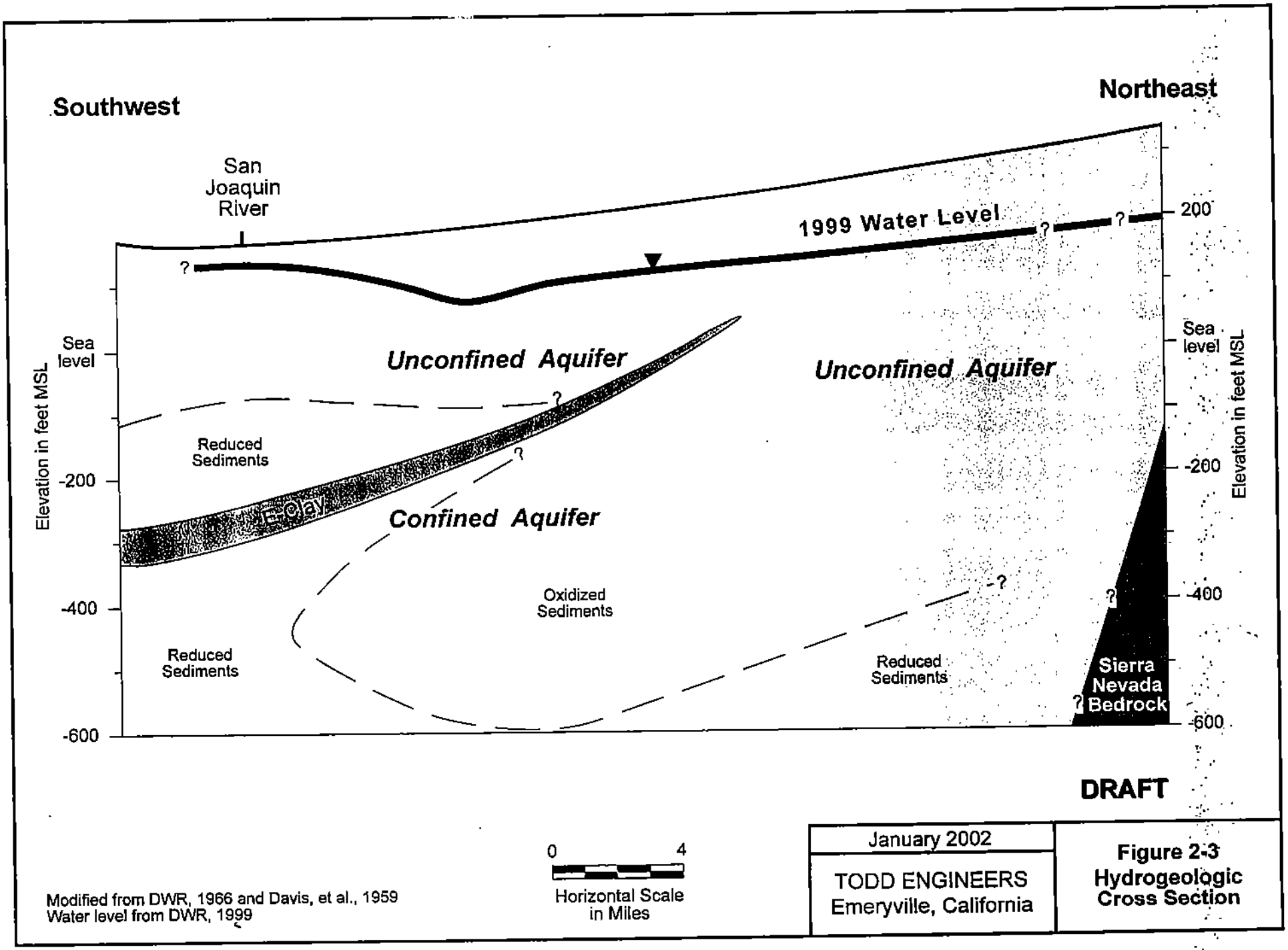
| | |
|---|---|
| January 2002 | **Figure 2-1** |
| TODD ENGINEERS<br>Emeryville, California | **1995 Land Use** |

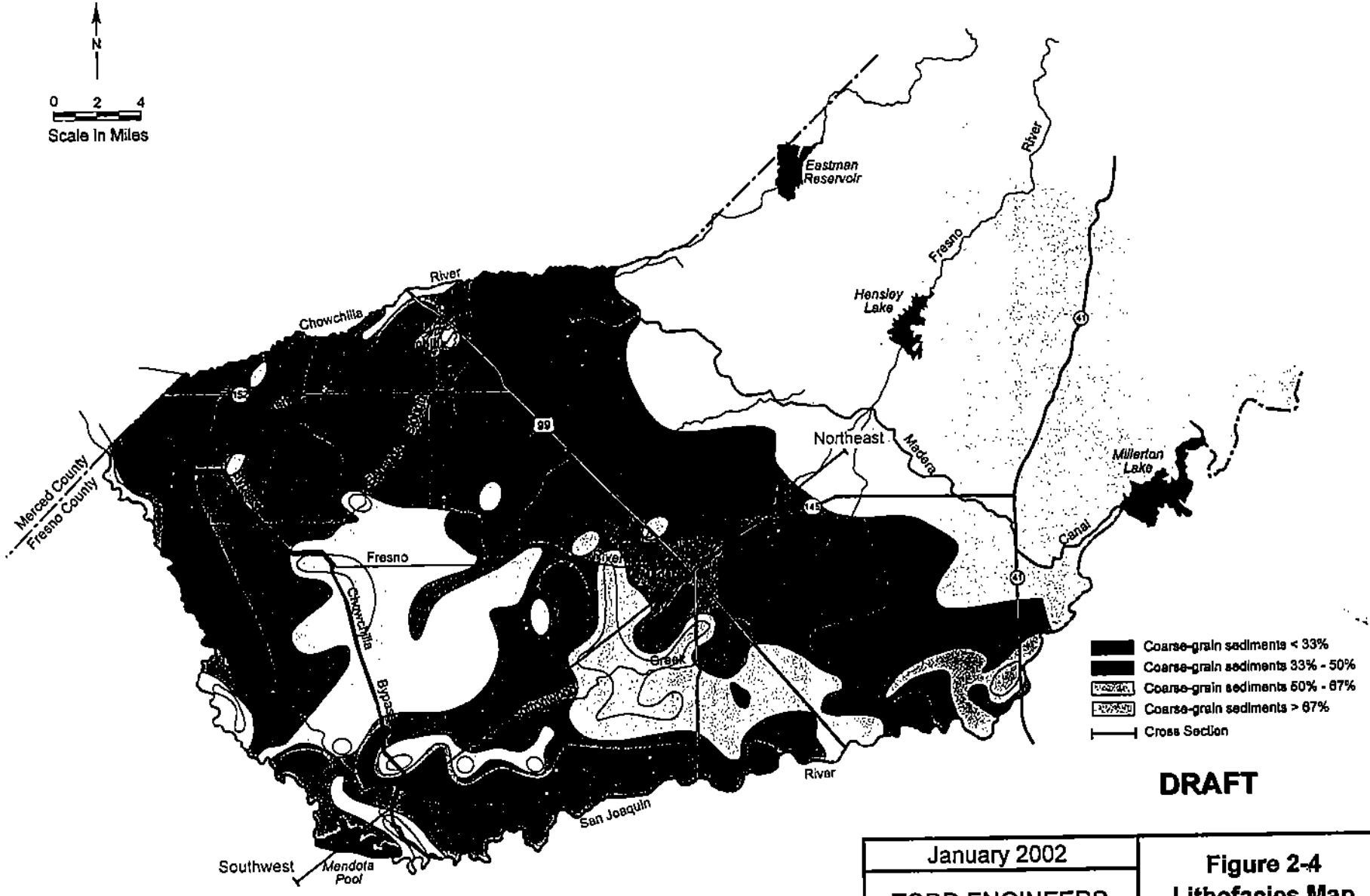



DRAFT

Based on monthly data from Madera Station No. 45233 NOAA

| January 2002 | Figure 2-2 |
|---|---|
| TODD ENGINEERS<br>Emeryville, California | Annual Precipitation<br>1931 - 1999 |


Southwest
Northeast
San Joaquin River
1999 Water Level
Sea level
Unconfined Aquifer
Unconfined Aquifer
Reduced Sediments
E-Clay
Confined Aquifer
Oxidized Sediments
Reduced Sediments
Reduced Sediments
Sierra Nevada Bedrock
Elevation in feet MSL
200
-200
-400
-600
DRAFT
0
4
Horizontal Scale in Miles
Modified from DWR, 1966 and Davis, et al., 1959
Water level from DWR, 1999
January 2002
TODD ENGINEERS
Emeryville, California
Figure 2-3
Hydrogeologic Cross Section




Source: Mitten, LeBlanc, and Bertoldi, 1970, USGS open-file Report.

January 2002

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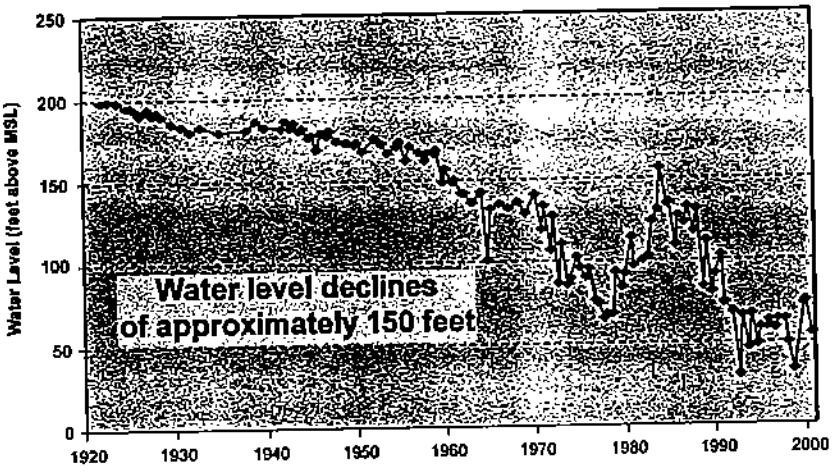
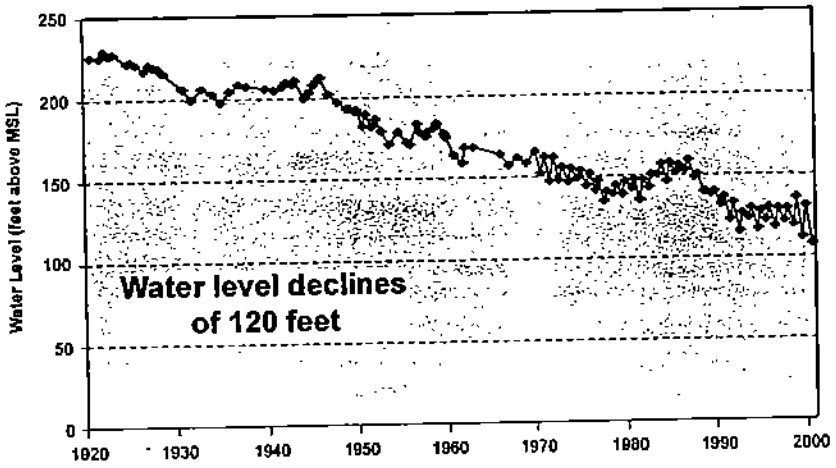
Emeryville, California

**Figure 2-4**
**Lithofacies Map**
**Unconfined Aquifer**

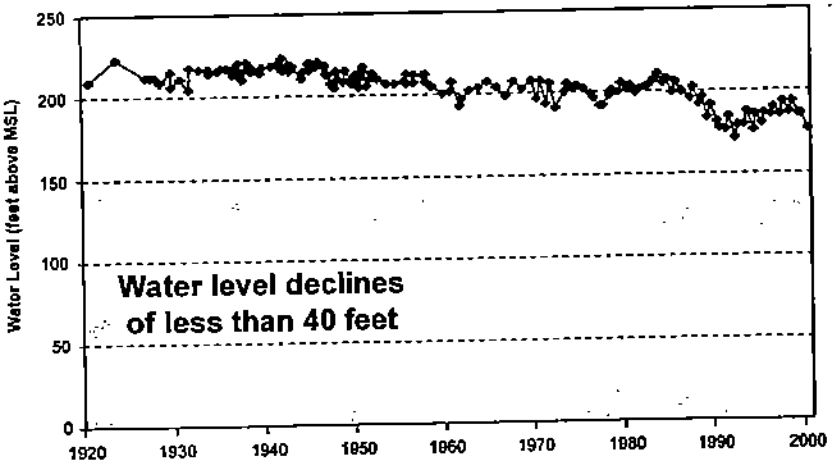
## Chowchilla Basin
## Southwest of Chowchilla




## Central Madera Basin
## Southwest of Madera

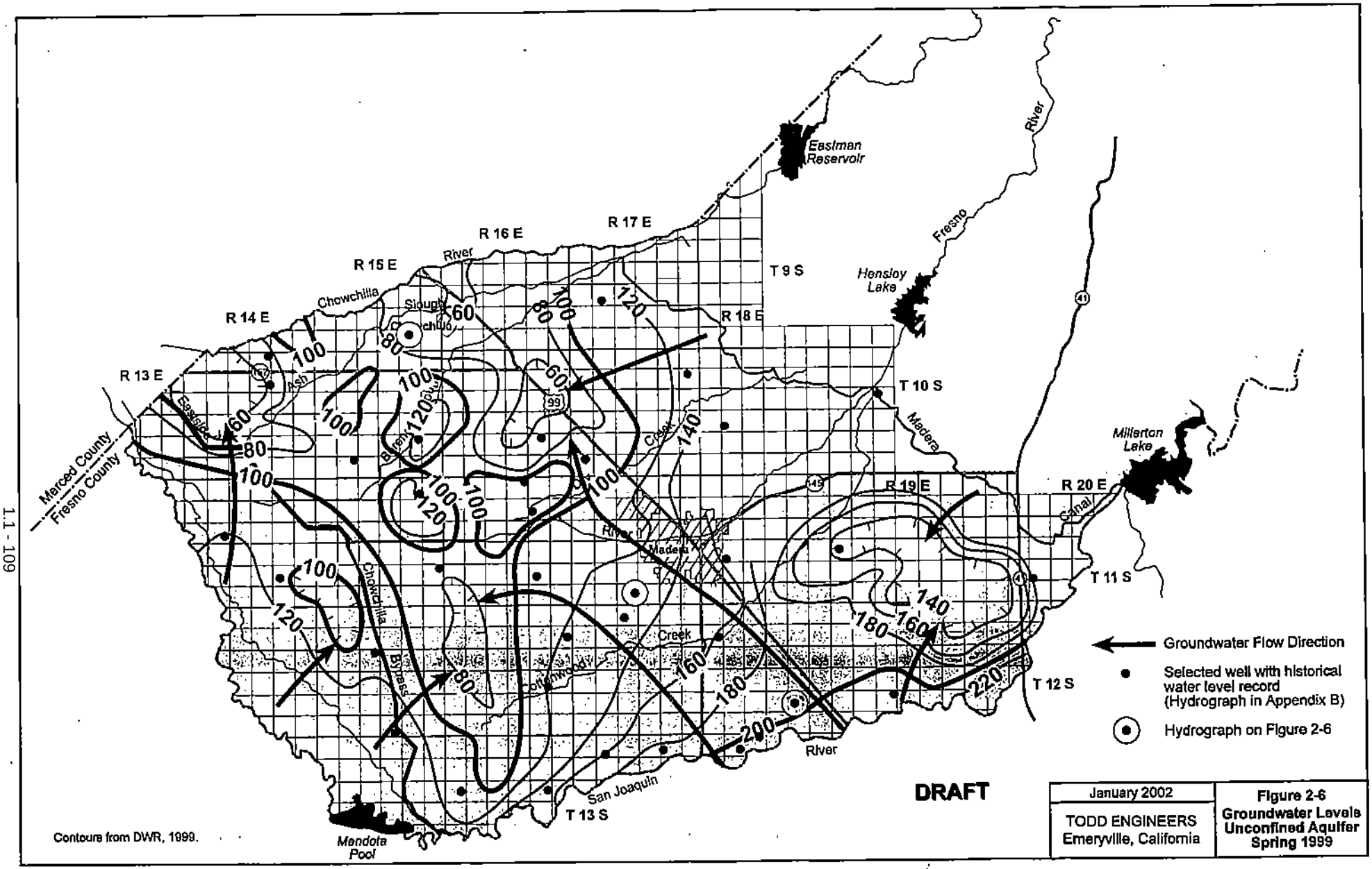


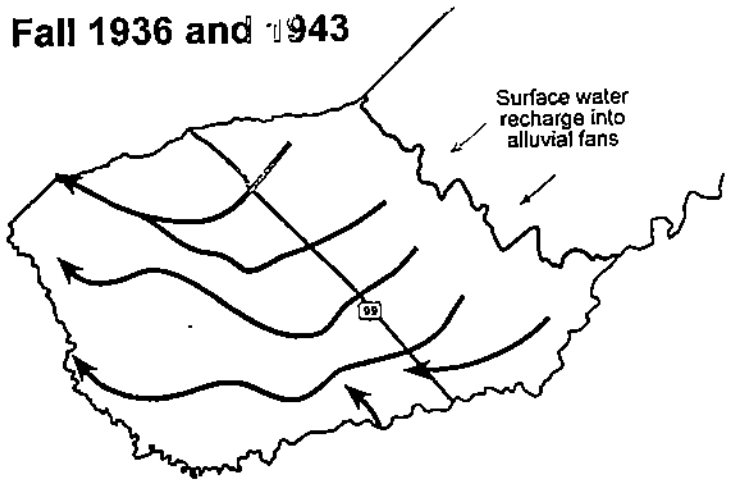

## Southern Madera Basin
## North of San Joaquin River

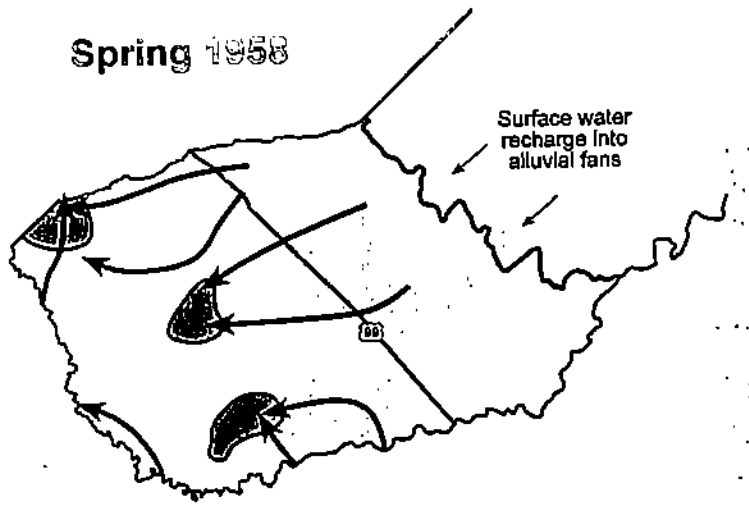


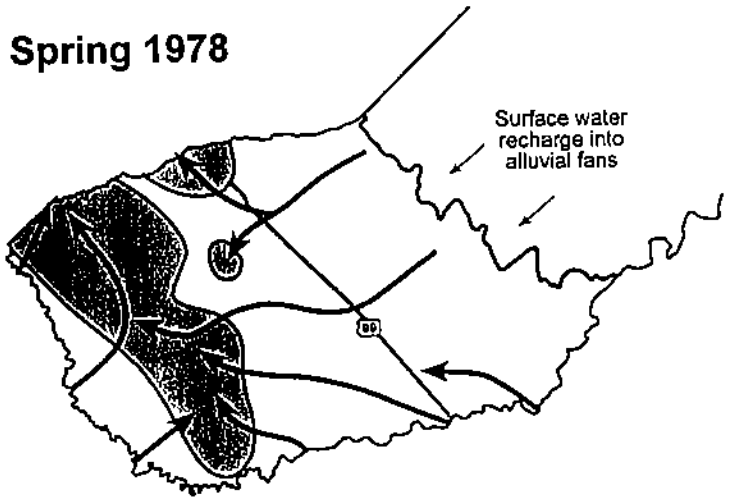

**DRAFT**

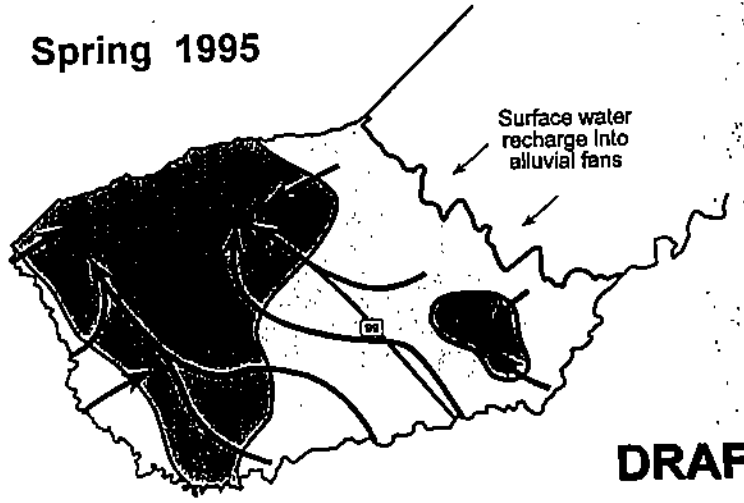
| January 2002 | **Figure 2-5** |
|---|---|
| TODD ENGINEERS<br>Emeryville, California | **Madera County Hydrographs 1920 - 2000** |


Eastman Reservoir
Fresno River
Hensley Lake
Millerton Lake
Madera Canal
Merced County
Fresno County
Chowchilla Bypass
Ash Slough
Berenda Slough
Owens Creek
Fresno River
Chowchilla River
Ash Creek
Berenda Creek
Orchard Creek
San Joaquin River
Mendota Pool
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.
January 2002
TODD ENGINEERS
Emeryville, California
Figure 2-6
Groundwater Levels
Unconfined Aquifer
Spring 1999



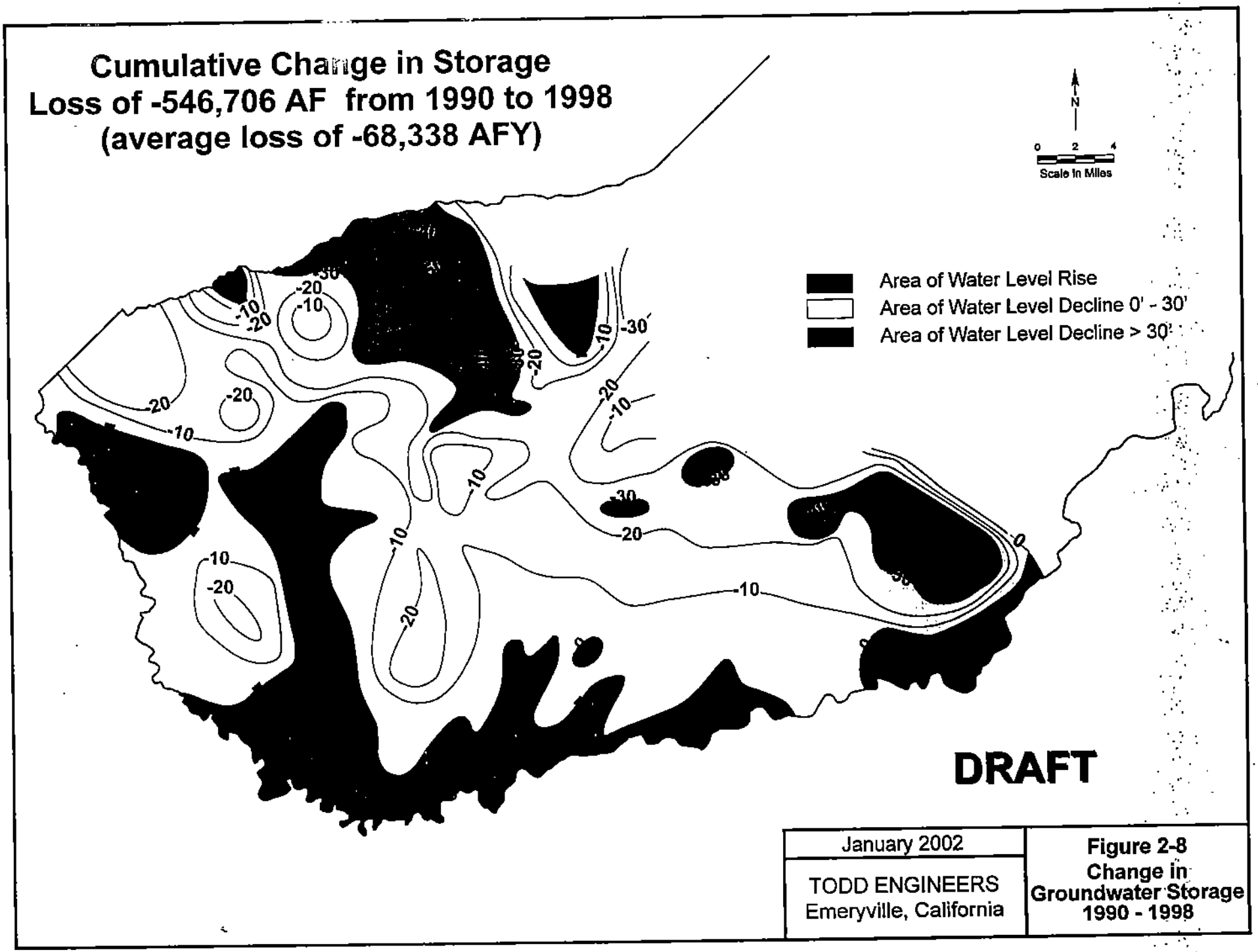



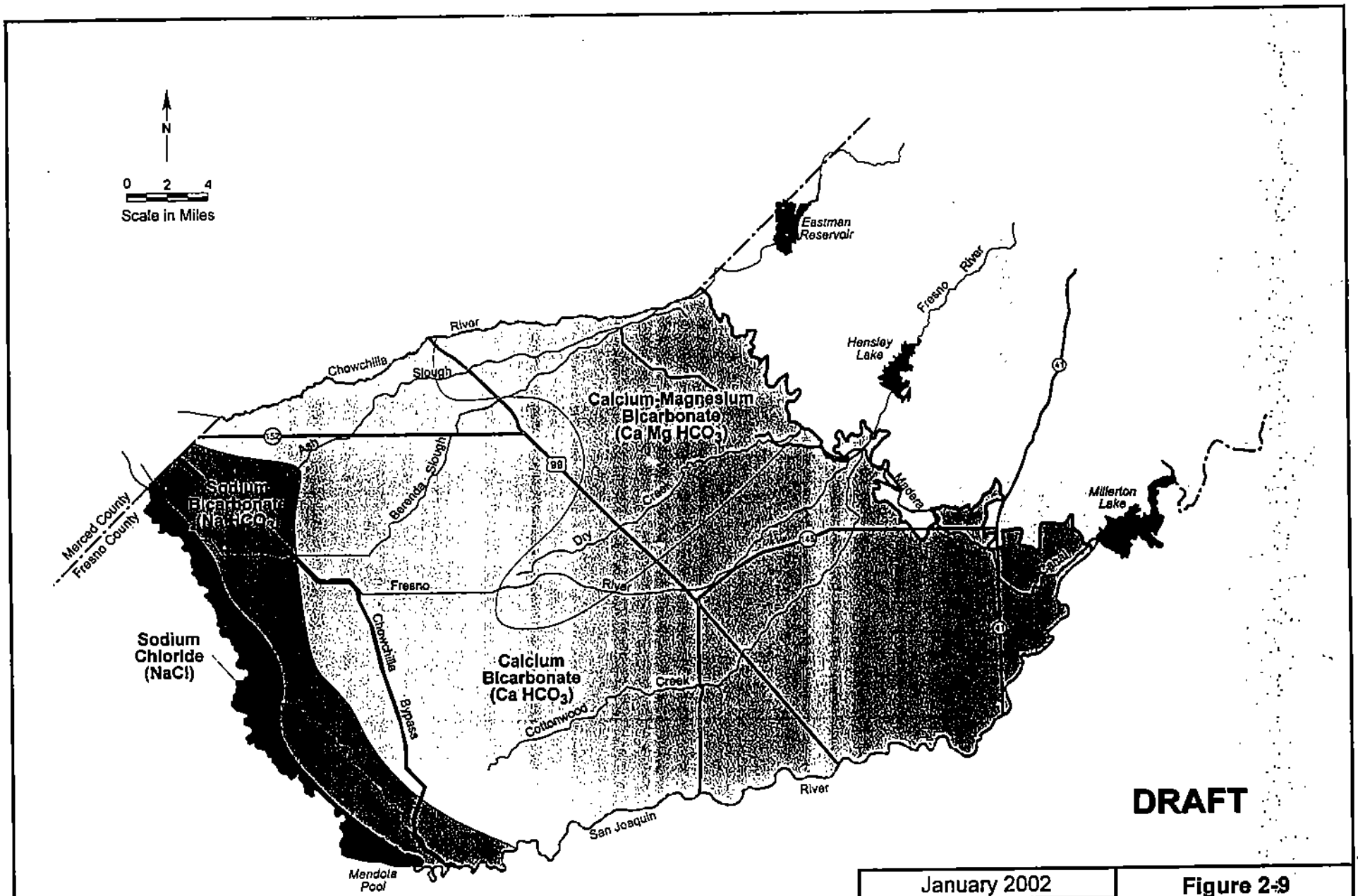




DRAFT

| January 2002 | Figure 2-7 Change in Groundwater Flow Directions over Time |
|---|---|
| TODD ENGINEERS Emeryville, California | |

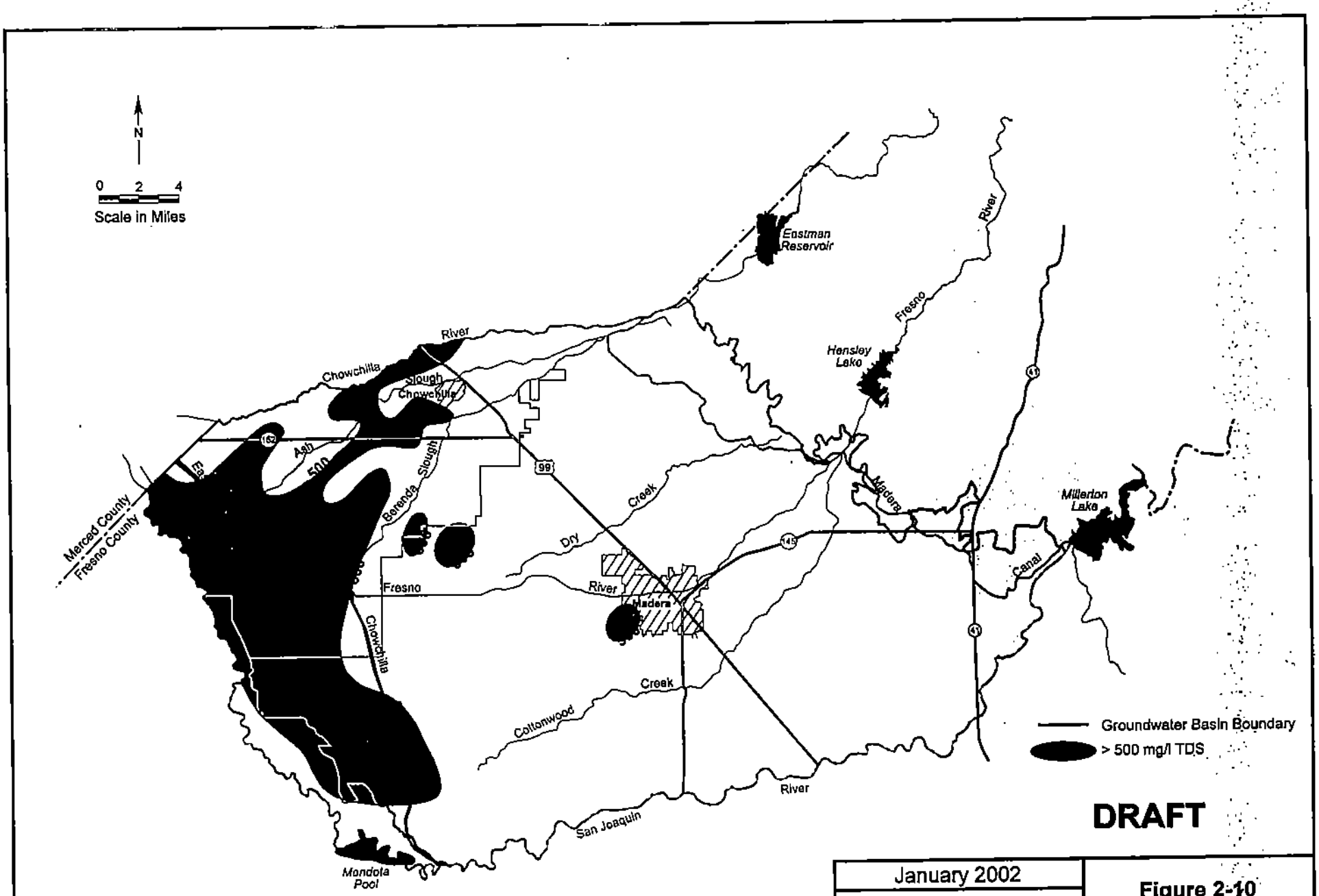



| | |
|---|---|
| January 2002 | **Figure 2-8** |
| TODD ENGINEERS<br>Emeryville, California | **Change in Groundwater Storage 1990 - 1998** |



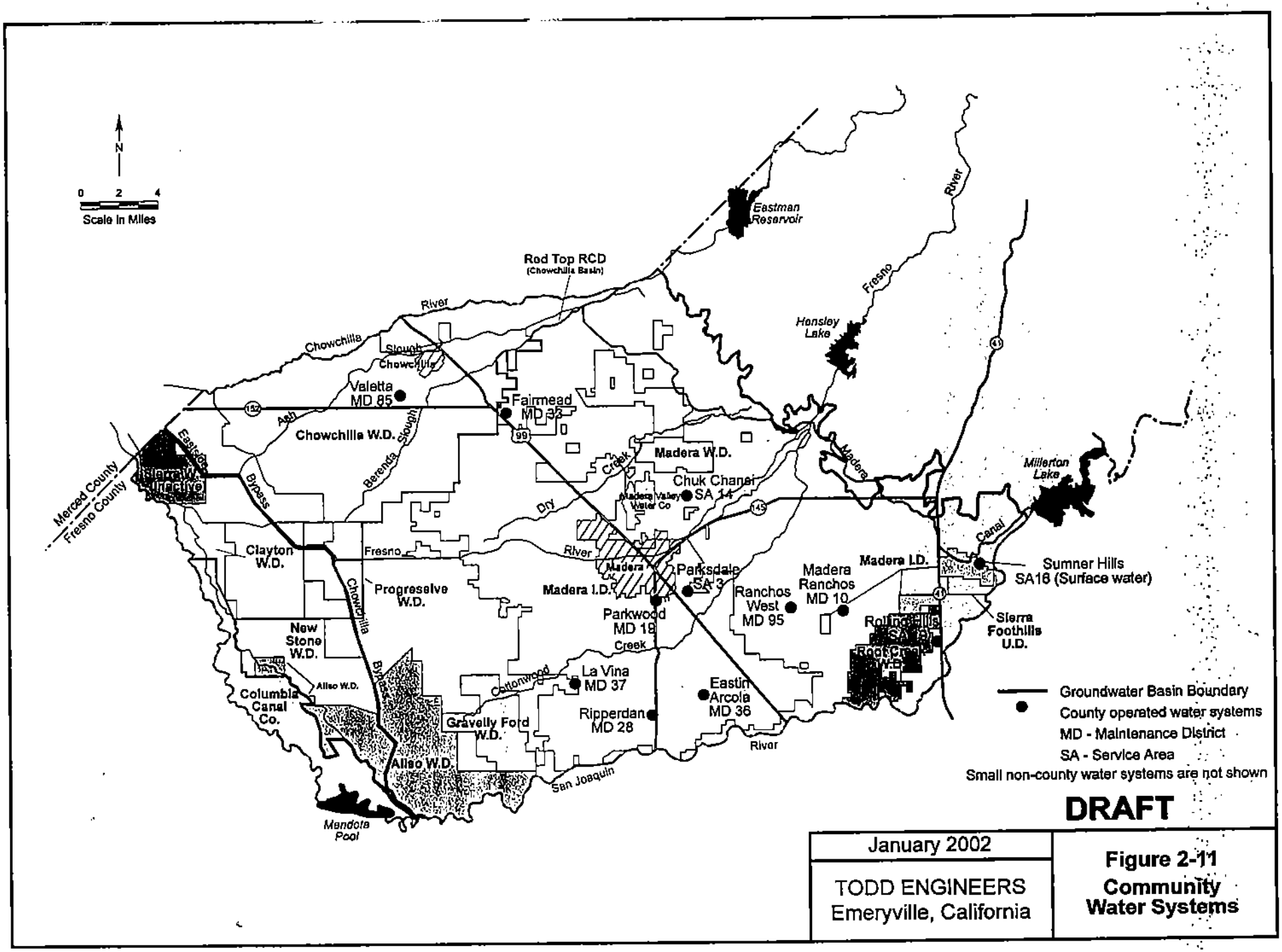

Source: California Department of Water Resources, Bulletin 130-63, 1965.

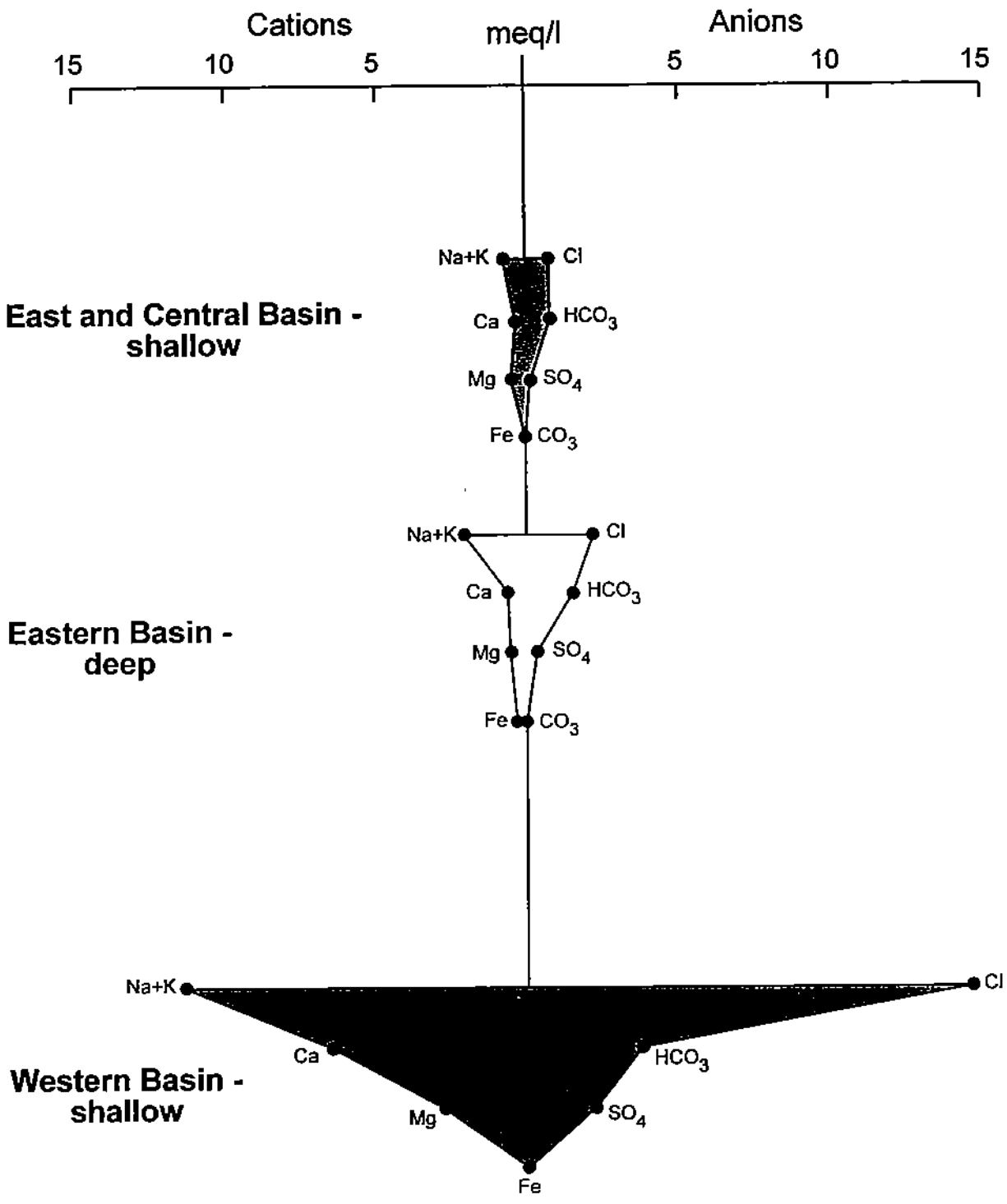
| January 2002 | Figure 2-9 |
|---|---|
| TODD ENGINEERS<br>Emeryville, California | Distribution of Groundwater Mineral Types |



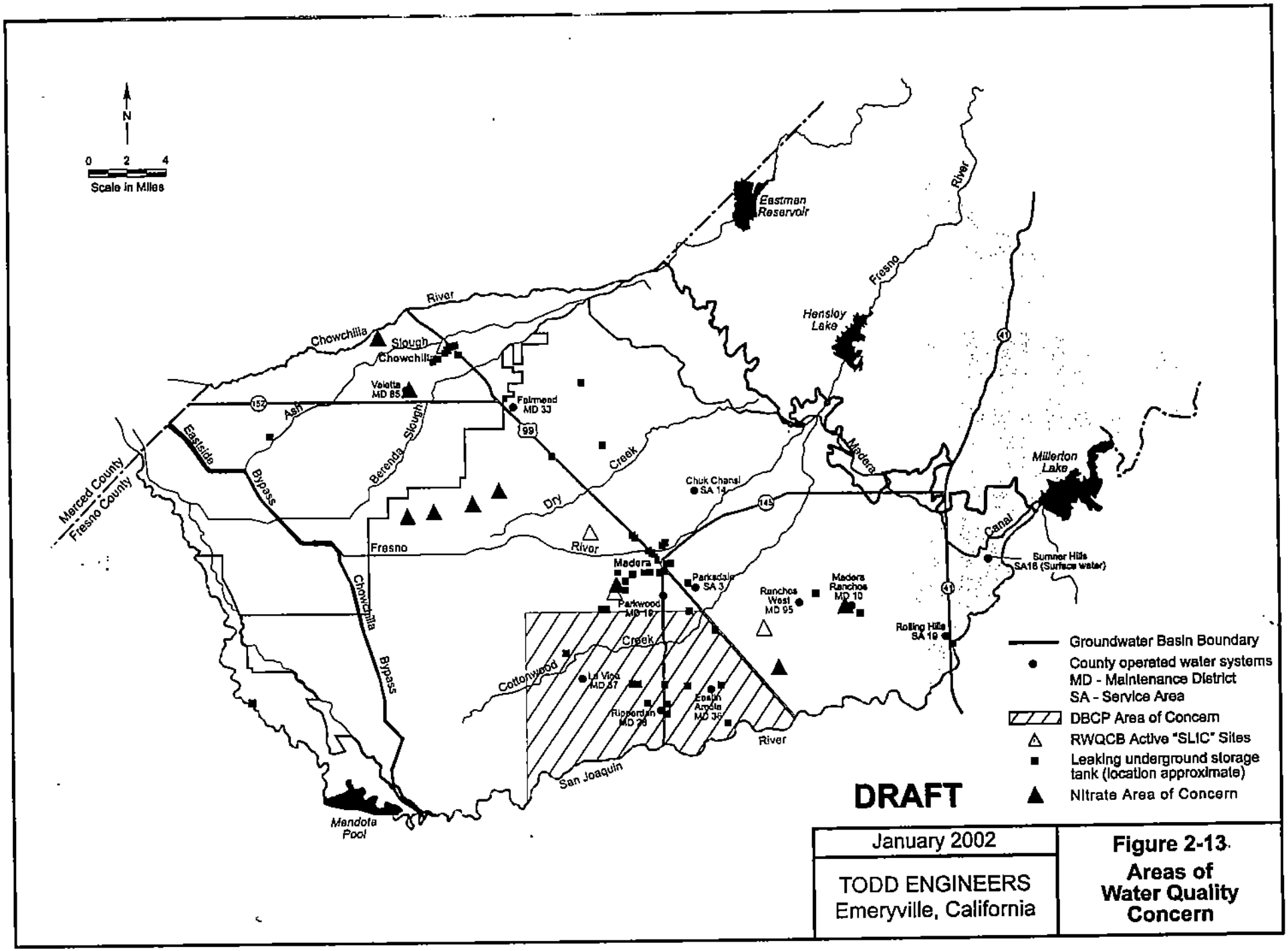

Sources of TDS data in wells: DWR, 1971 and Mitten et al., 1970.

| | |
|---|---|
| January 2002 | **Figure 2-10 TDS in Groundwater** |
| TODD ENGINEERS Emeryville, California | |


N
0 2 4
Scale in Miles
Red Top RCD
(Chowchilla Basin)
Eastman Reservoir
Fresno River
Hensley Lake
Chowchilla River
Slough
Chowchilla
Valetta MD 85
Fairmead MD 33
Ash
Chowchilla W.D.
Berenda Slough
Eastside Irrigative
Merced County
Fresno County
Bypass
Madera W.D.
Creek
Chuk Chanel SA 14
Madera Valley Water Co
Dry
Madera
Millerton Lake
Canal
Clayton W.D.
Fresno River
Madera I.D.
Parksdale SA 3
Madera Ranchos MD 10
Sumner Hills SA16 (Surface water)
Progresolve W.D.
Ranchos West MD 95
Parkwood MD 18
Sierra Foothills U.D.
New Stone W.D.
Creek
Chowchilla Bypass
Alliso W.D.
Columbia Canal Co.
Cottonwood
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
DRAFT
January 2002
TODD ENGINEERS
Emeryville, California
Figure 2-11
Community Water Systems




| | |
|---|---|
| January 2002 | **Figure 2-12** |
| TODD ENGINEERS<br>Emeryville, California | **Inorganic Water Quality** |


N
0 2 4
Scale in Miles
Eastman Reservoir
Hensley Lake
Millerton Lake
Fresno River
Chowchilla River
Chowchilla Slough
Velotta MD 85
Fairmead MD 33
Ash Slough
Berenda Slough
Eastside Bypass
Merced County
Fresno County
Dry Creek
Chuk Chansi SA 14
Madera Canal
Summer Hills SA16 (Surface water)
Fresno River
Madera
Parksdale SA 3
Parkwood MD 107
Ranchos West MD 95
Madera Ranchos MD 10
Rolling Hills SA 19
Chowchilla Bypass
Cottonwood Creek
La Vina MD 87
Ruppendan MD 29
Eastin Arcola MD 35
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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January 2002
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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<br><br>MADERA COUNTY GROUND-WATER MANAGEMENT PLAN | Resolution No.: 2001- 144<br><br>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.

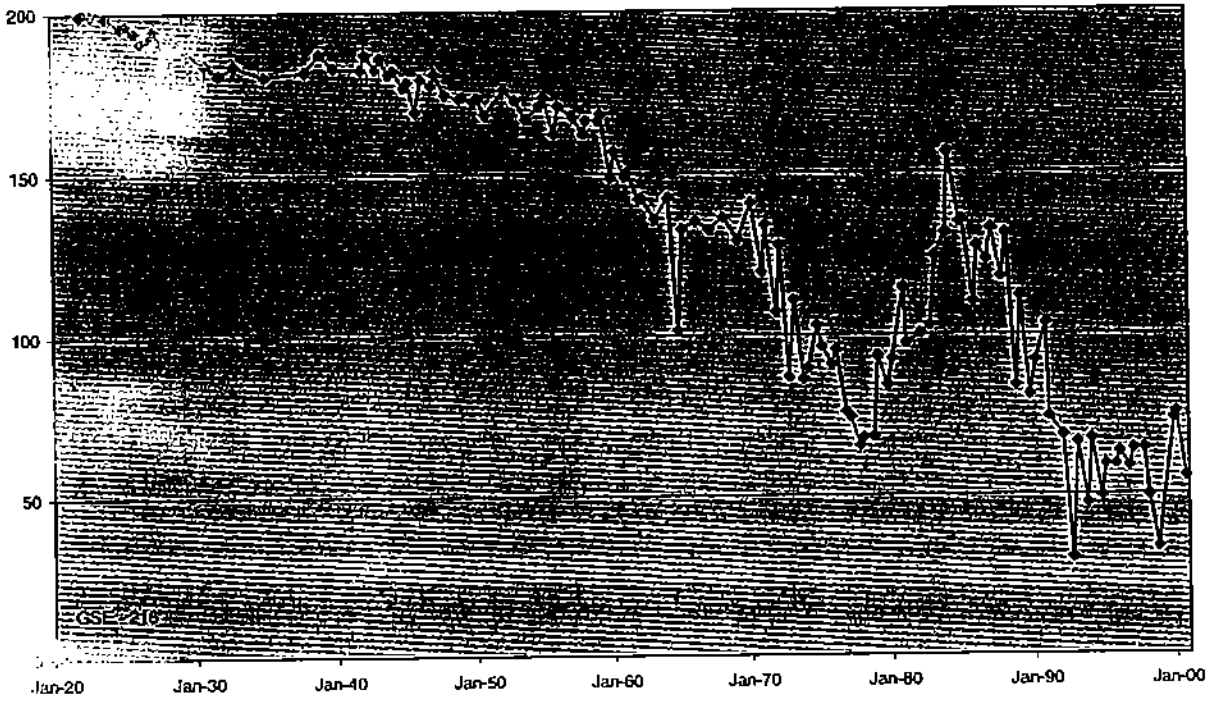
R 16 E

| | | | | | |
|---|---|---|---|---|---|
| 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 |

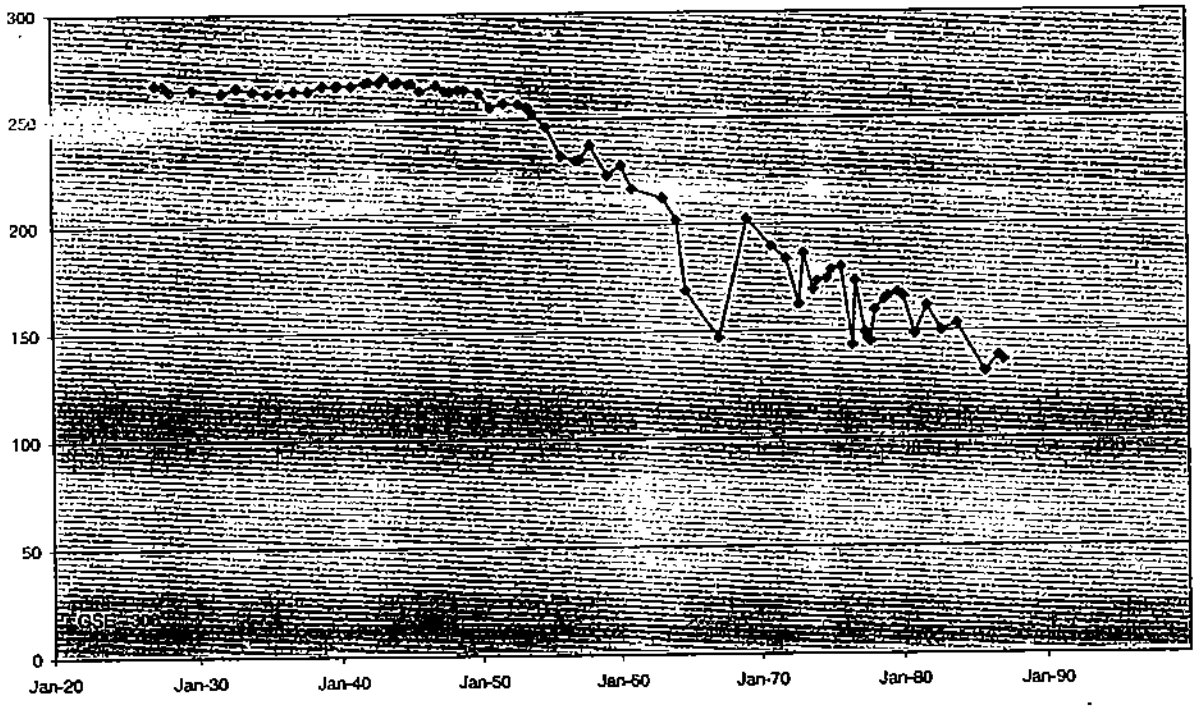
T 11 S

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).

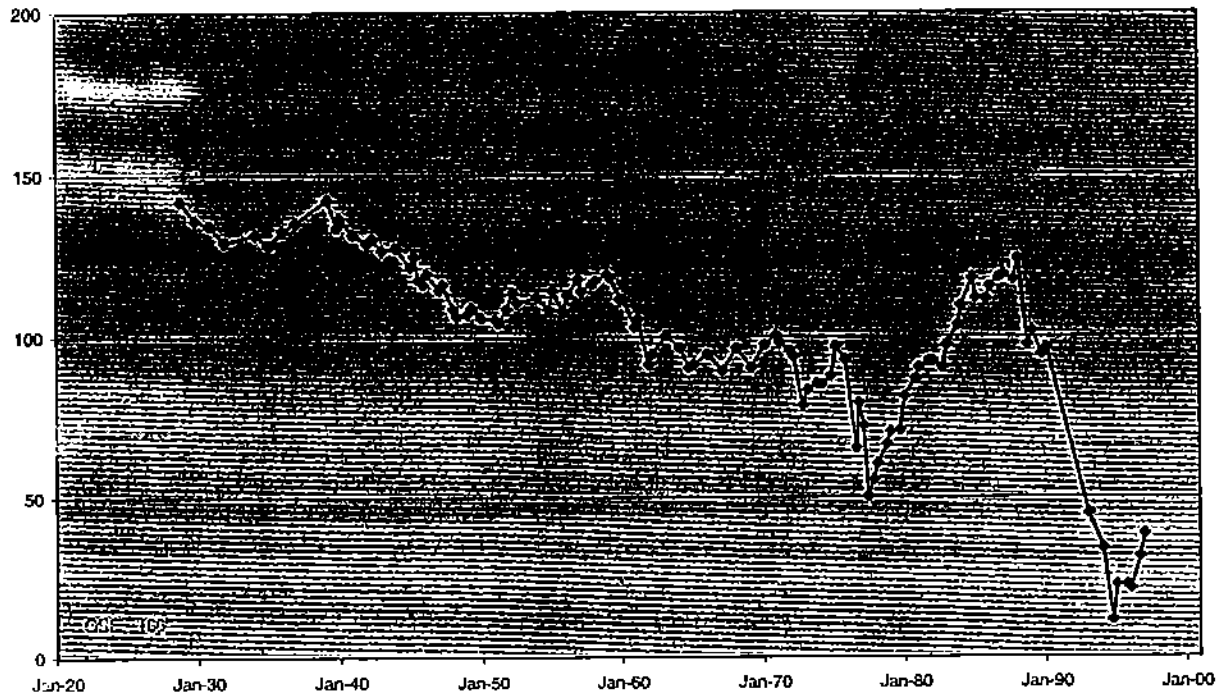
9S/15E-35 C01



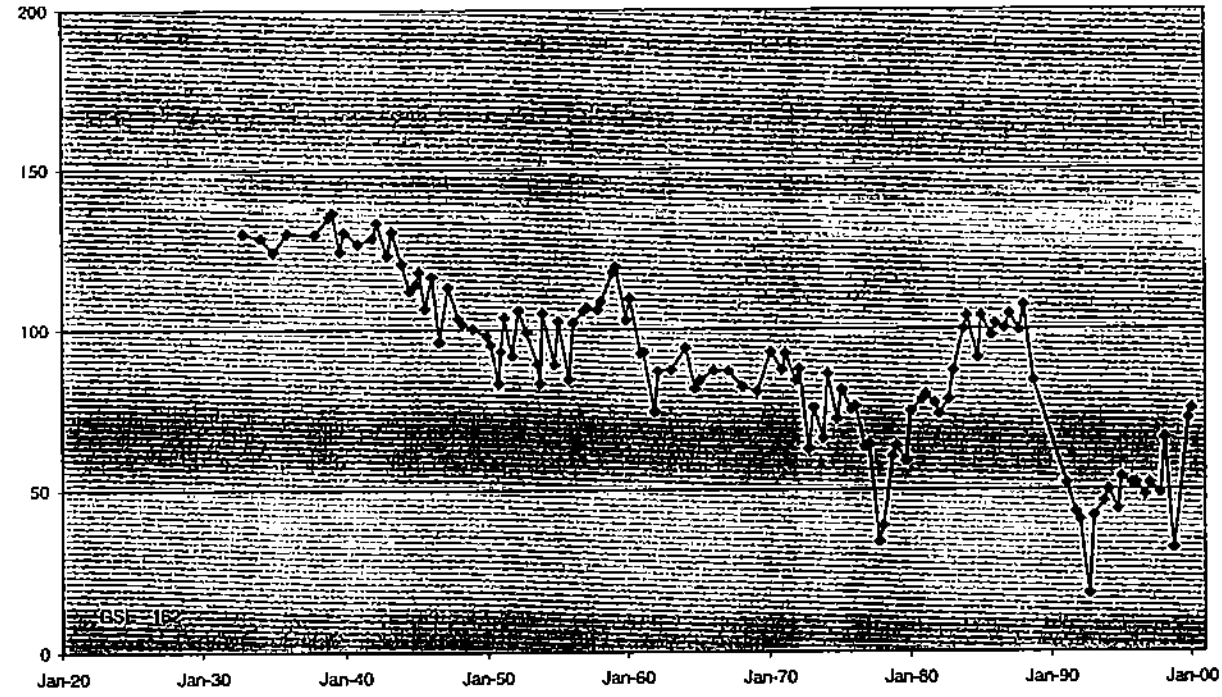

9S/17E-20 L1



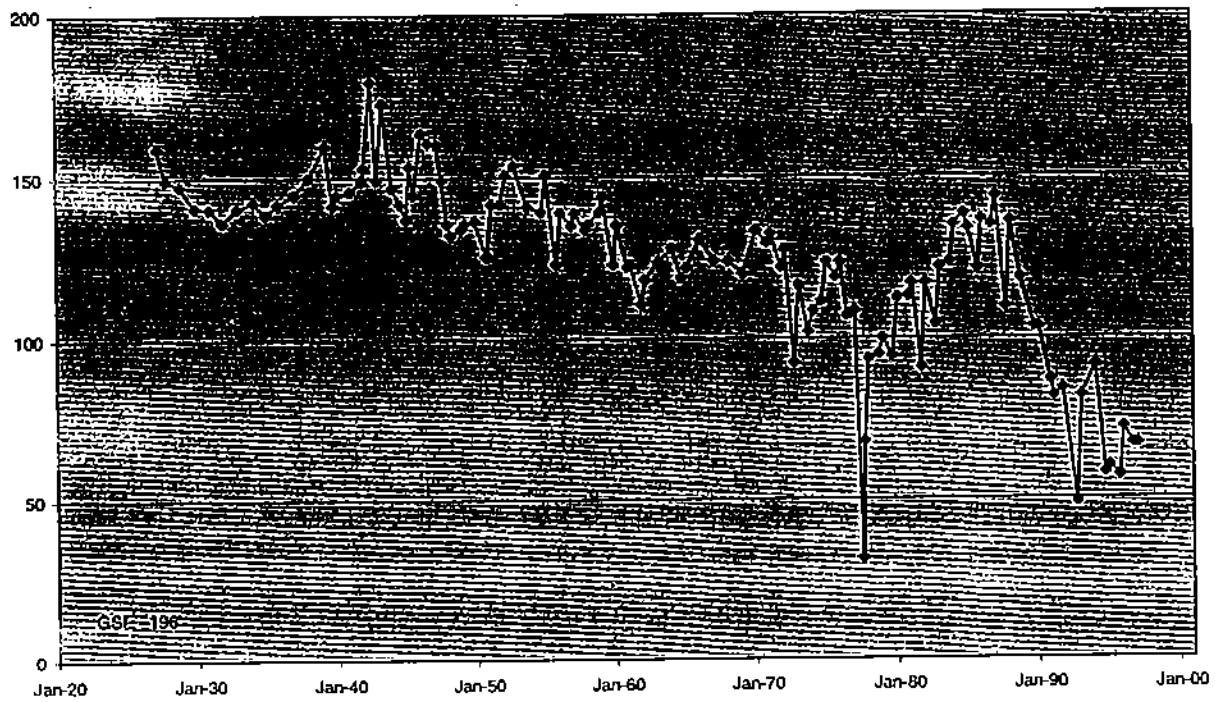
10S/14E-3 A1



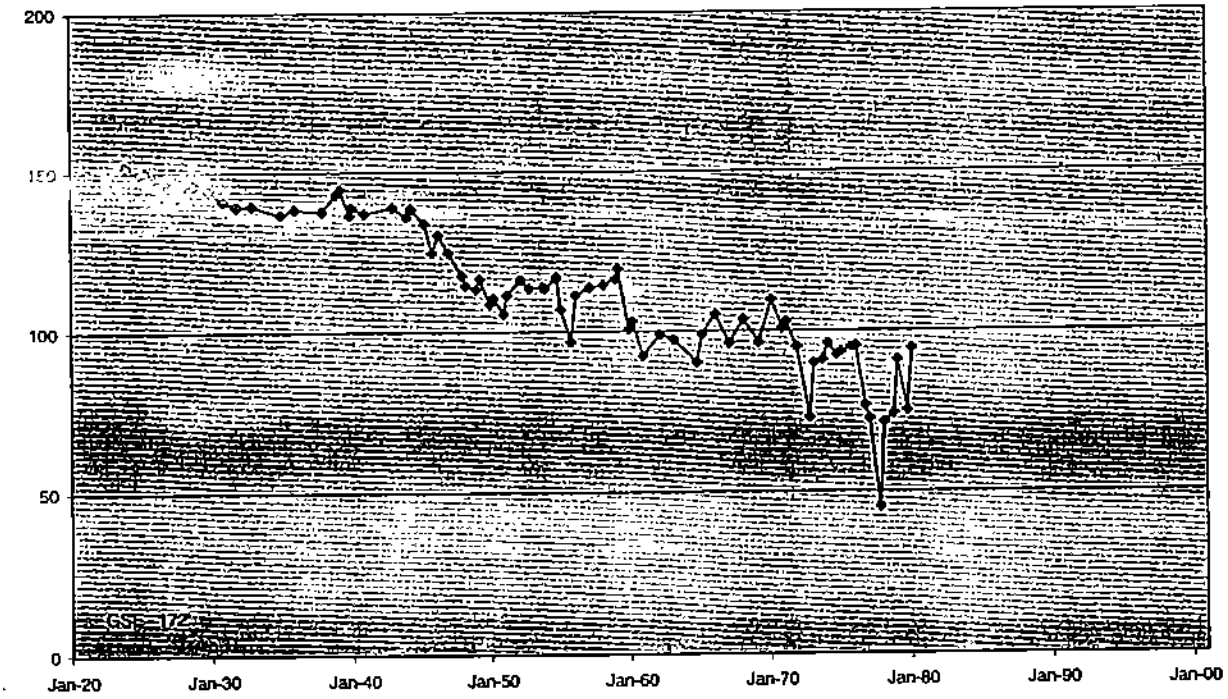

10S-14E-10H1



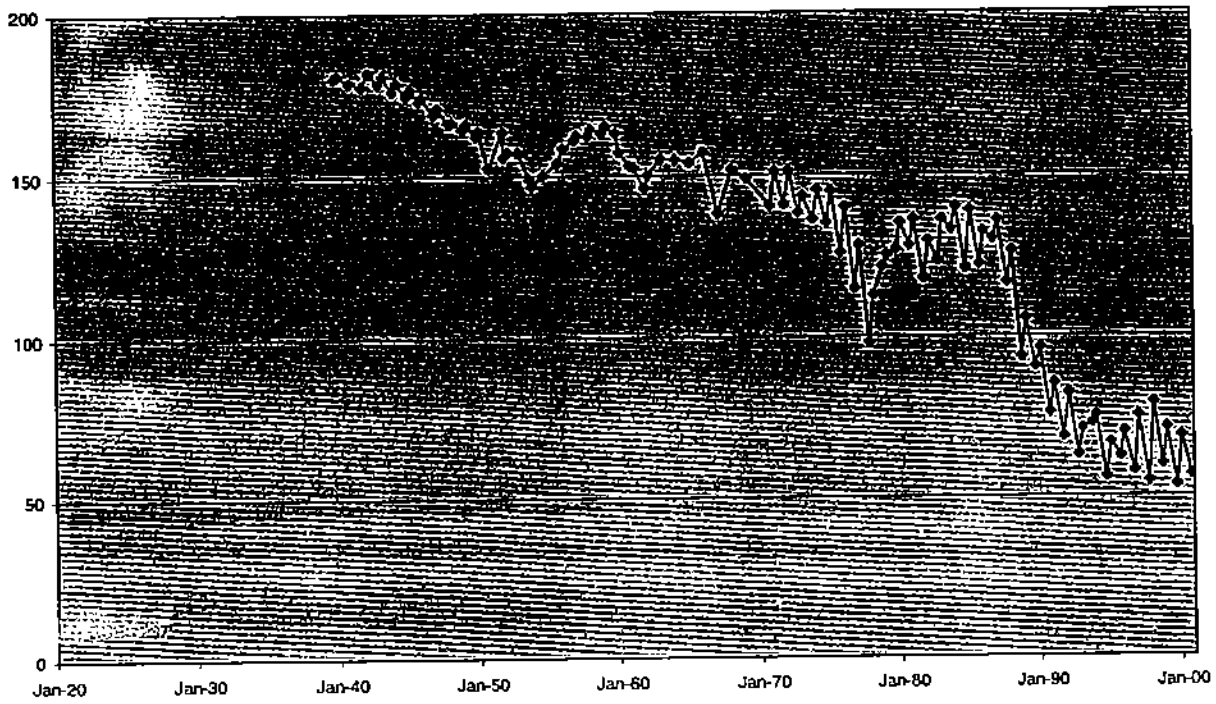
10S/15E-26A1




10S/15E-32A1



10S/16E-26 B01

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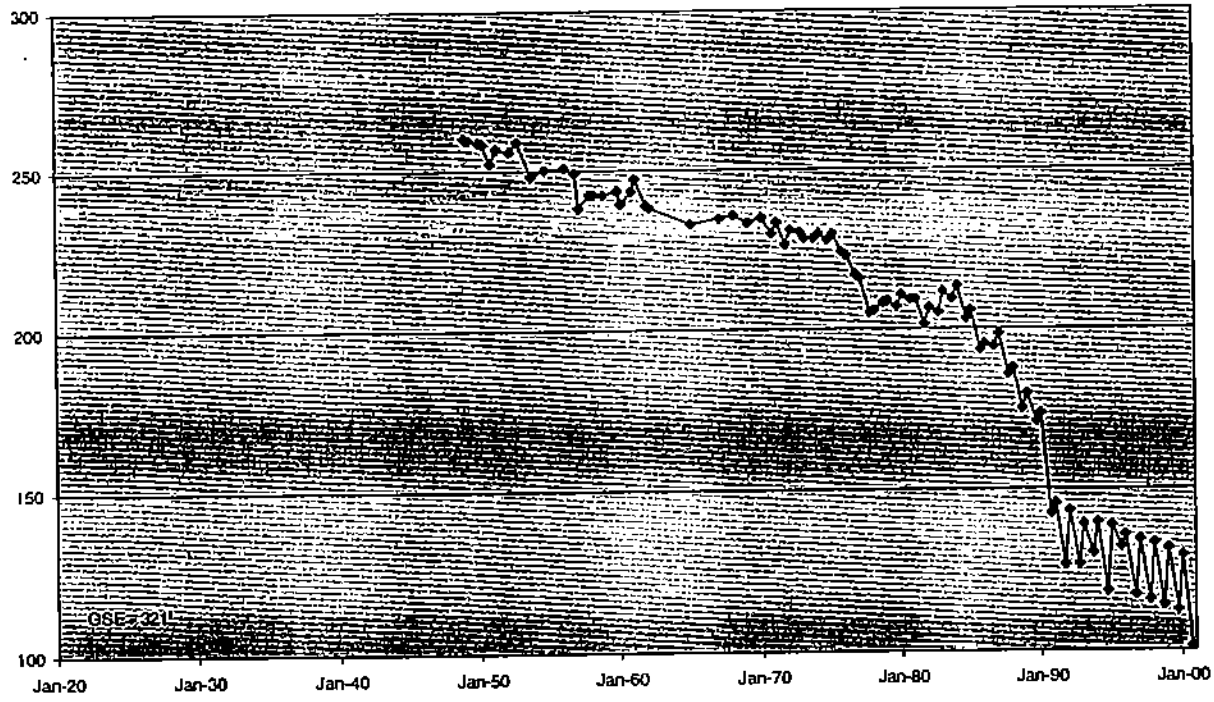

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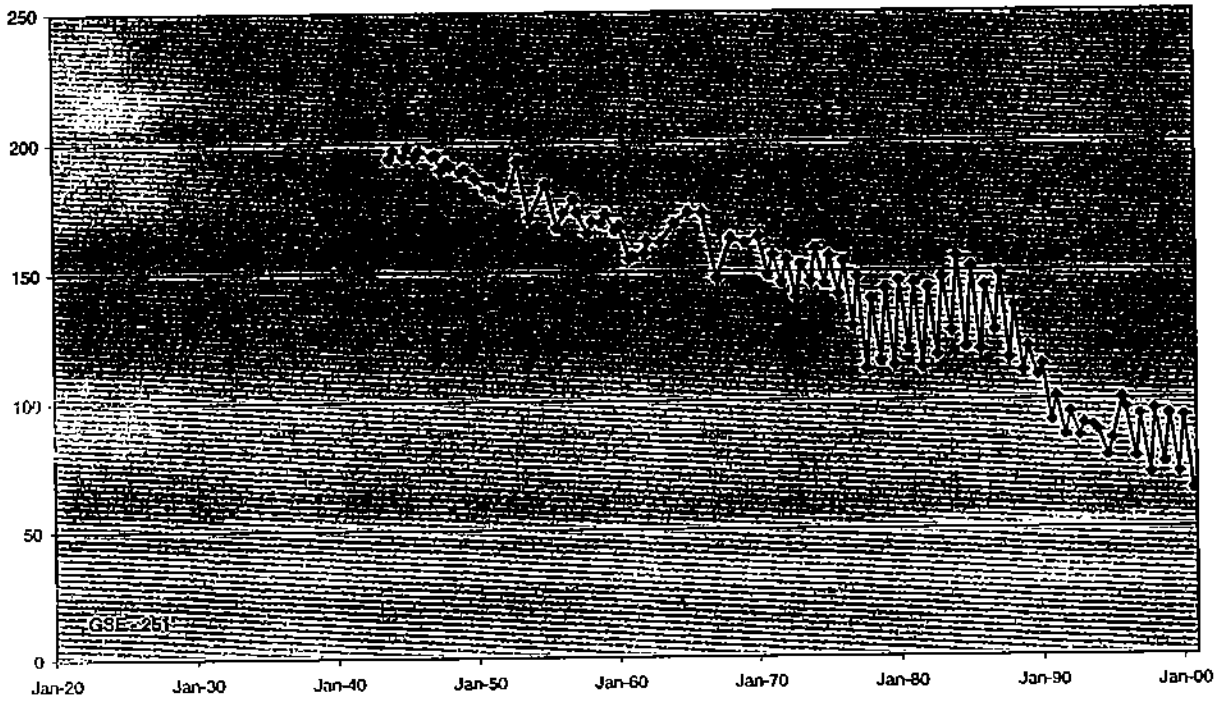


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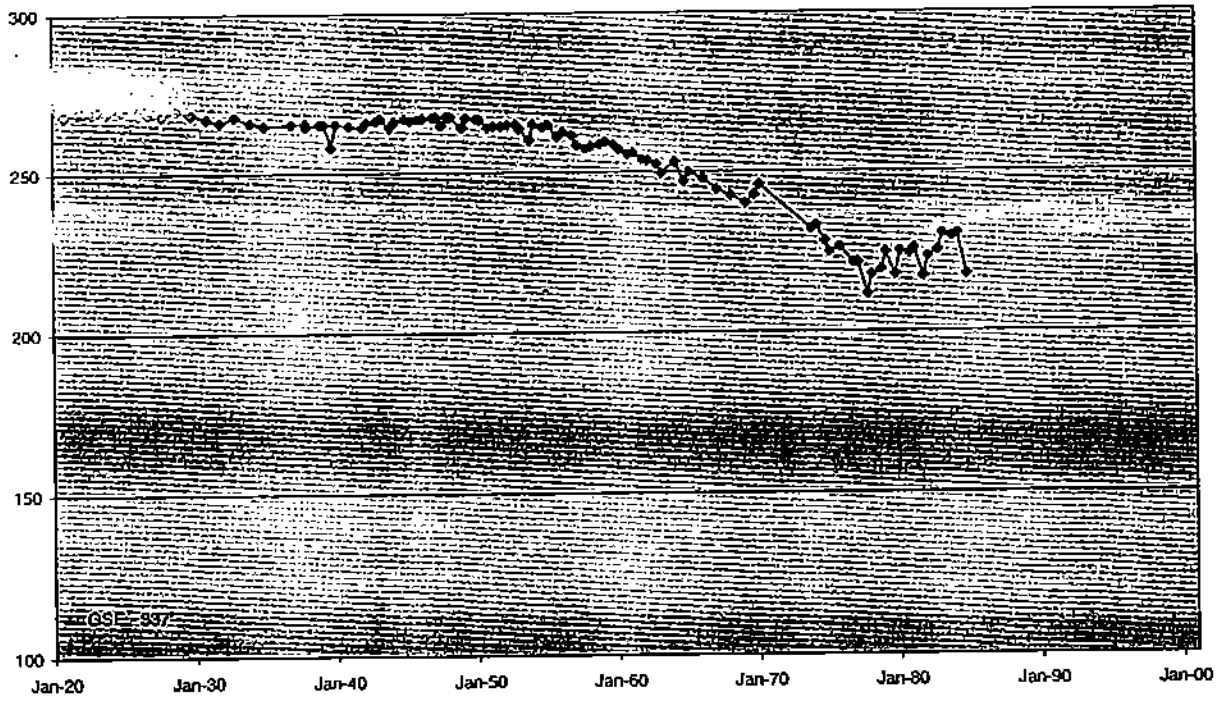

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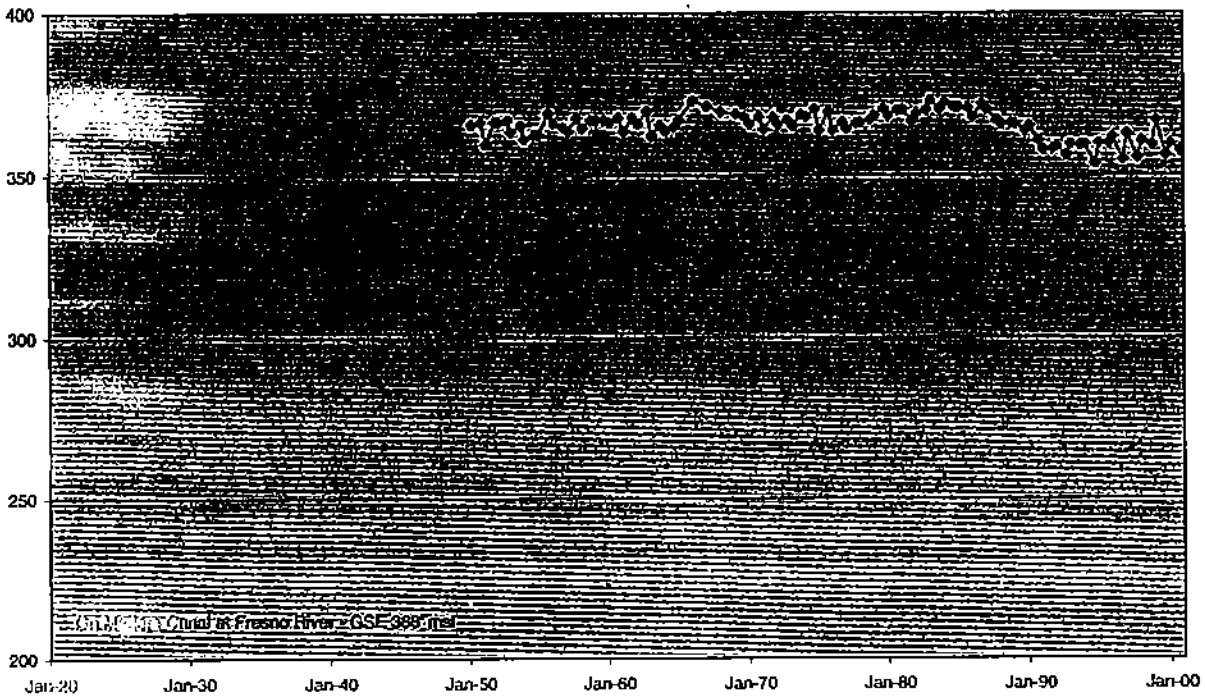


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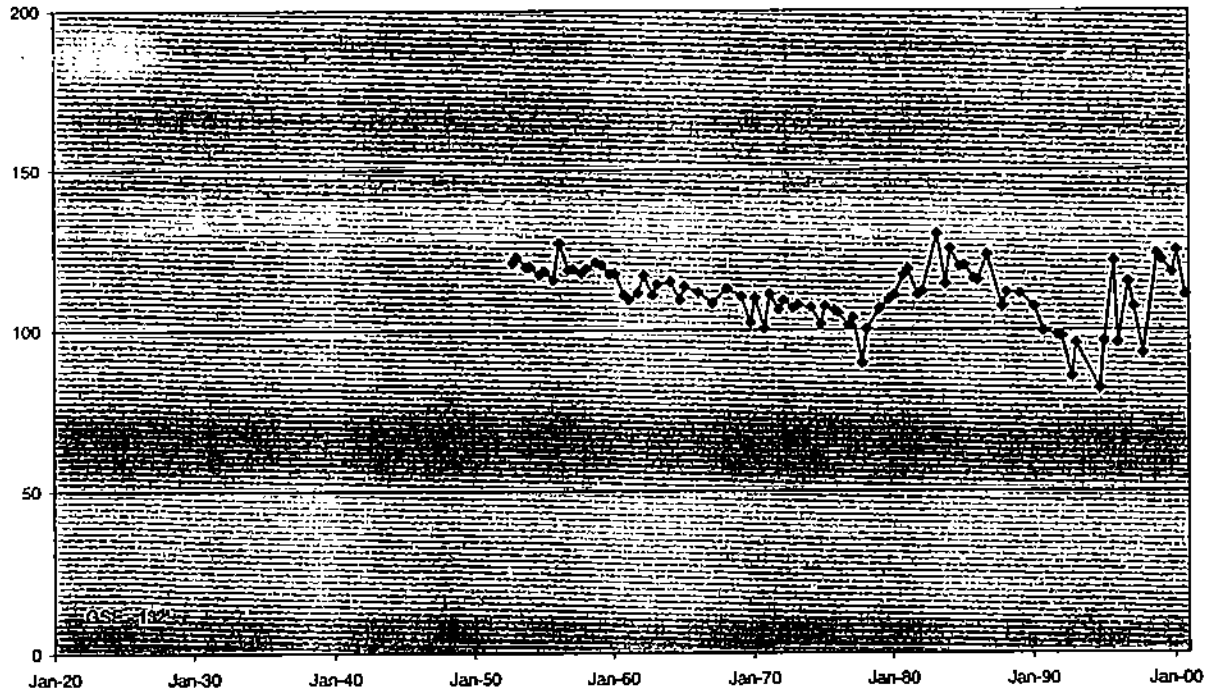

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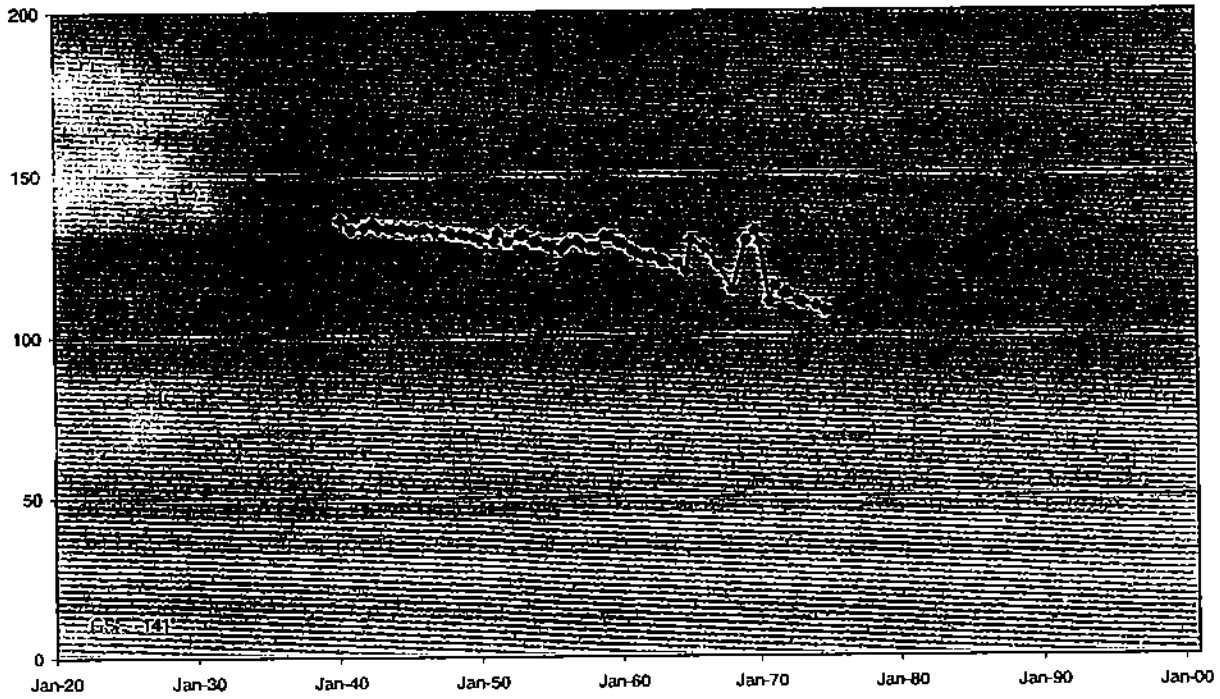


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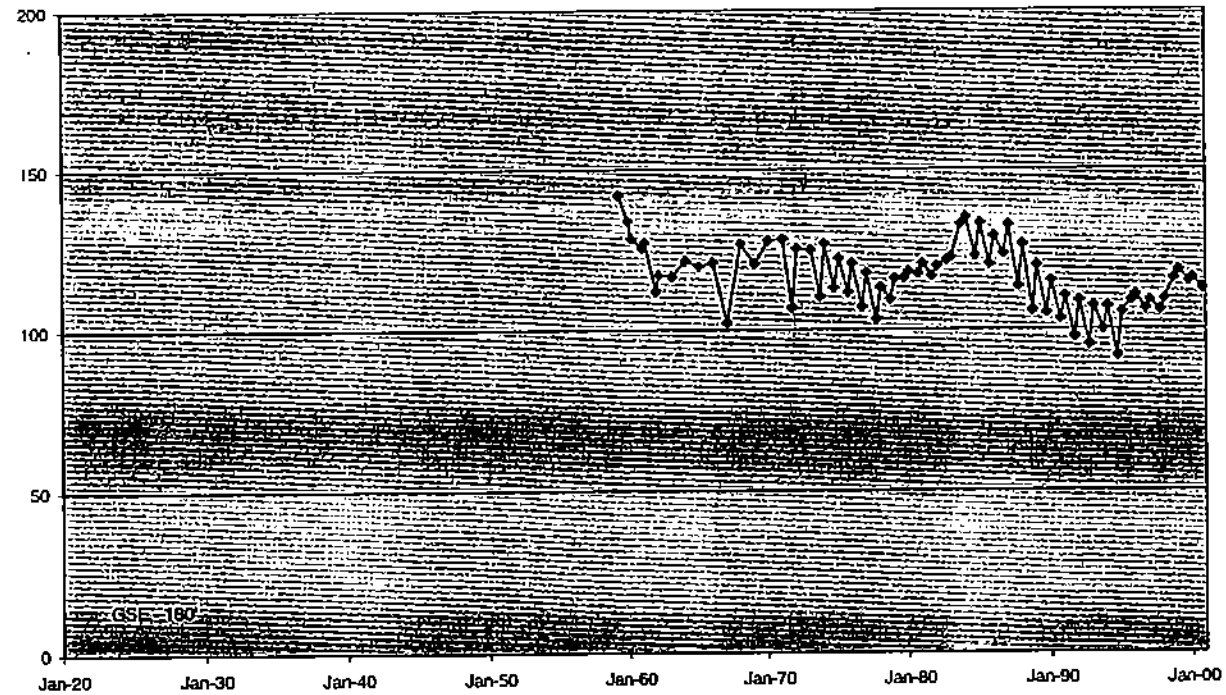

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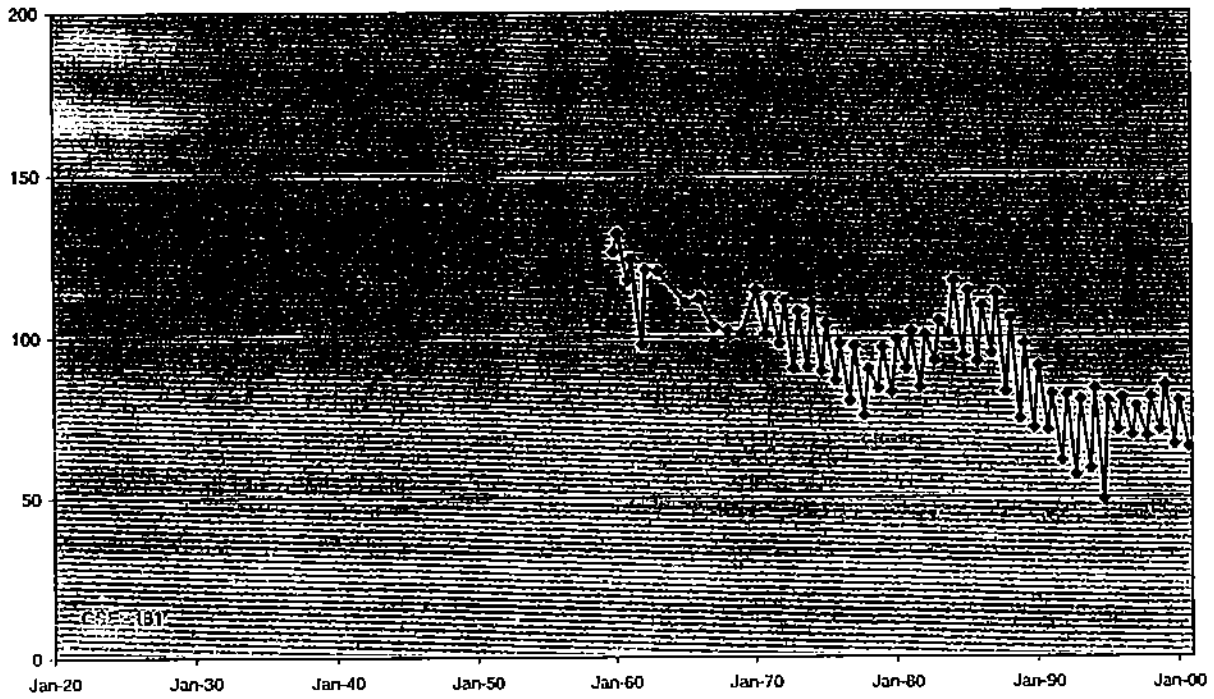


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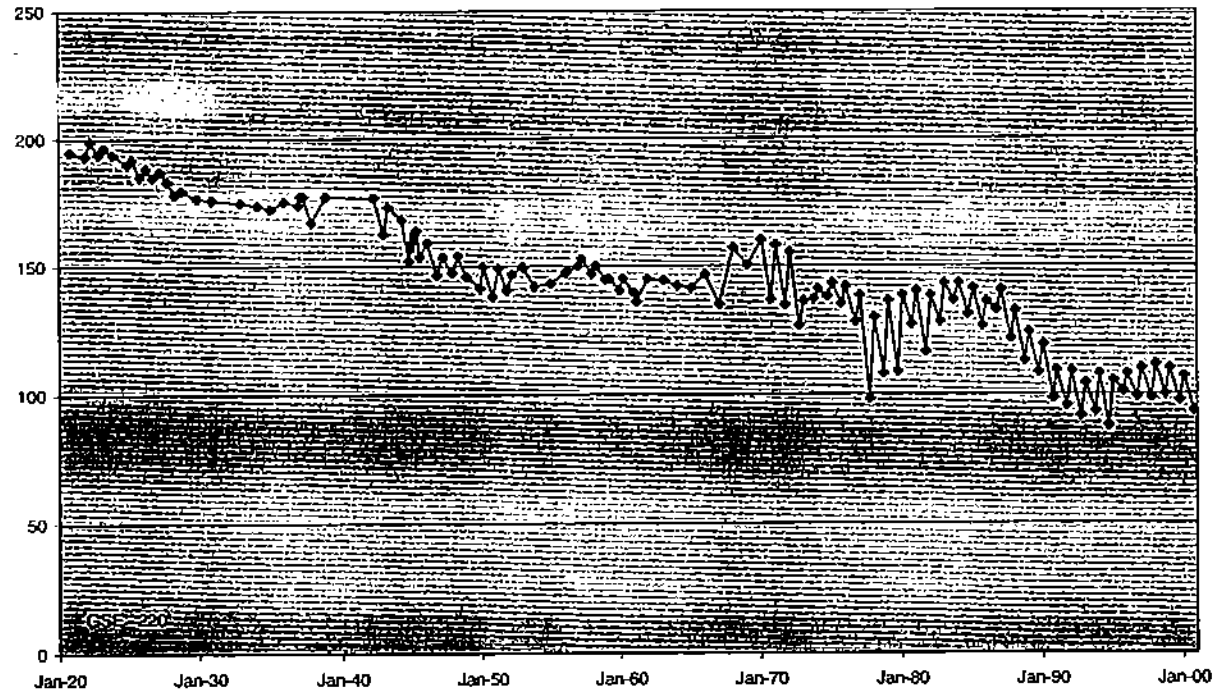

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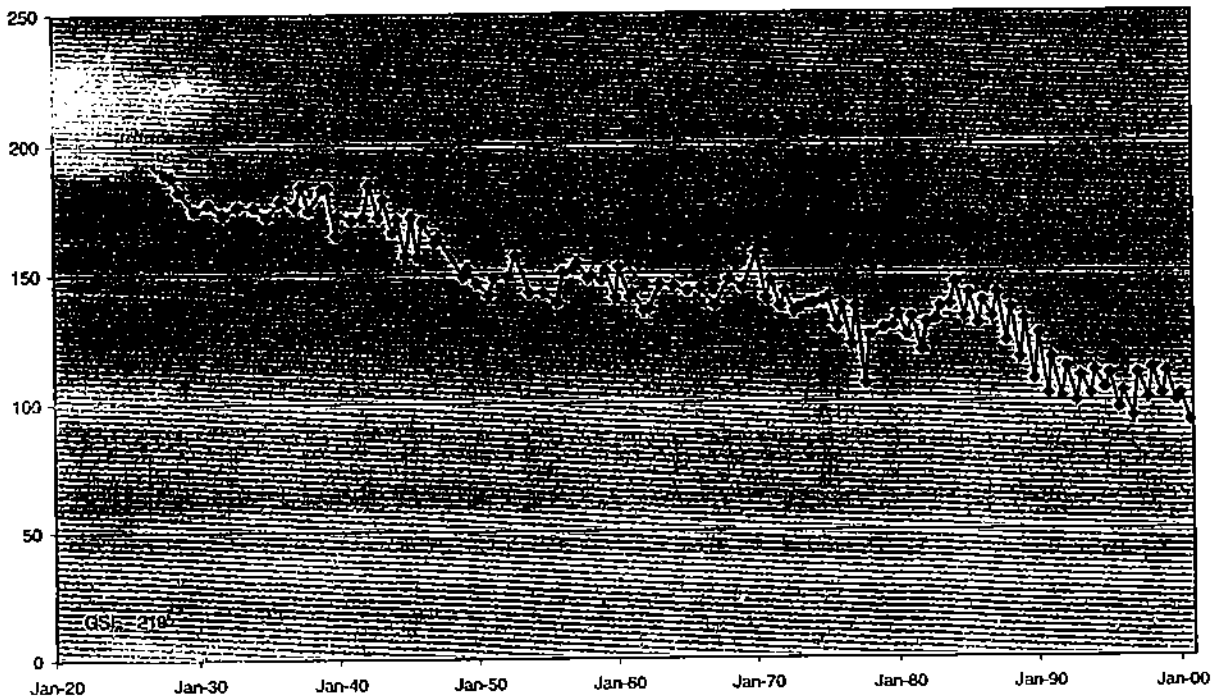


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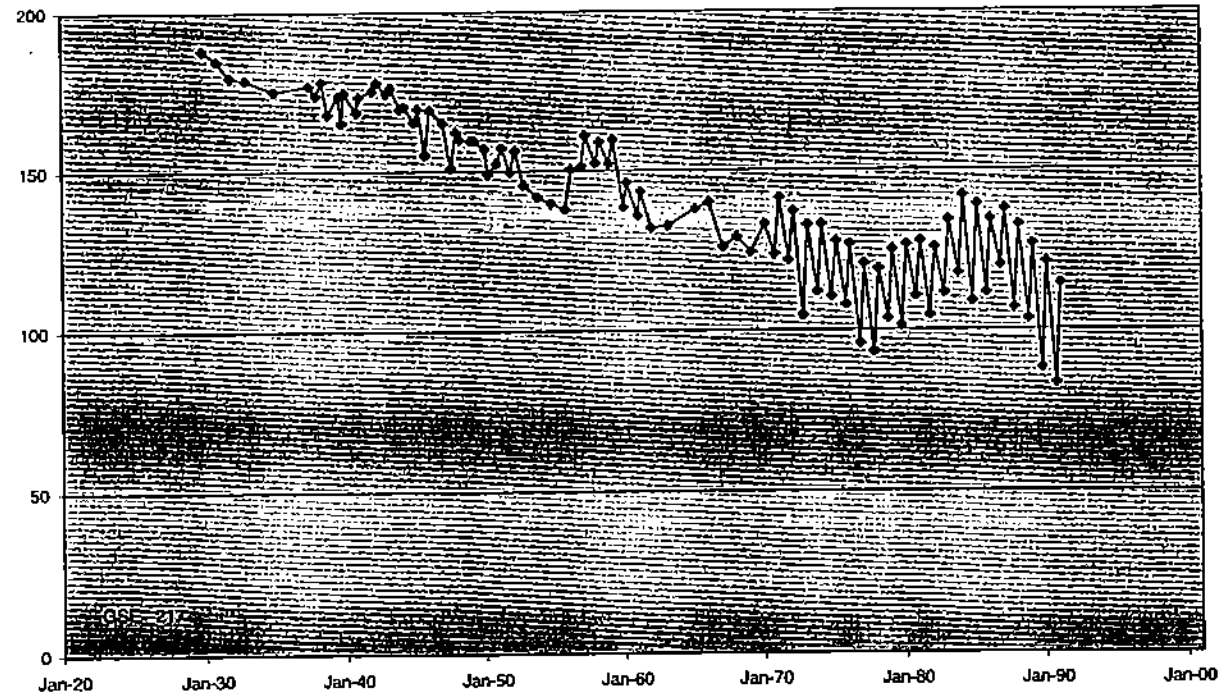

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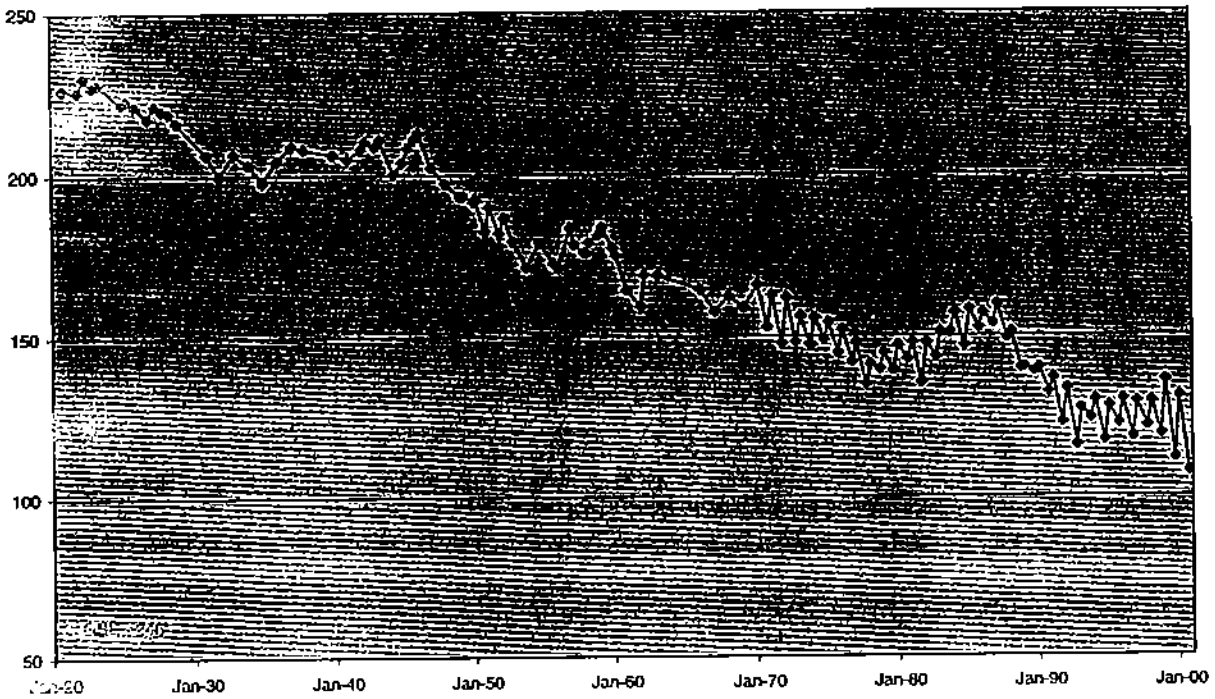


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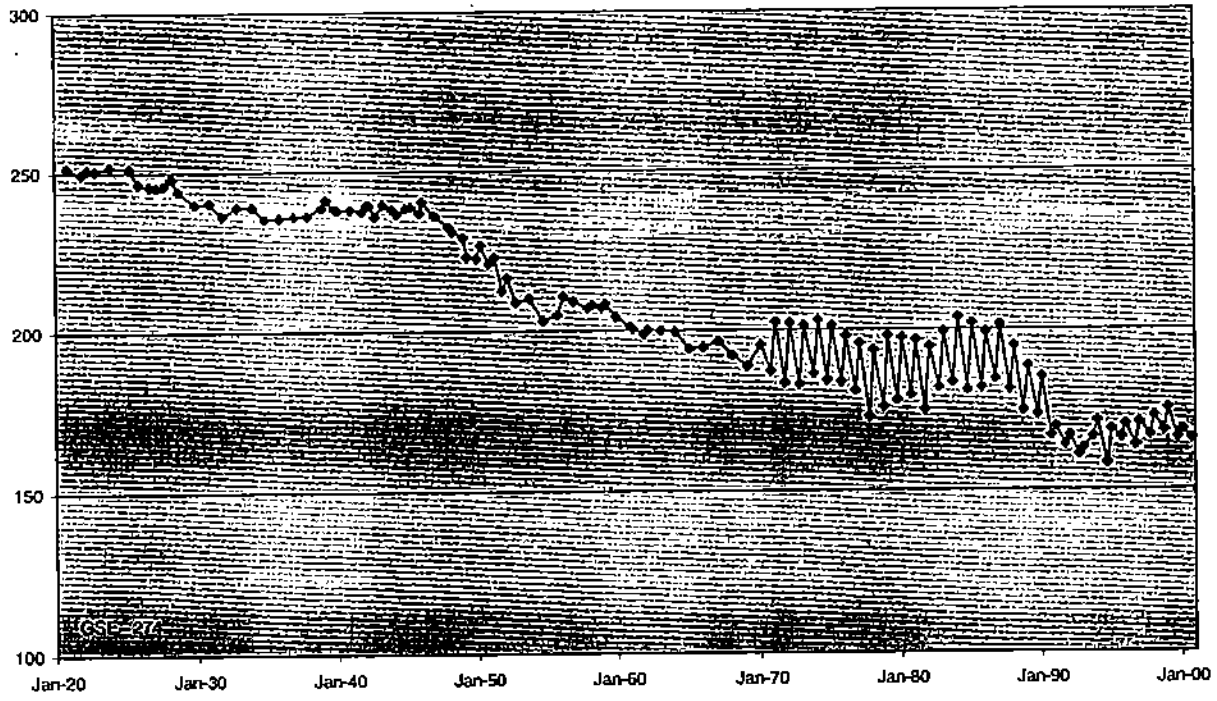

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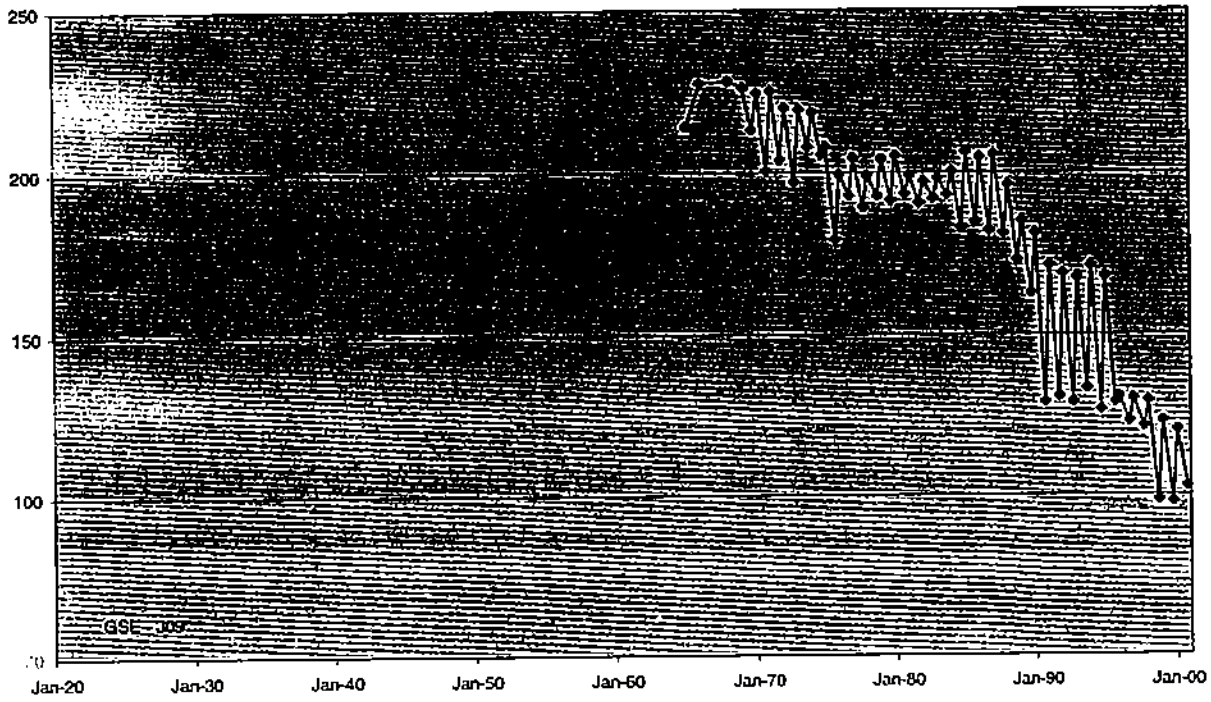


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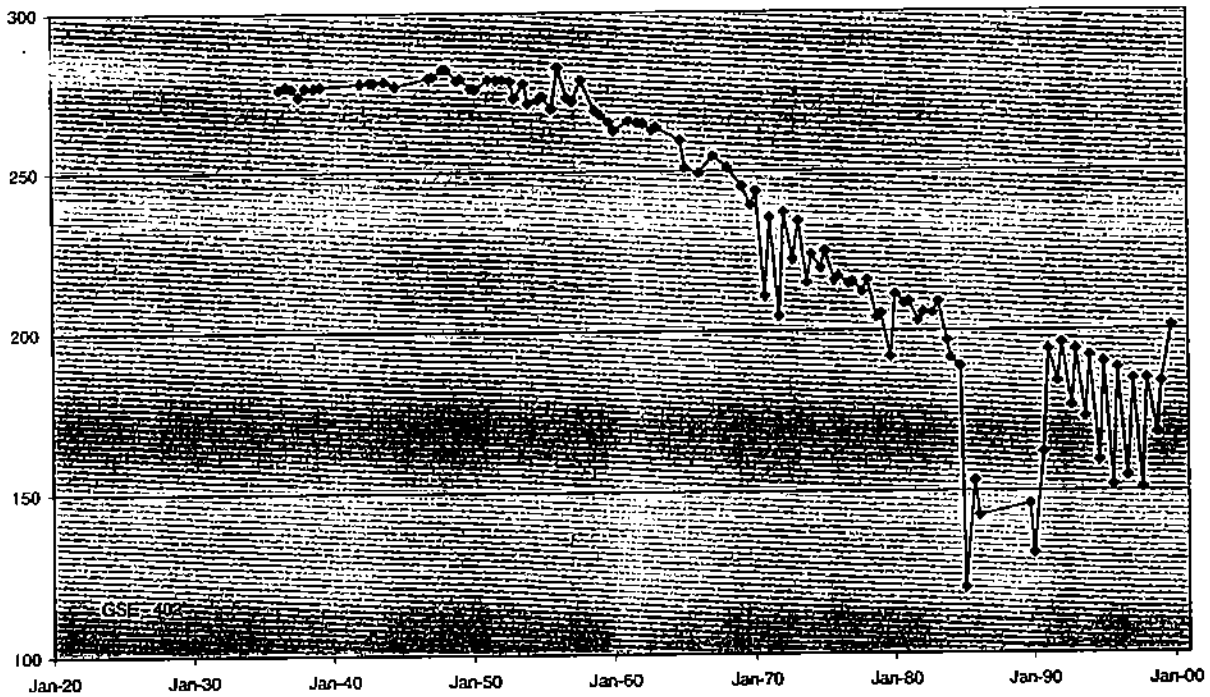

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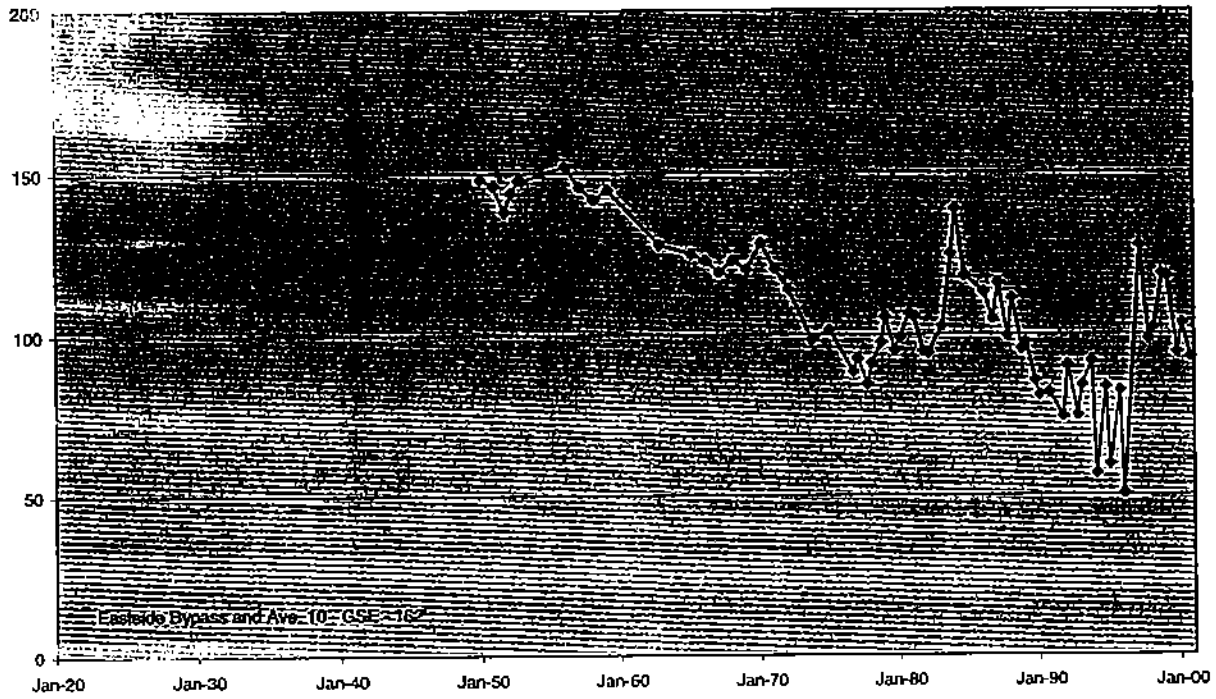


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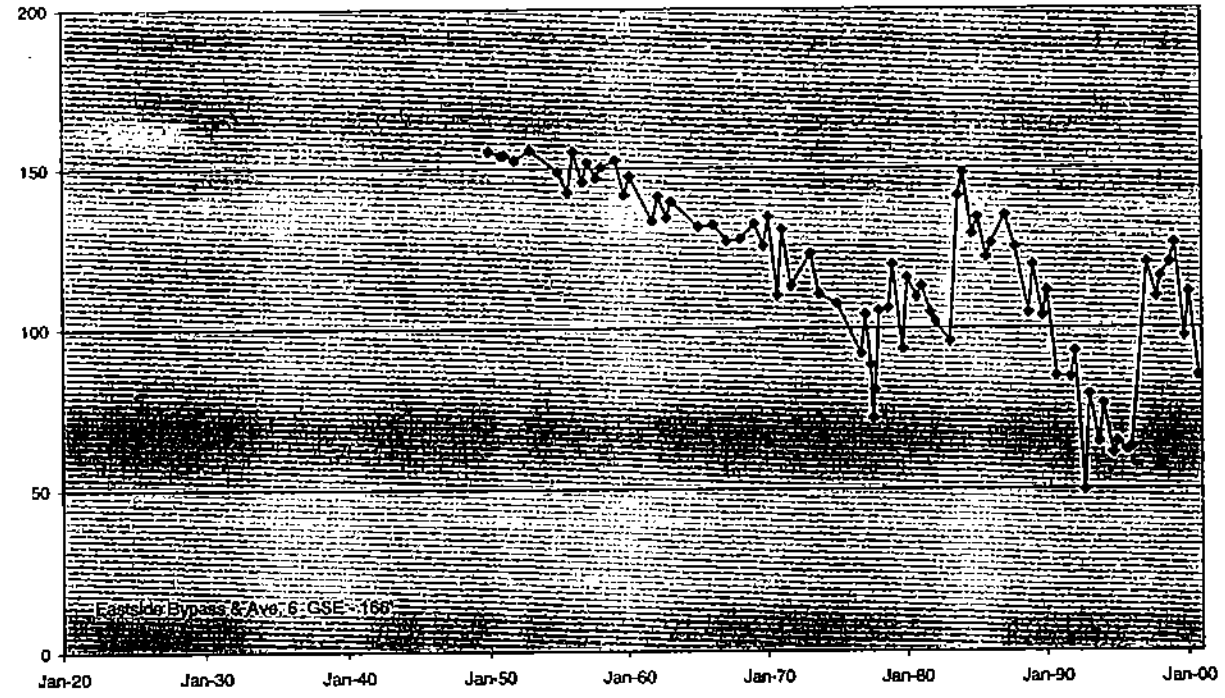

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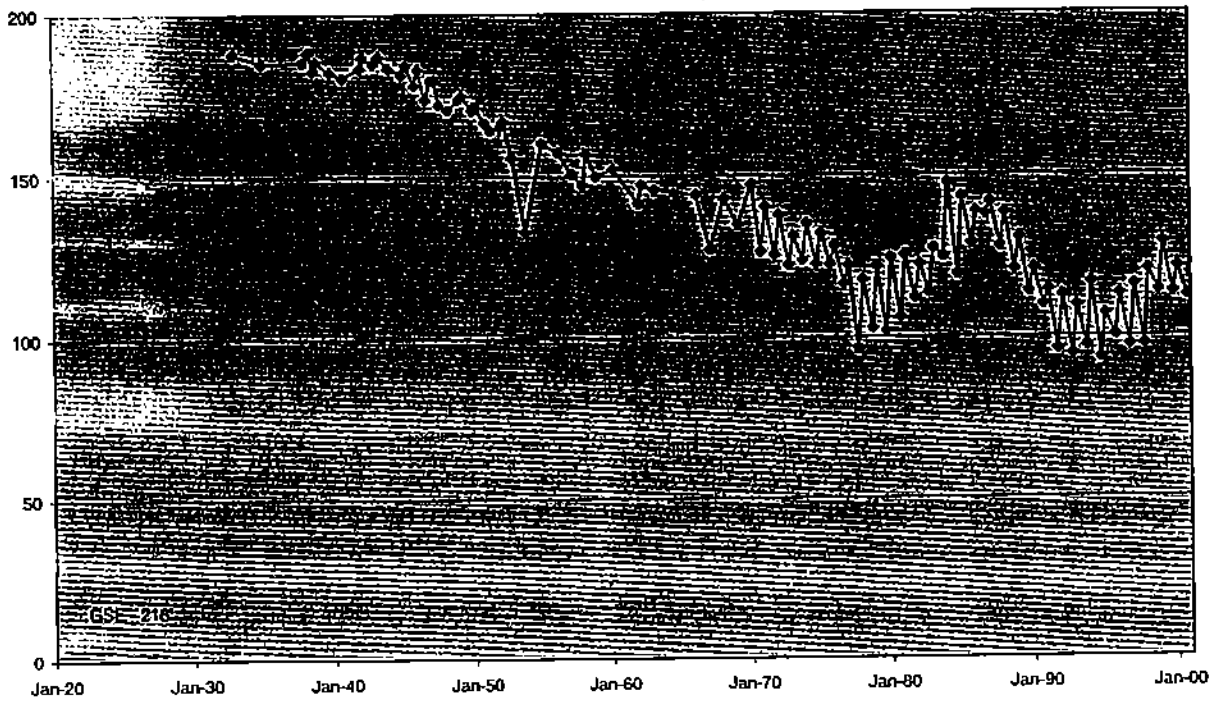


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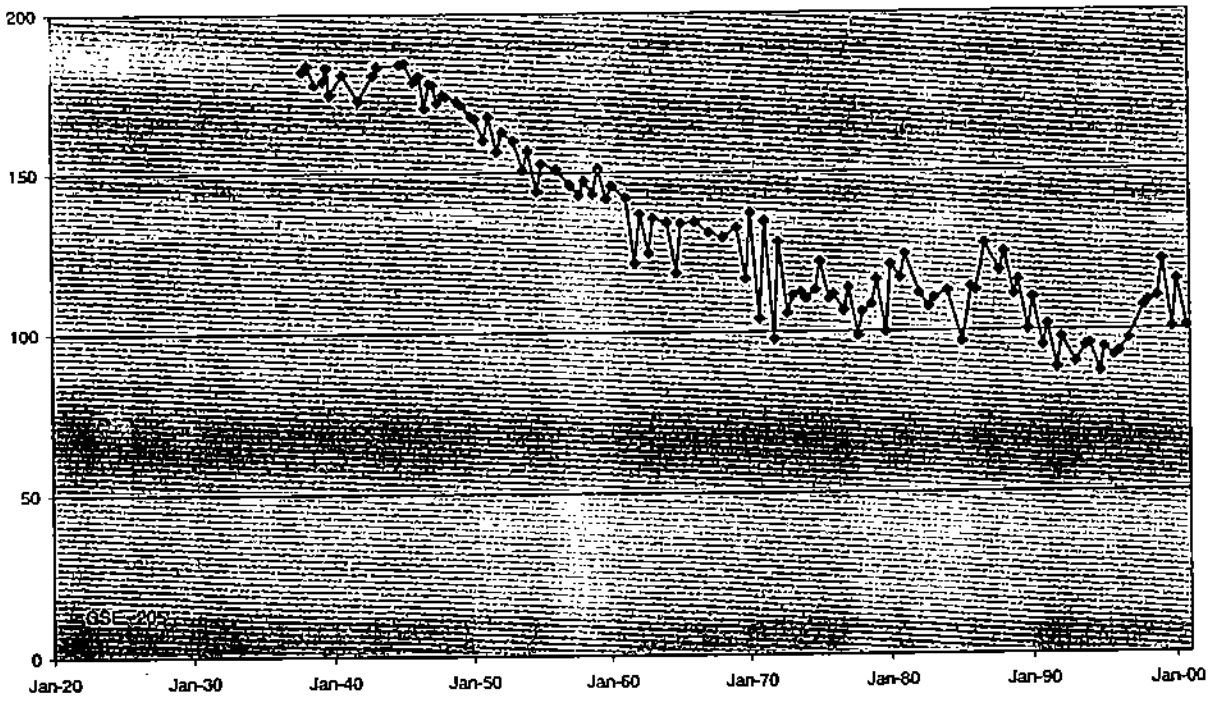

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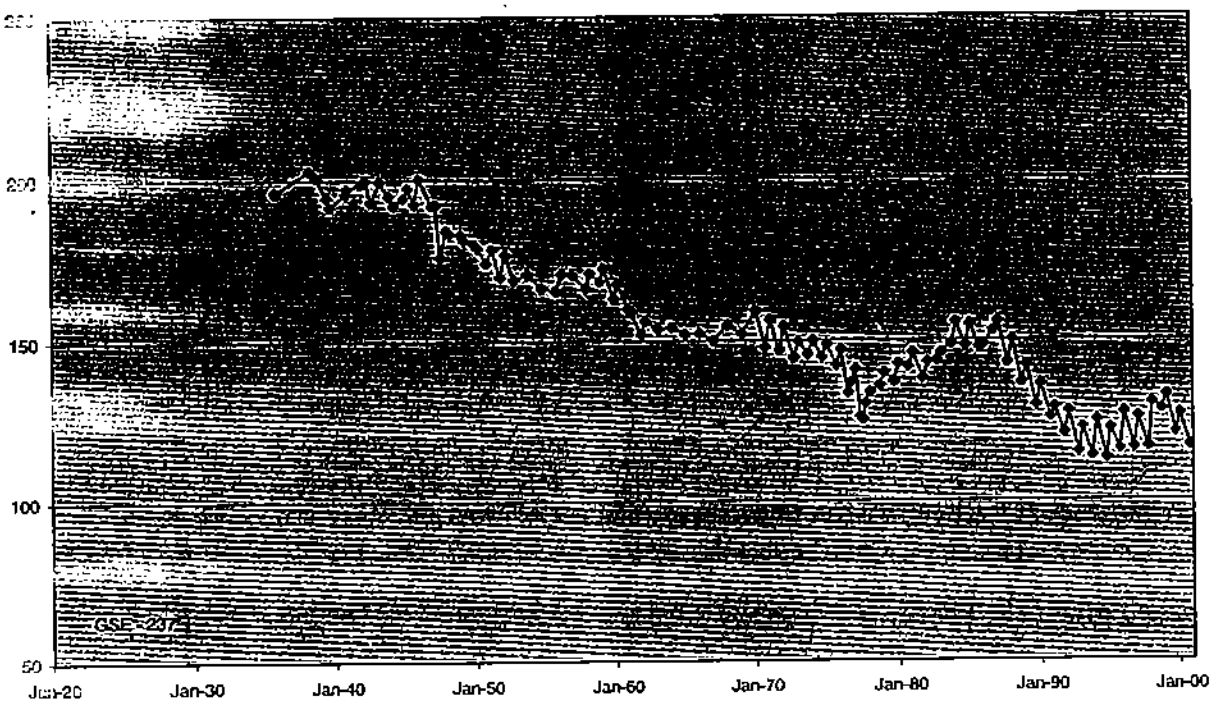


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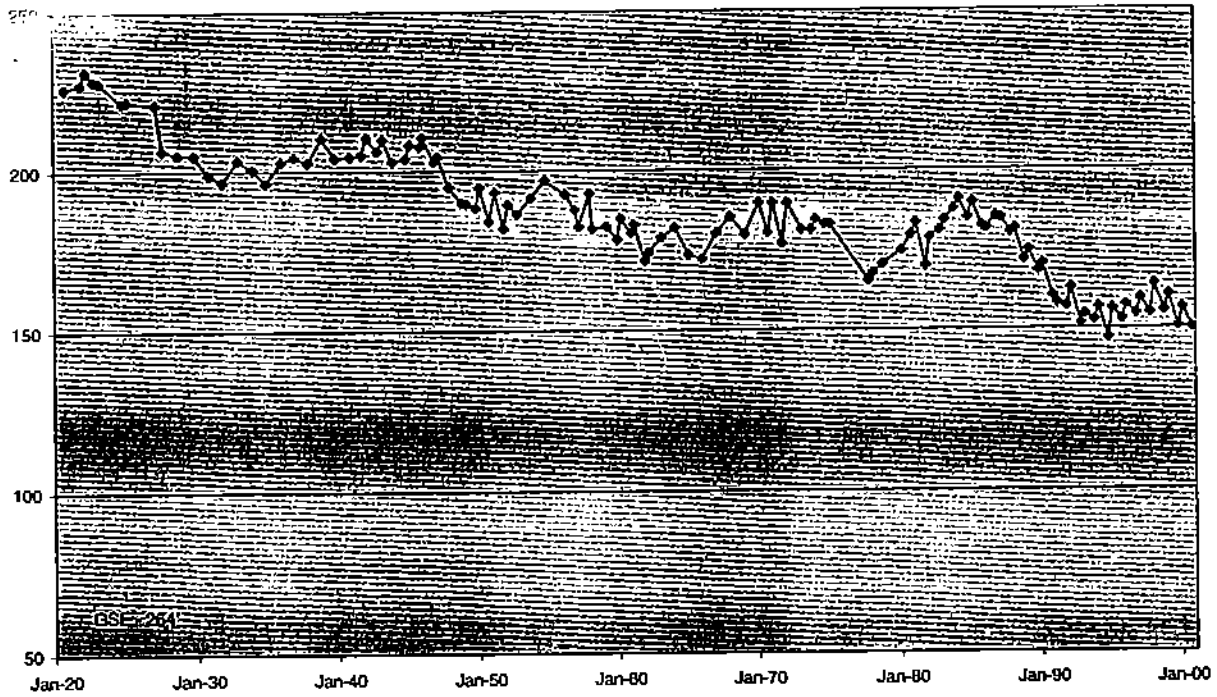

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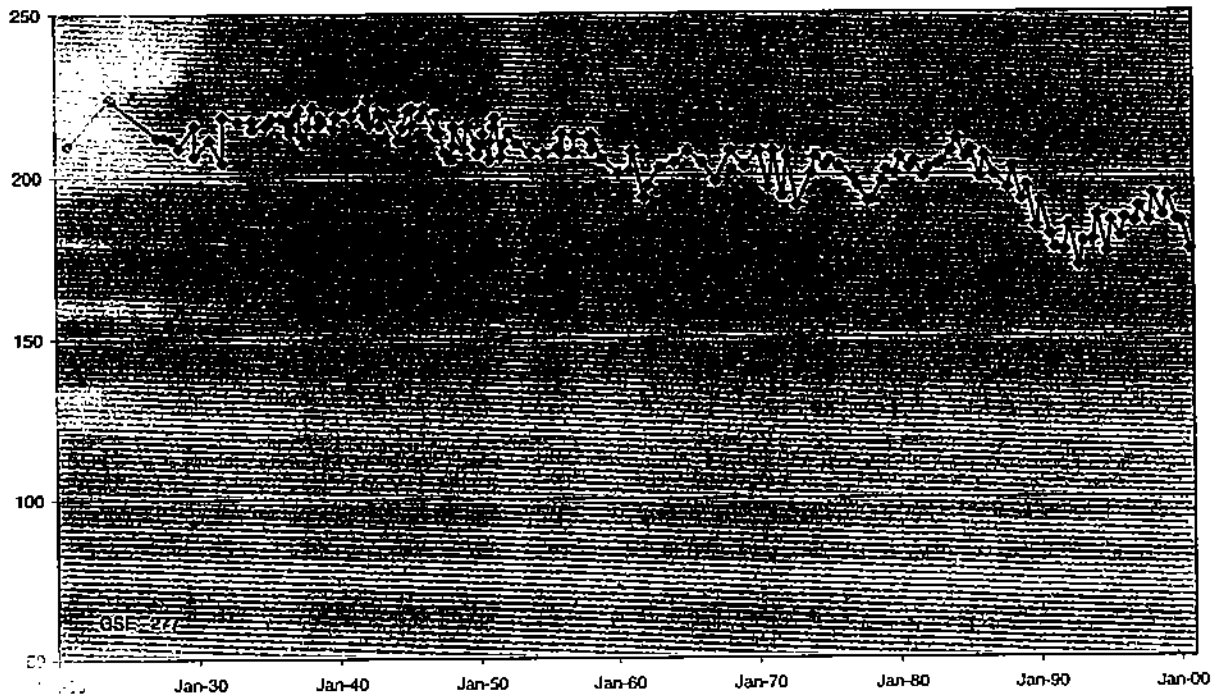


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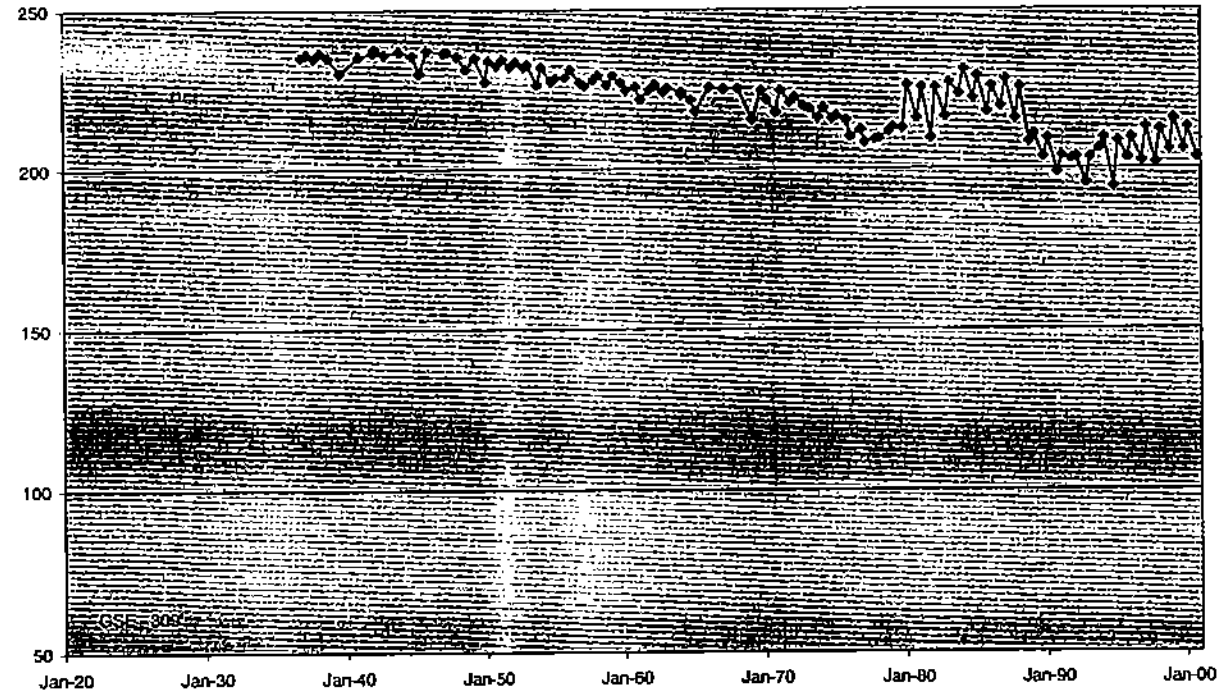

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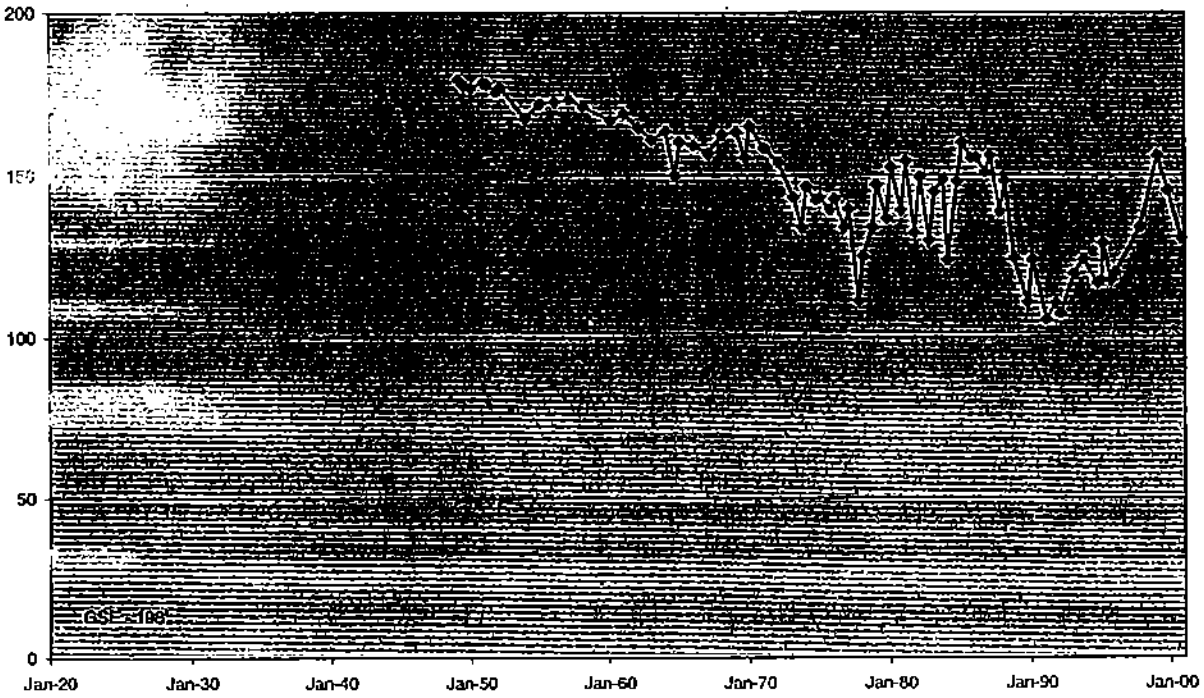


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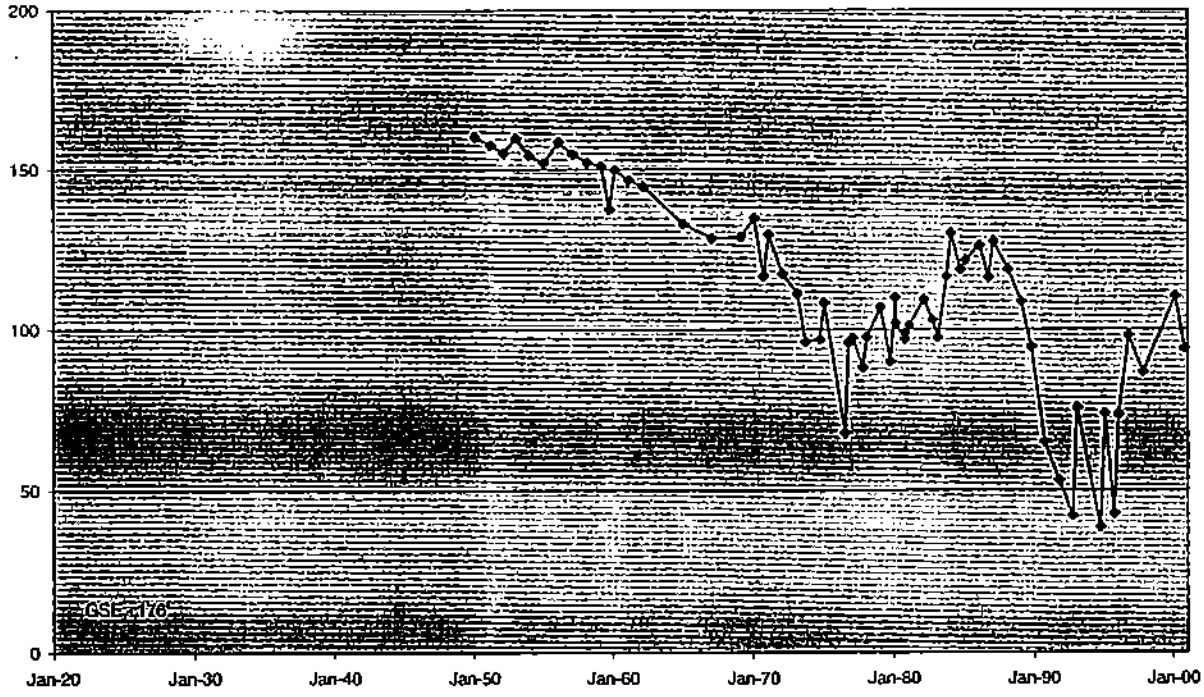

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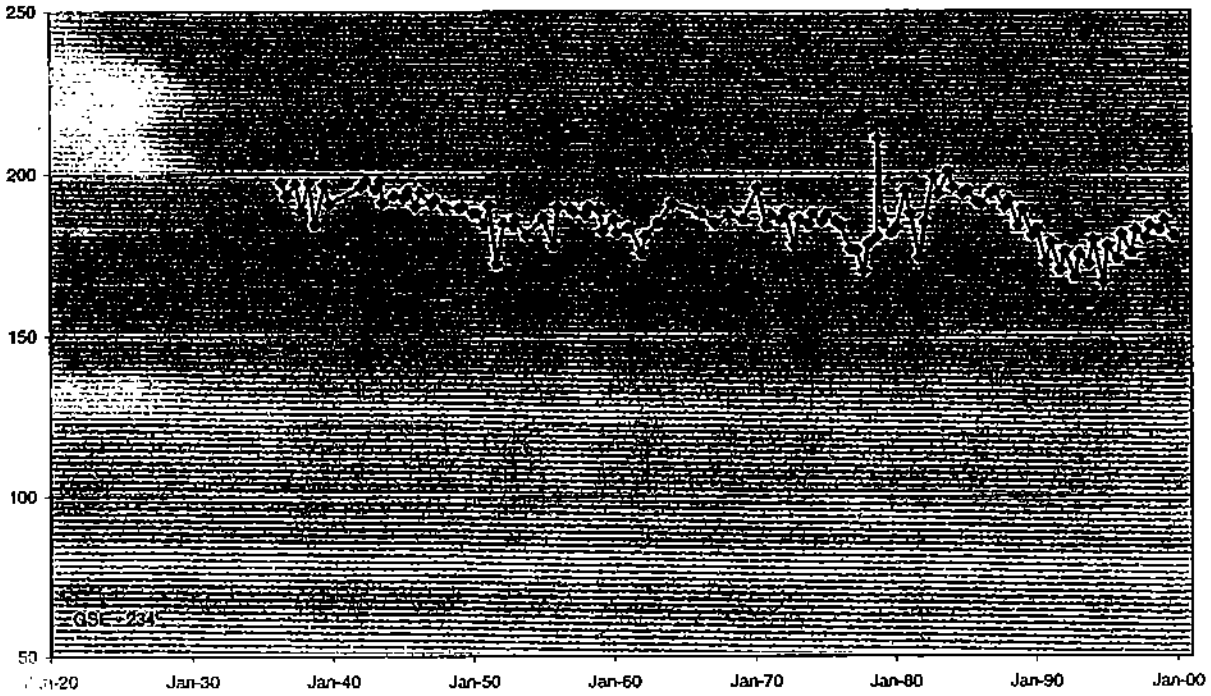


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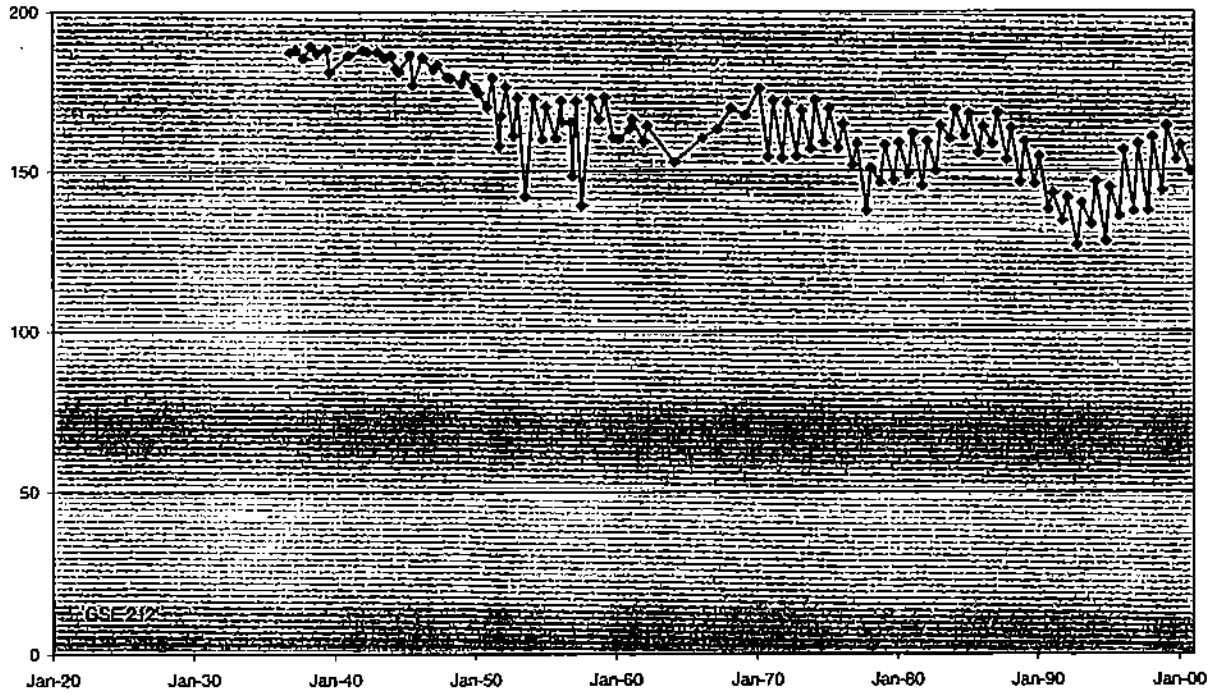

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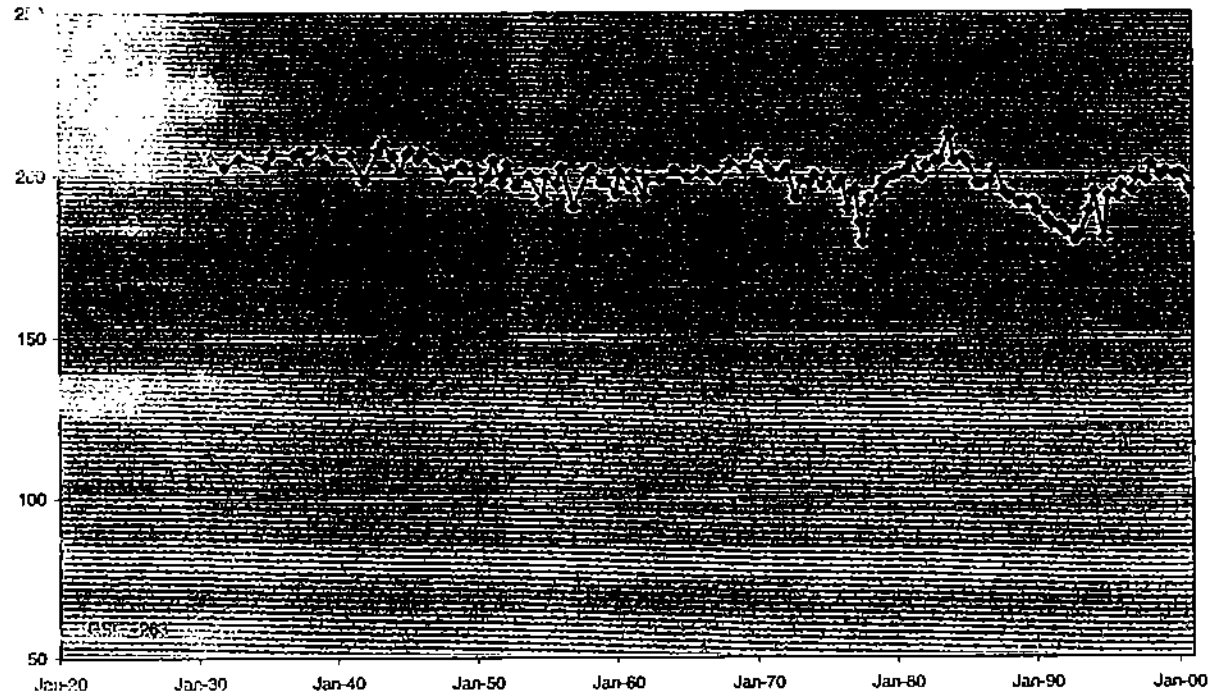


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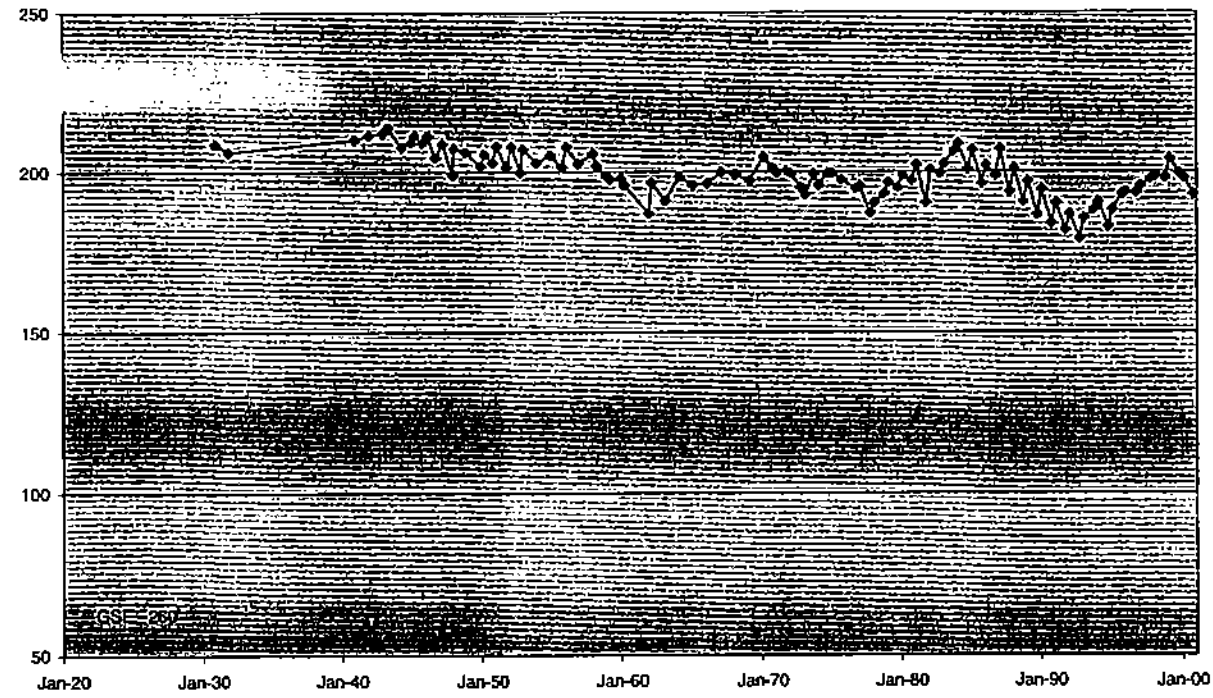
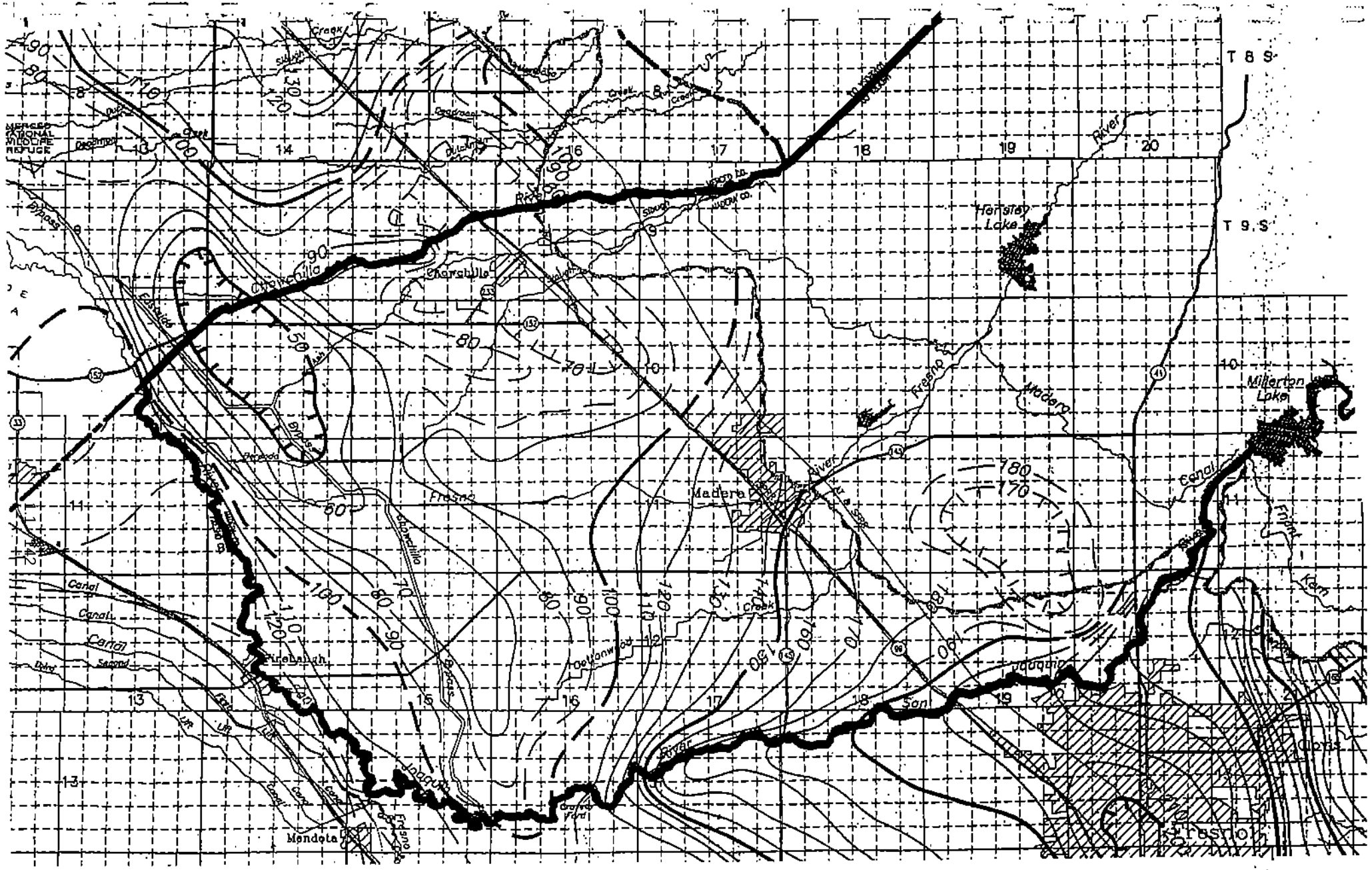


# APPENDIX C

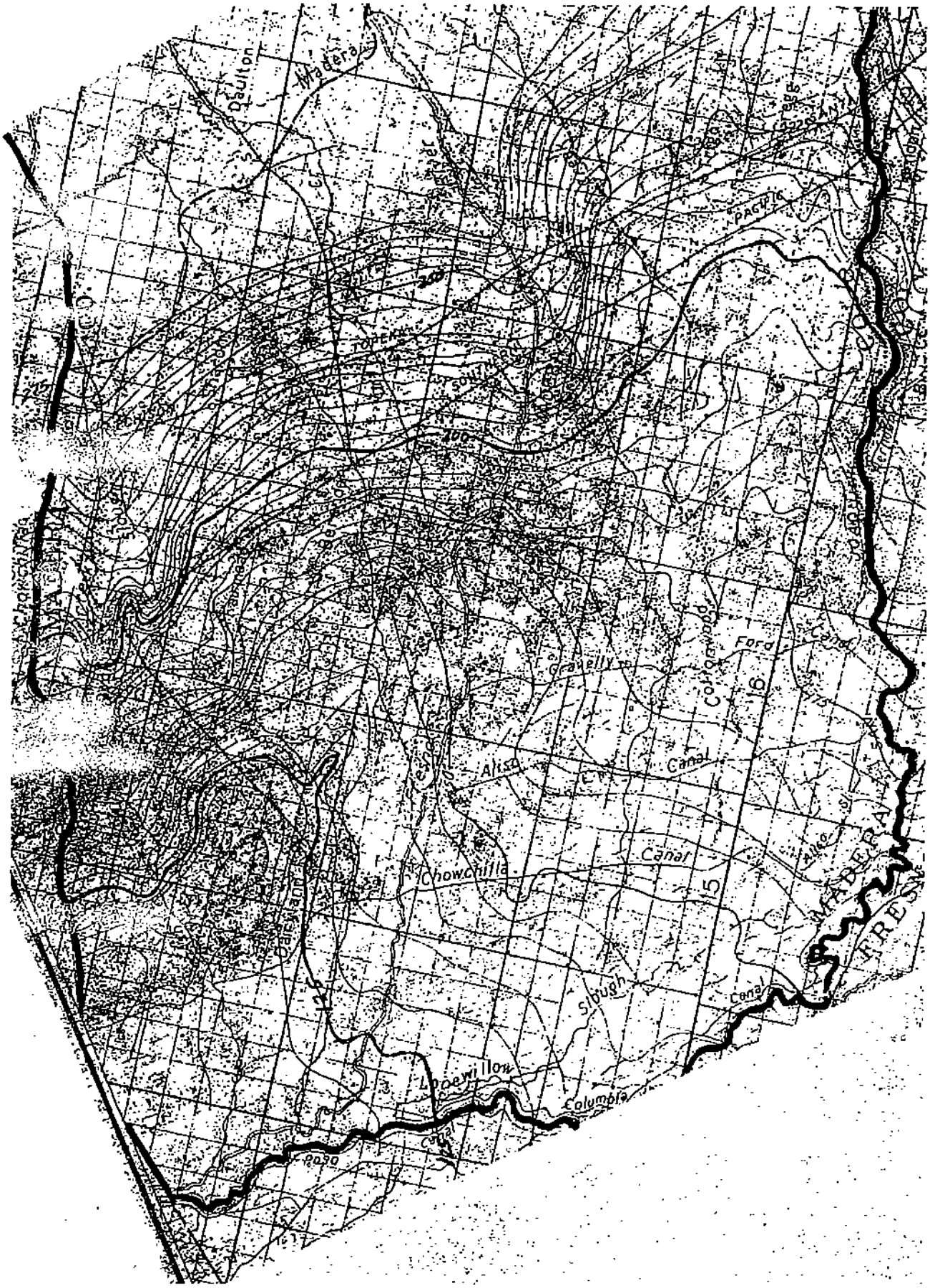
## Water Level Contour Maps




Spring 1995
Source DWR

Spring 1978
Source DWR

Spring 1958
Source DWR


Madera
Chowchilla
Canal
Slough
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 boundaries 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

# Distribution List

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Madera Irrigation District
12152 Road 28 ¼
Madera, CA 93637

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Coarsegold Resource Conservation District
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Coarsegold, CA 93614

Kole Upton
Chowchilla Water District
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Chowchilla, CA 93610

Michael Kirn
County of Madera – Engineering Department
135 W. Yosemite Ave.
Madera, CA 93637

Leonard Garoupa
County of Madera – Planning Department
135 West Yosemite Ave.
Madera, CA 93637

Kenneth Fransen
Bolen, Fransen & Boostrom, LLP
345 Pollasky Avenue
Clovis, CA 93612

Jill Nishi
Wayne Fox
Madera County – Environmental Health
216 W. 6th Street
Madera, CA 9363

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# Attachment 1.1, Madera Irrigation District Groundwater Management Plan

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File Copy Amended Nov 2000

# AB3030 Groundwater Management Plan

May 1999

## Madera Irrigation District

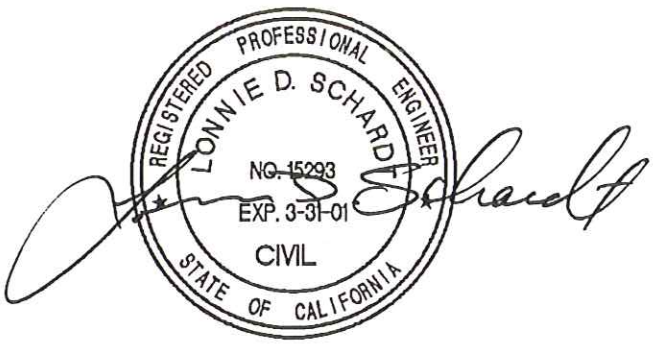
BOYLE ENGINEERING CORPORATION

# AB3030 Groundwater Management Plan

## Madera Irrigation District


## Boyle Engineering Corporation

Lonnie D. Schardt, PE Project Manager
Kassy D. Smith, EIT Project Engineer



FR-M50-101-01

May 1999





BOYLE 1044 E. Herndon Avenue, Suite 108, Fresno, CA 93720

# Table of Contents

**Tables**

# Section 1
# Introduction

## 1.1 Legal Authority

In some portions of California, groundwater represents an easily accessible, inexpensive alternative to surface water. Because the groundwater source is easily accessible, it has been heavily relied upon to meet supplemental water supply needs. Excessive use of groundwater has led to land subsidence, groundwater quality deterioration, and overdraft in some areas. Overdraft is the condition whereby the groundwater is extracted in quantities exceeding the long-term recharge replenishment capability of the groundwater basin.

In 1992, the California Assembly took action to address the lack of coordinated groundwater resource management in the State Assembly Bill 3030 (Water Code Sections 10750-10755) which provides the legislative authority for local water agencies to manage groundwater resources specifically. AB3030 enables local water agencies, such as the Madera Irrigation District (District), to develop and implement a groundwater management plan (GMP). The purpose of any GMP is to establish the role of the local agency in managing the local groundwater resources so as to maximize the water supply and to protect the quality of the supply.

The law contains 12 components that may be included in the GMP. Each component may play some role in evaluating or operating a groundwater basin so that groundwater can be managed to maximize the total water supply while protecting groundwater quality. Following the development of any GMP, the District must plan for a period of at least 35 days so as to allow for protests against the implementation of the plan to be filed. If the majority does not protest within the 35-day review period, the GMP can be adopted and implemented.

## 1.2 Past Groundwater Management Practices

The District works closely with the California Department of Water Resources and the Bureau of Reclamation to monitor the groundwater level and quality within the District. Twice a year (once in the spring, once in the fall), the District measures the depth to the static water level in several wells throughout the District. These measurements indicate that the static water table averages a decline of approximately 1.25 feet per year. However, the depth to the static water table varies throughout the District. Those areas in the District adjacent to the San Joaquin River have static water levels of 40 to 50 feet, while the deeper static water levels are as much as 200 feet. On the average, the static water level is 82 feet below the ground surface. In an effort to replenish the groundwater supply, the District operates ponds and canals that contribute to the recharge of the groundwater. Water is routed through natural channels such as the Fresno River, the channel below the Fanchi weir, and Cottonwood Creek,

when available, even when there are no riparian diversions. A list of the designated groundwater recharge facilities is provided below:

| Name | Location[1] Township/Range/Section | Area (acres) |
|---|---|---|
| Lake Madera | T10S/R18E/S34 | 300 |
| Airport Pit | T11S/R17E/S10 | 12 |
| Burgess Pond | T11S/R18E/S32 | 5 |
| Pistoresi Pond | T11S/R17E/S28 | 10 |
| Allende Pond | T12S/R18E/S15 | 5 |
| Russell Pond | T12S/R18E/S08 | 19 |
| Dirt/Beeman Pond | T12S/R18E/S17 | 9 |
| Hospital Pond | T11S/R18E/S30 | 3 |

[1]See Figure 1-1 for the locations of these recharge basins.

Water used for groundwater recharge is taken from the Fresno and San Joaquin Rivers. In addition to the recharge basins mentioned above, groundwater recharge is accomplished through the use of natural channels, unlined canals, and agricultural lands.

## 1.3 Goals of the Groundwater Management Plan

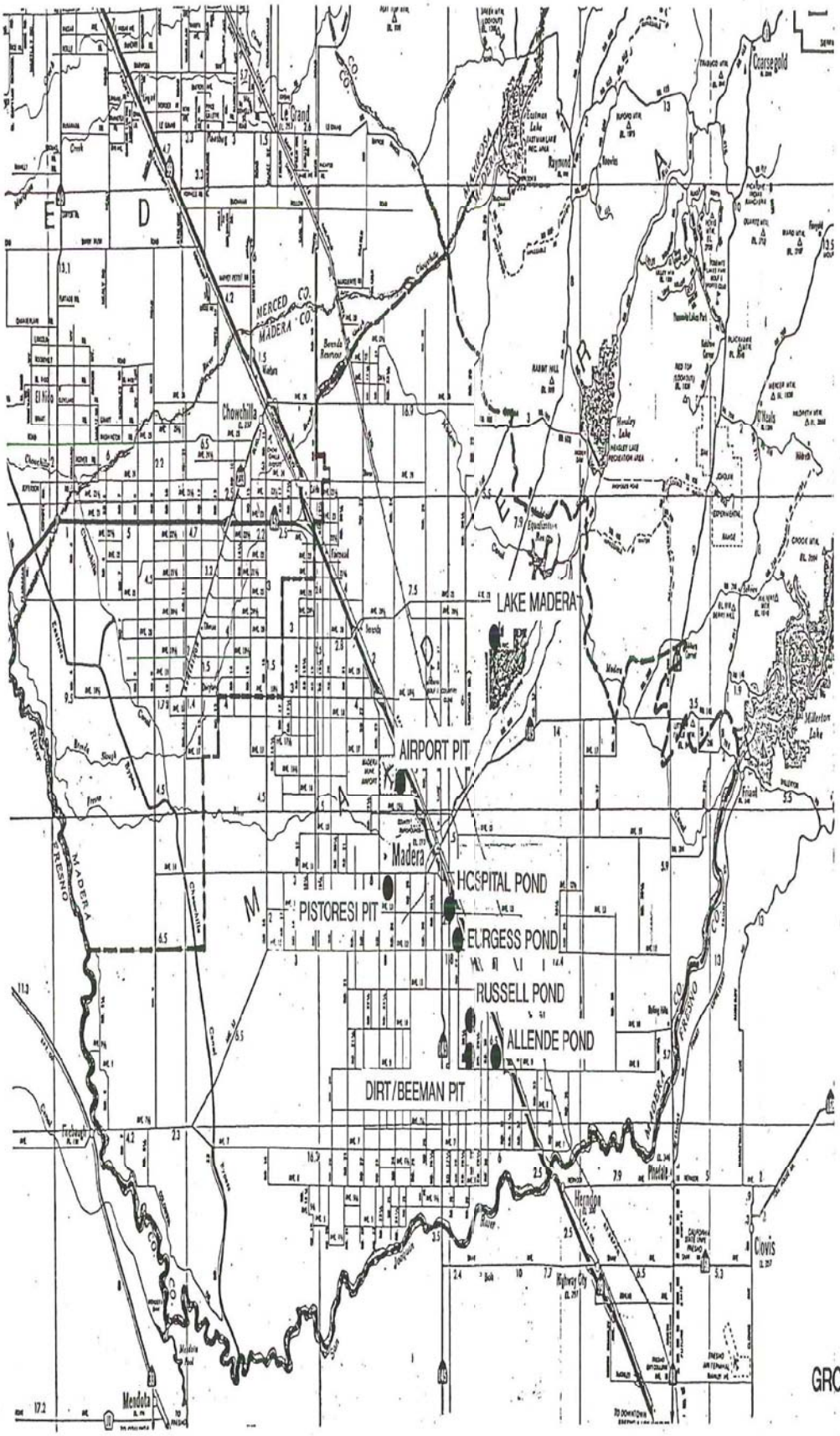
The District plans to develop a groundwater management program that is consistent with the following mission statement:

> *The District's primary mission is to obtain and manage affordable surface and groundwater supplies in a manner which will ensure the long-term viability of irrigated agriculture in the District.*

The District recognizes that groundwater is a major factor in being able to fulfill its mission statement. As a result, the District is preparing a groundwater management plan, the primary goal of which is to define the role of the District in managing the local groundwater resources so as to maximize the total water supply and protect the quality of the supply. To accomplish this goal, the District intends to evaluate and implement programs that will preserve the long-term viability of the groundwater resources within and adjacent to the District.

Other primary goals of this GMP are listed below:

- Ensure the long-term availability of high-quality groundwater.
- Maintain local control of groundwater resources within the District.
- Minimize the cost of groundwater use.




# GROUNDWATER RECHARGE FACILITIES

MADERA IRRIGATION DISTRICT

GROUNDWATER MANAGEMENT PLAN

M50101101

BOYLE ENGINEERING CORPORATION

FIGURE 1-1

- Prohibit the net export of groundwater from the District and use of groundwater to replace surface water removed from the District as a result of a transfer.
- Minimize the impacts of groundwater pumping, including subsidence, overdraft, and soil productivity.
- Prevent unnecessary restrictions on the private use of the District's groundwater resources.
- Ensure coordination between the District, local, and regional groundwater management activities.
- Ensure efficient use of the District's groundwater resources and minimize deep percolation in areas where it may contribute to the shallow groundwater problem through the use of an effective water conservation and management program.
- Ensure that the District's water users understand the steps they can take to protect and enhance their groundwater supply.
- Encourage water conservation by the farmers, which includes providing information on efficient irrigation practices.
- Support the programs for the agricultural reuse of reclaimed water.
- Coordinate with other local irrigation districts and the city and county of Madera to preserve local water rights.

# Section 2
# Description of Groundwater Management Plan Area

## 2.1 Description of District

The Madera Irrigation District encompasses an area of 128, 924 acres on the San Joaquin valley floor in Madera County. The District varies in width from five to thirteen miles. It is bounded to the south by the San Joaquin River with the northern boundary at approximately 10 miles north of the City of Madera. The Eastern boundary varies from Highway 99 to 1-1/2 miles east of Highway 99. In addition, there are several remote island areas. Figure 2-1 shows the general location of the District. Within the District boundaries there is an extensive open flow canal system extending approximately 315 miles. In addition, there are approximately 115 miles of pipelines that are used to convey the water throughout the District.

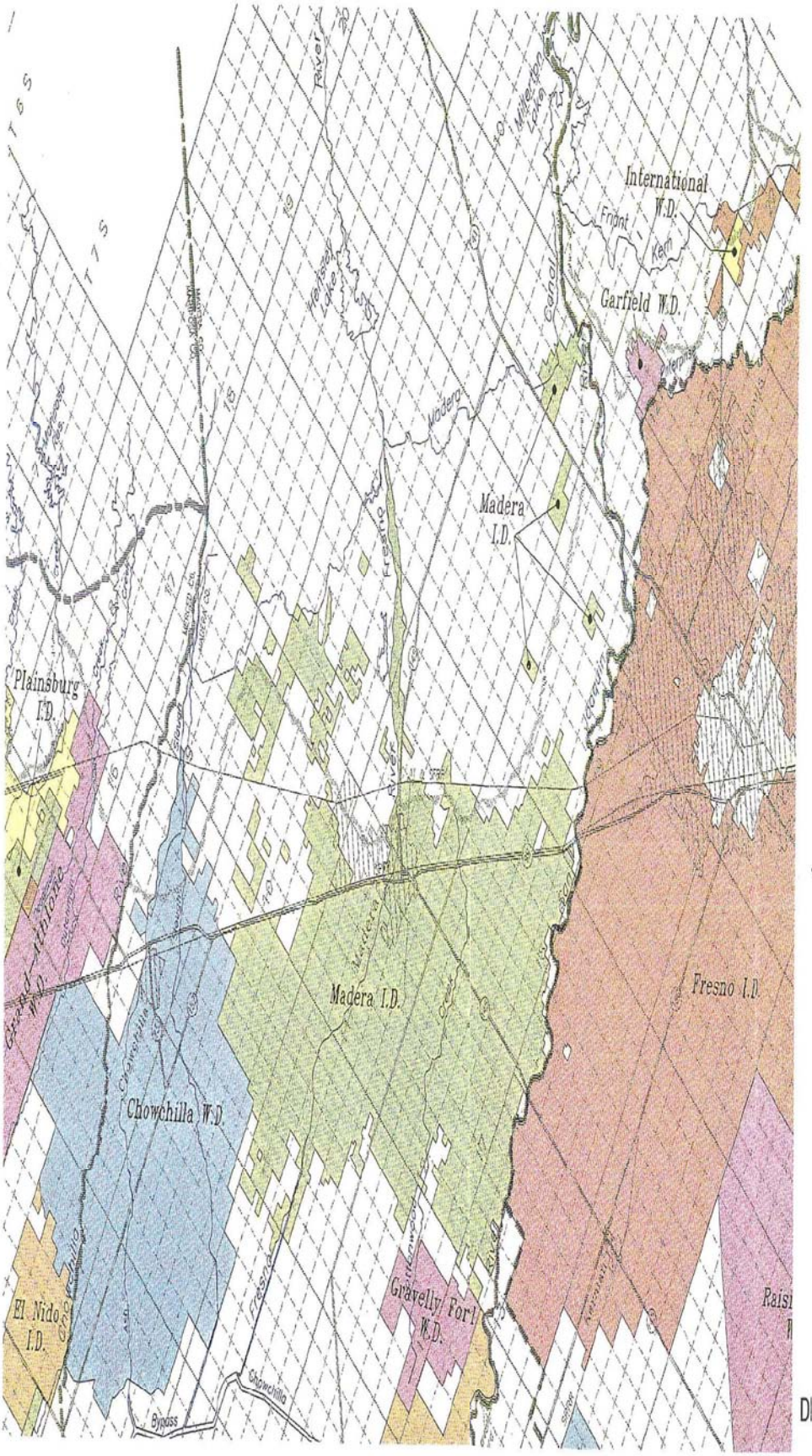
## 2.2 History

Madera Irrigation District was formed in 1920 with approximately 350,000 acres encompassing the District. The formation was the effort of a 40-member committee organized to bring water to the Madera area. The District purchased a site for Friant Dam and filed for accompanying water rights. These actions were followed by several years of litigation with Miller and Lux and of negotiations with the State Water Authority. These efforts failed leading the District to contract with the United States Bureau of Reclamation. This contract granted the District a guaranteed water supply of a maximum of 270,000-acre feet per year, for an area of 172,000 acres.

Several times since the formation of the District, the area boundary has fluctuated. In 1950, approximately 46,000 acres were excluded from the District to permit the formation of the neighboring Chowchilla Water District reducing the gross area to 112,500 acres, of which 94,500 acres is irrigable area. In 1975, the District added 15,000 acres as required by a contract with the Bureau that provided 24,800-acre feet on average from Hidden Dam. In 1983, the District joined the Mid Valley Water Authority in an effort to obtain additional water supplies for the District.

## 2.3 Location/Facilities

The District's water and distribution system is a combination of open flow primary and secondary laterals, enclosed conduit, and natural streams. There are approximately 315 miles of open flow canals and laterals, 115 miles of pipeline, and 102 miles of natural streams used for District conveyance and distributions. The open flow canals are comprised of approximately 90 miles of unlined canals and




DISTRICT BOUNDARY MAP

MADERA IRRIGATION DISTRICT

GROUNDWATER MANAGEMENT PLAN

M5010101

BOYLE ENGINEERING CORPORATION

FIGURE 2-1

225 miles of the Bureau of Reclamation built "lined" canals. The pipelines range in size from 12 inches to 84 inches with about half of the pipelines being cast in place. The open flow laterals range in capacity from 5 cfs to 340 cfs. Many of the non-piped laterals have been in use for over 100 years.

With the exception of a few small pump stations, the distribution system is a gravity system. However, there are approximately 1,600 turnouts, and about one-third are equipped with grower lift pumps in order to obtain adequate on-farm flow. There are no reservoirs or regulating reservoirs located within the District.

The District receives water via the Madera Canal from Friant Dam through natural streams and open flow primary laterals. Fresno River water is available from both controlled release and uncontrolled flows from Hidden Dam. Water from the Madera Canal may also be released into the Fresno River. Water is diverted from the Fresno River at the District's Fanchi Diversion Weir on the east side of the District. This provides service to approximately 45,000 acres. The Fresno River is also the conveyance to direct pump dwellers, the Island Tract pumping plant service area, and riparian users.

Franchi

## 2.4 Size

The District encompasses an area of 128,294 acres on the San Joaquin Valley floor in Madera County. The District generally varies from 5 to 13 miles in width bounded on the south by the San Joaquin River, with the northern boundary approximately 10 miles north to the city of Madera. The eastern boundary varies from Highway 99 to 1.5 miles east of the highway. There are several remote island areas that are also included.

## 2.5 Terrain and Soils

Lands in the District are gently sloping from northeast to southwest, with a fall of approximately 5 feet per mile. The District can be divided into two major segments in terms of terrain and soils:

- Recent alluvial fans and floodplains
- Older alluvial fans and terraces

The soils of the recent alluvial fans and floodplains cover the area from the Fresno River south to the San Joaquin River and primarily consist of the Traver-Chino and the Hanford-Tujunga types of soil. These soils are categorized as Class 1 and Class 2 soils and exhibits high surface and subsurface permeability.

The soils of the older fans and terraces cover the 10-mile-wide area from the Fresno River north to the District's northern boundary. The predominant soils classification for this area is of the San Joaquin-Madera association. They are generally classified as Class 3, 4, and 5, and generally exhibit low permeability at both the surface and subsurface levels.

## 2.6 Climate

Annual precipitation in the District averages about 10.3 inches, the majority of which falls during the months of November through April. Summer maximum temperatures frequently exceed 100°F, and winter temperatures vary from the high 30s to low 40s at night to the low 50s during the day. Normally, the frost period is between November and mid-March.

Although the climate in the District is generally dry with mild winters and hot summers, humidity can be as high as 90 to 100 percent during the early morning in December and January. Inversion layers accompanied by "Tule fog" are not uncommon during the winter months.

## 2.7 Water Supply

Since the majority of the precipitation falls in the winter, most landscaping, crops, and agriculture are dependent upon irrigation during the growing season. The District's main source of water is through water diversions from Friant Dam. Other sources of water for the District include Hidden Dam as well as from water rights on the Fresno River, including Big Creek Diversion from the Merced River watershed and the Soquel Diversion from the San Joaquin watershed.

In 1951, the District negotiated a contract with the Bureau of Reclamation (Bureau) for the water from Friant Dam. The contract provided for 85,000 AF of Class I water and 186,000 AF of Class II water. Class I is a relatively firm supply, whereas Class II is on an as-available basis and its quantity varies from year to year. All water supplied under this contract with the Bureau is through the Friant-Kern and Madera canals, which redistribute the waters of the San Joaquin River downstream of the Friant Dam. On the average, 100 percent of the Class I and 48 percent of the Class II water is provided to the District annually.

Water supplied to the District under the Hidden Dam contract with the Bureau is for the conservation yield of the project. However, the project has stringent flood control criteria that precludes any realistic carryover storage or early season storage.

The Big Creek and Soquel Diversions provide an average annual supply of 10,000 AF and 9,700 AF, respectively. The Fresno River adjudicated and appropriative average annual supply is approximately 20,000 AF and is inclusive of the Big Creek and Soquel diversions.

The following table summarizes the amount of water the District has been supplied from the various sources over the 10-year period of 1988 to 1997.

| Year | Water Supplied to District[1] (AF) |
|---|---|
| 1988 | 92,162 |
| 1989 | 110,801 |
| 1990 | 79,573 |
| 1991 | 122,090 |
| 1992 | 98,962 |
| 1993 | 330,248 |
| 1994 | 123,084 |
| 1995 | 327,376 |
| 1996 | 307,266 |
| 1997 | 295,302 |

[1]The water supplied includes transfers in and out of the supply and spill lost while in the San Joaquin River.

The total amount of water supplied to the District on an average annual basis is 188,686 AF from the various sources based on this 10-year period. Despite the amount of water available per year, the District is only able to provide a supplemental water supply to its users, all of which are agricultural.

## 2.8 Water Demand

The total water demand for the District varies from year to year. Climate is the major cause of this variation. In very wet years, the water demand on the District is significantly less than during drought years. The District reports that the water deliveries from 1988 through 1997 are as shown in the table below.

| Year | Water Delivered to Growers (AF) |
|---|---|
| 1988 | 54,592 |
| 1989 | 62,096 |
| 1990 | 46,828 |
| 1991 | 79,700 |
| 1992 | 62,896 |
| 1993 | 154,290 |
| 1994 | 72,141 |
| 1995 | 129,298 |
| 1996 | 138,909 |
| 1997 | 154,821 |

The average total grower deliveries for the 10-year period of 1988 to 1997 is 95,557 AFY. This water delivered to the growers originates at one of the District's sources for surface water supply. Additional water required for the farming of crops within the District is extracted from the groundwater table.

The water provided to growers is used for a variety of different crops. Cropping patterns within the District have changed drastically with time. Table 2-1 provides a list of crops grown within the District as well as the number of acres of that crop per year. The table ranges in time from 1962 to the latest available data in 1997. This data is supplied annually to the District in the annual crop survey. In addition, Table 2-1 provides the 5-year average number of acres for each crop for the 5-year period of 1993 to 1997. The average number of acres of irrigated farmland for this period is 168,779. However, the number of acres designated for agriculture has continuously increased since 1962 with an average yearly increase of approximately 2 percent. The continuous increase in the amount of farmland can be attributed to the growth of the District.

Table 2-2 provides a list of the different crops grown within the District as well as the average amount of water applied to the crop per year and the average total amount of water applied per year. The average number of crops for the period of 1993 to 1997 was used in determining an average crop water demand per year. From 1993 to 1997, the number of acres per crop has been relatively constant as compared to earlier years as shown in Table 2-1. The total annual water applied to the various crops throughout the District is 318,740 AF as shown in Table 2-2. There are a variety of sources used to supply this amount of water to the crops. The various sources include the following:

- Surface water delivered from the District
- Groundwater extracted from the groundwater table
- Precipitation

Another factor that affects the water demand for the District is urban growth. The majority of the city of Madera is included within the boundaries of the District and has continuously urbanized with time. Table 2-3 shows the number of acres of urban/industrial land within the District. As shown in the table, it is apparent that the acres of urban/industrial land has increased significantly since 1962. The District has changed its boundaries several times since the original boundaries. Therefore, the amount of land designated as urban/industrial has continuously changed. As urbanization continues in the areas surrounding the city of Madera, land that at one time was primarily agricultural has been converted to developed land. This reduces the amount of water used by crops each year as well as the recharge of the groundwater basin.

Figure 2-2 shows the increase in urban/industrial land for the period 1992 to 1997. For this time period, there has been a continuous increase in the amount of urban land. As shown on Figure 2-2, the projected amount of urban land in the year 2000 is approximately 14,200 acres; and in 2010, the amount of urban land is projected to be as much as 17,500 acres. This is a projected increase of approximately 3 percent per year for the next 12 years. The continuous urban growth will impact the condition of the groundwater basin.

## Table 2-1
## Madera Irrigation District
## Groundwater Management Plan
## Summary of Crop Demand

| Year | Grains | Rice | Cotton | Sugar Beets | Corn | Other Field | Alfalfa | Pasture | Tomatoes | Almonds/ Pistachios | Other/ Truck | Grapes | Citrus/ Olives | Deciduous | Total Acres |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Acres | | | | | | | | | | | | | | |
| 1952 | 6460 | 0 | 38616 | 0 | 83 | 241 | 14217 | 14798 | 0 | 116 | 1695 | 18501 | 0 | 2069 | 74358 |
| 1962 | 4702 | 0 | 23731 | 260 | 2494 | 980 | 13839 | 14535 | 0 | 1267 | 1537 | 28381 | 28 | 3879 | 99254 |
| 1972 | 3210 | 0 | 11994 | 40 | 3083 | 2217 | 11218 | 12766 | 0 | 6118 | 1686 | 40009 | 619 | 3769 | 129934 |
| 1973 | 3063 | 0 | 11871 | 0 | 4371 | 1568 | 8521 | 13469 | 0 | 6501 | 103 | 42773 | 629 | 3652 | 134254 |
| 1974 | 4511 | 0 | 13954 | 163 | 3070 | 2934 | 8057 | 12080 | 0 | 7520 | 54 | 43953 | 587 | 3779 | 135946 |
| 1975 | 11149 | 0 | 8604 | 237 | 3478 | 278 | 8357 | 11224 | 0 | 8642 | 209 | 44209 | 582 | 3759 | 137250 |
| 1976 | 10696 | 0 | 8638 | 321 | 2867 | 218 | 8506 | 11148 | 0 | 8699 | 83 | 44556 | 583 | 4611 | 139360 |
| 1977 | 5129 | 0 | 13530 | 54 | 1951 | 507 | 7987 | 10915 | 0 | 8927 | 2 | 45348 | 709 | 4842 | 141486 |
| 1978 | 5908 | 0 | 12087 | 0 | 4488 | 1846 | 6079 | 11298 | 0 | 9308 | 62 | 46656 | 554 | 4929 | 145614 |
| 1979 | 6262 | 0 | 13375 | 0 | 2143 | 1119 | 4169 | 9613 | 0 | 10504 | 70 | 48379 | 551 | 4802 | 147838 |
| 1980 | 7206 | 0 | 10947 | 0 | 3826 | 921 | 3744 | 8090 | 0 | 11252 | 50 | 50509 | 565 | 5034 | 151000 |
| 1981 | 6101 | 0 | 8953 | 0 | 3945 | 877 | 3137 | 7252 | 0 | 12211 | 65 | 52338 | 568 | 5012 | 154892 |
| 1982 | 8907 | 0 | 7244 | 0 | 1942 | 1600 | 2568 | 5861 | 0 | 13304 | 433 | 53933 | 564 | 5380 | 158950 |
| 1987 | 3802 | 0 | 6531 | 0 | 2704 | 972 | 1638 | 4434 | 0 | 13758 | 907 | 53819 | 923 | 5661 | 159004 |
| 1992 | 3698 | 0 | 4863 | 0 | 1795 | 114 | 1819 | 3087 | 77 | 15673 | 893 | 53182 | 1285 | 6651 | 161696 |
| 1993 | 2485 | 0 | 3939 | 0 | 3172 | 0 | 1461 | 3481 | 172 | 15876 | 811 | 53817 | 1340 | 6634 | 164262 |
| 1994 | 1525 | 0 | 4223 | 0 | 1664 | 0 | 1113 | 3647 | 3 | 17093 | 1163 | 52897 | 1447 | 6748 | 165996 |
| 1995 | 3431 | 0 | 4432 | 0 | 1807 | 0 | 1056 | 3716 | 10 | 16508 | 1318 | 54180 | 675 | 7339 | 167492 |
| 1996 | 3320 | 0 | 3122 | 0 | 1966 | 398 | 956 | 3981 | 10 | 17487 | 1408 | 54755 | 643 | 7500 | 171568 |
| 1997 | 941 | 0 | 2072 | 0 | 3632 | 207 | 1085 | 4451 | 7 | 18328 | 1285 | 54765 | 905 | 7548 | 174578 |
| 5-year Average, Acres | 2340 | 0 | 3558 | 0 | 2448 | 121 | 1134 | 3855 | 40 | 17058 | 1197 | 54083 | 1002 | 7154 | 168779 |

**Table 2-2**
**Madera Irrigation District**
**Groundwater Management Plan**
**Summary of Five-Year Average Annual Crop Water Requirements**

| Crops | Five-Year Average Annual Area[1] (acres) | Unit Water Applied[2] (AF/ac) | Annual Total Water Applied (AF) |
|---|---|---|---|
| Grains | 2,340 | 1.3 | 3,042 |
| Rice | 0 | -- | 0 |
| Cotton | 3,558 | 3.3 | 17,741 |
| Sugar Beets | 0 | 3.2 | 0 |
| Corn | 2,448 | 2.8 | 6,855 |
| Other Field | 1,211 | 2.9 | 351 |
| Alfalfa | 1,134 | 4.5 | 5,103 |
| Pasture | 3,855 | 4.5 | 17,348 |
| Tomatoes | 40 | 3.0 | 120 |
| Other Truck | 1,197 | 2.2 | 2,634 |
| Almonds/Pistachios | 17,058 | 3.1 | 52,880 |
| Grapes | 54,083 | 3.6 | 194,699 |
| Citrus/Olives | 1,002 | 2.5 | 2,505 |
| Deciduous | 7,154 | 3.0 | 21,462 |
| Totals | | | 318,740 |

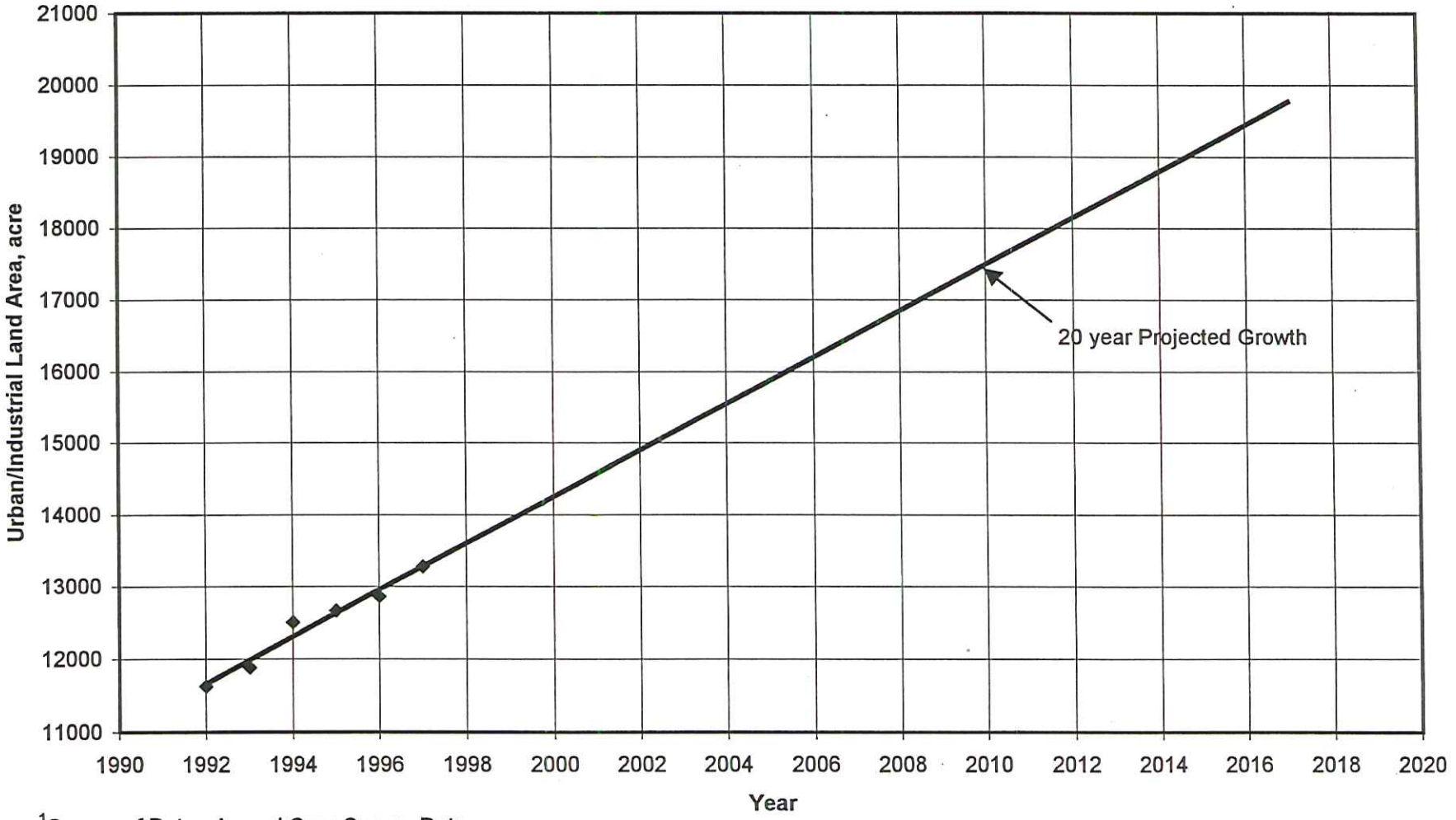
[1]Summary of Crop Acres provided by California Department of Water Resources.
[2]Unit applied water values provided by California Department of Water Resources.

**Table 2-3**
**Madera Irrigation District**
**Groundwater Management Plan**
**Urban Growth Within the District**

| Year | Urban/Industrial Land Area (acres) |
|---|---|
| 1962 | 9824 |
| 1972 | 11008 |
| 1973 | 11278 |
| 1974 | 11300 |
| 1975 | 11417 |
| 1976 | 11449 |
| 1977 | 11632 |
| 1978 | 11836 |
| 1979 | 12020 |
| 1980 | 11785 |
| 1981 | 11346 |
| 1982 | 12194 |
| 1987 | 10727 |
| 1992 | 11631 |
| 1993 | 11881 |
| 1994 | 12502 |
| 1995 | 12666 |
| 1996 | 12862 |
| 1997 | 13279 |

[1]Farmsteads were excluded from urban/industrial land area after 1987. Prior to 1987, farmsteads were incorporated into urban land area.

**Figure 2-2**
**Madera Irrigation District**
**Groundwater Management Plan**
**Urban/Industrial Land Area Vs. Year[1]**




[1]Source of Data: Annual Crop Survey Data

FRM5010101 8/31/98
graph2-2.xls

BOYLE

## 2.9 Groundwater Quality

Groundwater quality is influenced by various factors such as the quality of watershed runoff, the mineral content of soils, land use practices such as fertilizer and pesticide application, and localized waste disposal practices. The use of groundwater for domestic and agricultural purposes is only feasible if it is of an acceptable quality. As a result, this GMP includes provisions to help maintain the groundwater at an acceptable quality.

Groundwater quality within the Madera groundwater basin is currently not monitored by the District. The only parameter that is monitored is the depth to static water level. However, between 1959 and 1989, the quality of the groundwater was monitored by the United States Bureau of Reclamation. Table 2-4 lists all the constituents that were measured as well as the range and average values for the period of record. In addition, Table 2-4 provides the current EPA standards for drinking water parameters. For the period of record between 1959 and 1989, the groundwater within Madera Irrigation District is of excellent quality as it does not exceed any of the maximum contaminant levels for secondary drinking water standards.

However, in recent years, the groundwater in areas within the District boundaries has experienced problems with DBCP and salt brine contamination. The salt brine plume is located in the vicinity of the Tri-Valley Growers olive plant (Oberti Olives) in the Avenue 13/Road 26 area. Remediation activities to correct this problems are being taken by Tri-Valley under the regulatory direction of the Regional Water Quality Control Board. There is a large plume of DBCP that underlies the District. The apex of the DBCP plume is located at Avenue 12 near Highway 99 and flows southwesterly through the basin. The DBCP plume was initially discovered in 1979 by the County of Madera Public Health officials. In several places, a large concentration of DBCP was found. In 1993, another study was done to determine whether the plume continued to exist and the concentration of DBCP in the groundwater. The results of the 1993 study indicated that the plume continues to move in a southwest direction. However, the concentration of DBCP in the groundwater had significantly decreased.

## 2.10 Groundwater Monitoring

Madera Irrigation District monitors an average of 229 wells located throughout the District twice a year. The semiannual well measurement programs are conducted in October and February of each year. These dates were selected because they best characterize the maximum depressed and recovery levels associated with the growing season. The measurements are accomplished by sounding each well in a static condition. This information enables the District to monitor groundwater trends and estimate District-wide pumped groundwater quantities. It also allows the District to calculate seasonal application efficiency more accurately. Fifteen of the monitored wells were selected to be representative of the groundwater levels within the District. Table 2-5 provides the static water level for the 10-year period of 1989 to 1998 for the spring season. The water levels for the fall are listed in Table 2-6 for the same 10-year period. The approximate location of the measured wells can be found on Figure 2-3.

**Table 2-4**
**Madera Irrigation District**
**Groundwater Management Plan**
**Summary of Groundwater Quality[1]**

| Constituent | Unit | Range | Average | EPA Standard Drinking Water[2] |
|---|---|---|---|---|
| Specific Conductance | µmhos | 126-1,370 | 569 | 900 |
| Total Dissolved Solids | mg/L | 79-989 | 361 | 500 |
| Aluminum | mg/L | <0.010-0.020 | <0.010 | 0.2 |
| Arsenic | mg/L | 0.001-0.003 | 0.00156 | 1,000 |
| Barium | mg/L | 0.052-0.180 | 0.0888 | 1.0 |
| Bicarbonate | mg/L | 52-490 | 169 | N/A |
| Boron | µg/L | 0-900 | 80.8 | -- |
| Bromide | mg/L | 0.05-0.35 | 0.14 | -- |
| Cadmium | mg/L | <0.001—0.001 | <0.001 | 0.005 |
| Calcium | mg/L | 10.0-150 | 42.7 | N/A |
| Chloride | mg/L | 8-250 | 53.2 | 250 |
| Chromium | mg/L | <0.001-0.008 | 0.0045 | 0.5 |
| Cobalt | µg/L | <1-1 | <1 | -- |
| Copper | mg/L | <0.001-0.003 | 0.0014 | 1.0 |
| Fluoride | mg/L | 0-0.30 | 0.10 | 1.4 |
| Iodide | µg/L | 1-11 | 3.1 | -- |
| Iron | mg/L | 0-0.023 | 0.0061 | 0.3 |
| Lead | µg/L | <1-<5 | <5 | Lead & Copper Rule |
| Lithium | µg/L | <4-25 | 12.4 | -- |
| Magnesium | mg/L | 2.1-34 | 12.5 | N/A |
| Manganese | mg/L | <0.001-0.005 | 0.0013 | 0.05 |
| Mercury | µg/L | <0.1-<0.1 | <0.1 | -- |
| Molybdenum | µg/L | <1-4 | 1.2 | -- |
| Nickel | mg/L | <0.001-0.001 | <0.001 | 0.1 |
| Nitrate | mg/L | 0-53 | 19.0 | 45 |
| Nitrate & Nitrite | mg/L | 2.3-12 | 6.7 | -- |
| Phosphorus | mg/L | 0.03-0.13 | 0.08 | -- |
| Potassium | mg/L | 0-14 | 4.5 | -- |
| Selenium | mg/L | <0.001-0.001 | <0.001 | 0.05 |
| Silver | mg/L | <0.001 | <0.001 | 0.1 |
| Sodium | mg/L | 10-110 | 38.5 | N/A |
| Strontium | µg/L | 120-830 | 362 | -- |
| Sulfate | mg/L | 0-63 | 15.0 | 600 |
| Vanadium | µg/L | 1-30 | 14.3 | -- |
| Zinc | mg/L | 0.005-0.098 | 0.0332 | 5.0 |

[1]Data as reported in the U.S. Bureau of Reclamation's Irrigation Suitability Land Classification Report, September 1993.

[2]SecondaryWater Quality Standards as required by California Safe Drinking Water Act.

**Table 2-5**
**Madera Irrigation District**
**Groundwater Management Plan**
**Summary of Spring Depth to Groundwater of Representative Wells[1]**

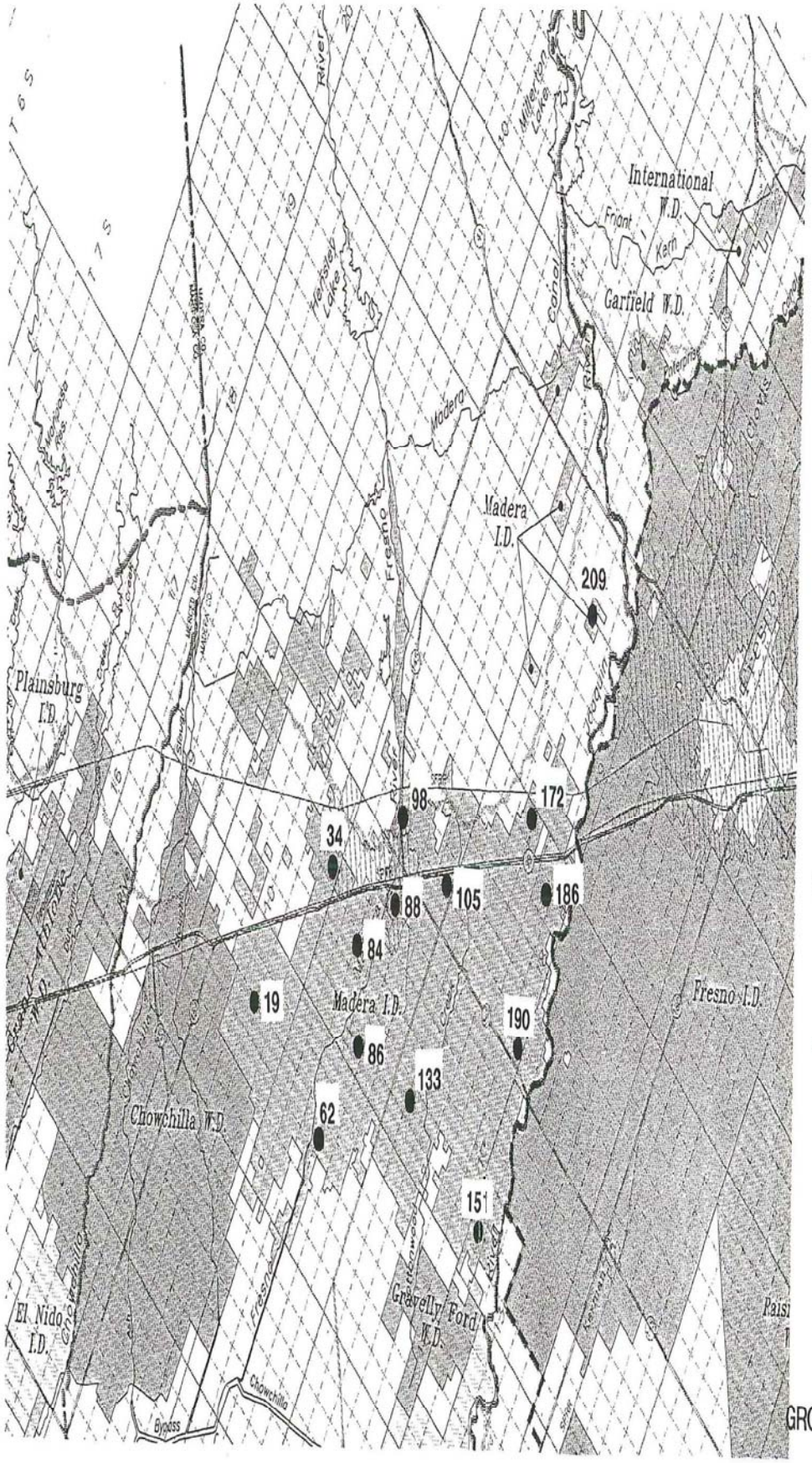
| MID Lic. No. | State Well No. | Depth to Groundwater | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
| 19 | T10S/R16E/S26-B1 | 144.8 | 139.0 | 150.0 | 153.0 | 164.2 | 160.0 | 168.4 | 165.1 | 160.0 | 156.0 |
| 34 | T10S/R17E/S34-A1 | 147.8 | 141.2 | 151.1 | 156.0 | 170.0 | 164.6 | 169.4 | 176.4 | 182.1 | 183.7 |
| 37 | T10S/R18E/S07-D1 | 170.0 | 155.0 | 161.6 | 166.6 | 176.2 | 178.7 | 179.2 | 178.6 | 182.6 | 184.0 |
| 62 | T11S/R16E/S15-L1 | 98.1 | 94.6 | 98.1 | 102.0 | 109.6 | 109.8 | 110.0 | 106.3 | 105.2 | 102.1 |
| 84 | T11S/R17E/S16-H1 | 96.1 | 101.0 | 108.2 | 110.2 | 115.9 | 117.2 | 120.0 | 121.6 | 121.7 | 121.1 |
| 86 | T11S/R17E/S18-B1 | 90.2 | 93.2 | 104.6 | 105.2 | 111.8 | 110.0 | 115.0 | 112.2 | 110.6 | 108.6 |
| 88 | T11S/R17E/S24-D2 | 98.4 | 101.1 | 128.0 | 124.1 | 130.7 | 134.3 | 134.9 | 132.9 | 131.5 | 130.6 |
| 98 | T11S/R18E/S18-A1 | 73.0 | -- | -- | -- | 84.1 | 82.4 | 82.6 | 80.5 | 78.3 | 78.2 |
| 105 | T11S/R18E/S31-A3 | 92.2 | 97.5 | 102.9 | 104.7 | 106.3 | 110.0 | 110.9 | 110.0 | 112.1 | 110.0 |
| 133 | T12S/R17E/S18-H1 | 80.8 | 93.0 | 99.8 | 101.2 | 108.7 | 102.7 | 105.6 | 102.0 | 101.6 | 98.6 |
| 151 | T12S/R17E/S32-H1 | 69.8 | 75.9 | 88.0 | 88.9 | 90.1 | 82.4 | 85.1 | 83.1 | 81.0 | 77.2 |
| 172 | T12S/R18E/S13-R1 | 93.8 | 103.2 | 108.3 | 110.6 | 113.0 | 103.2 | 104.6 | 104.0 | 103.0 | 102.3 |
| 186 | T12S/R18E/S26-R1 | 76.5 | 81.7 | 90.0 | 92.3 | 97.9 | 90.0 | 94.2 | 89.1 | 86.2 | 81.8 |
| 190 | T12S/R18E/S31-J1 | 66.5 | 72.5 | 86.3 | 86.9 | 93.0 | 86.2 | 89.6 | 86.4 | 85.1 | 81.0 |
| 209 | T12S/R20E/S18-N1 | 137.7 | 151.8 | 160.5 | 165.0 | 169.2 | 161.7 | 166.4 | 168.6 | 166.0 | 168.4 |

[1]Measurements as reported in Madera Irrigation District - Semiannual Groundwater Report, Spring 1998.

**Table 2-6**
**Madera Irrigation District**
**Groundwater Management Plan**
**Summary of Fall Depth to Groundwater[1]**

| MID Lic. No. | State Well No. | Depth to Groundwater | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 |
| 19 | T10S/R16E/S26-B1 | 141.1 | 144.8 | 159.0 | 166.6 | 172.2 | 162.4 | 178.2 | 172.8 | 177.4 | 180.6 |
| 34 | T10S/R17E/S34-A2 | 147.0 | 147.8 | 157.3 | 159.1 | 176.3 | 164.0 | 183.1 | 184.6 | 192.8 | 192.9 |
| 37 | T10S/R18E/S07-C1 | -- | 170.0 | 197.3 | 197.8 | 171.1 | 200.0 | 207.4 | 190.0 | 207.6 | 209.5 |
| 62 | T11S/R16E/S15-L1 | 91.5 | 98.1 | 108.7 | 112.7 | 115.6 | 112.5 | 117.2 | 108.6 | 114.0 | 112.6 |
| 84 | T11S/R17E/S16-H1 | 114.7 | 116.2 | 124.9 | 126.7 | 133.3 | 127.3 | 135.2 | 135.1 | 137.3 | 148.0 |
| 86 | T11S/R17E/S18-B1 | 103.2 | 109.1 | 118.1 | 120.1 | 122.3 | 118.4 | 124.6 | 120.0 | 127.3 | 127.5 |
| 88 | T11S/R17E/S24-D2 | 110.0 | 112.9 | 138.6 | 142.2 | 142.6 | 143.6 | 138.2 | 134.6 | 138.1 | 138.7 |
| 98 | T11S/R18E/S18-A1 | -- | -- | -- | -- | 89.2 | 84.1 | 93.7 | 85.0 | 85.0 | 84.6 |
| 105 | T11S/R18E/S31-A3 | 100.0 | 104.2 | 115.0 | 117.4 | 119.7 | 115.4 | 120.1 | 115.5 | 117.2 | 113.4 |
| 133 | T12S/R17E/S10-H1 | 87.0 | 91.6 | 100.5 | 107.5 | 110.9 | 108.2 | 111.1 | 107.7 | 108.0 | 105.6 |
| 151 | T12S/R17E/S32-H1 | 73.1 | 86.0 | 91.3 | 93.9 | 97.0 | 93.4 | 96.1 | 88.4 | 87.1 | 85.4 |
| 172 | T12S/R18E/S13-R1 | 99.7 | 107.7 | 112.0 | 114.0 | 116.6 | 106.7 | 110.3 | 107.4 | 105.2 | 105.5 |
| 186 | T12S/R18E/S26-R1 | 86.5 | 91.5 | 96.2 | 98.9 | 103.3 | 96.1 | 105.0 | 97.3 | 95.2 | 93.6 |
| 190 | T12S/R18E/S31-J1 | 81.9 | 87.9 | 92.8 | 96.7 | 100.1 | 92.0 | 101.7 | 96.8 | 96.6 | 89.4 |
| 209 | T12S/R20E/S18-N1 | 142.3 | 164.2 | 174.2 | 178.9 | 180.8 | 170.1 | 182.7 | 177.5 | 179.6 | 183.0 |

[1]Measurements as reported in Madera Irrigation District - Semiannual Groundwater Report, Fall 1998.




WELLS USED FOR GROUNDWATER MONITORING

MADERA IRRIGATION DISTRICT

GROUNDWATER MANAGEMENT PLAN

M5010101

BOYLE ENGINEERING CORPORATION

FIGURE 2-3

# Section 3
# Groundwater Basin Conditions

## 3.1 Characteristics

The groundwater basin underlying the District is known as the Madera Groundwater Basin. The Madera Groundwater Basin also underlies several small water districts and a majority of land in the county that is not within any organized district. Figure 3-1 shows the approximate boundary of the Madera Groundwater Basin. The Lines of Equal Elevation Maps (Figure 3-2), published by the Department of Water Resources, indicate that the flow of the groundwater within the basin is in a southwest direction. However, the flow direction can be influenced on the local level, depending on how much water is being extracted from the aquifer. Heavy localized pumping can cause depressions in the groundwater table.

## 3.2 Geological Description

Groundwater within the Madera Irrigation District and throughout the San Joaquin Valley Basin occurs under unconfined and confined conditions. Much of the District is underlain by the Corcoran clay, which separates the groundwater into two zones—an upper, unconfined aquifer and a lower, confined aquifer.

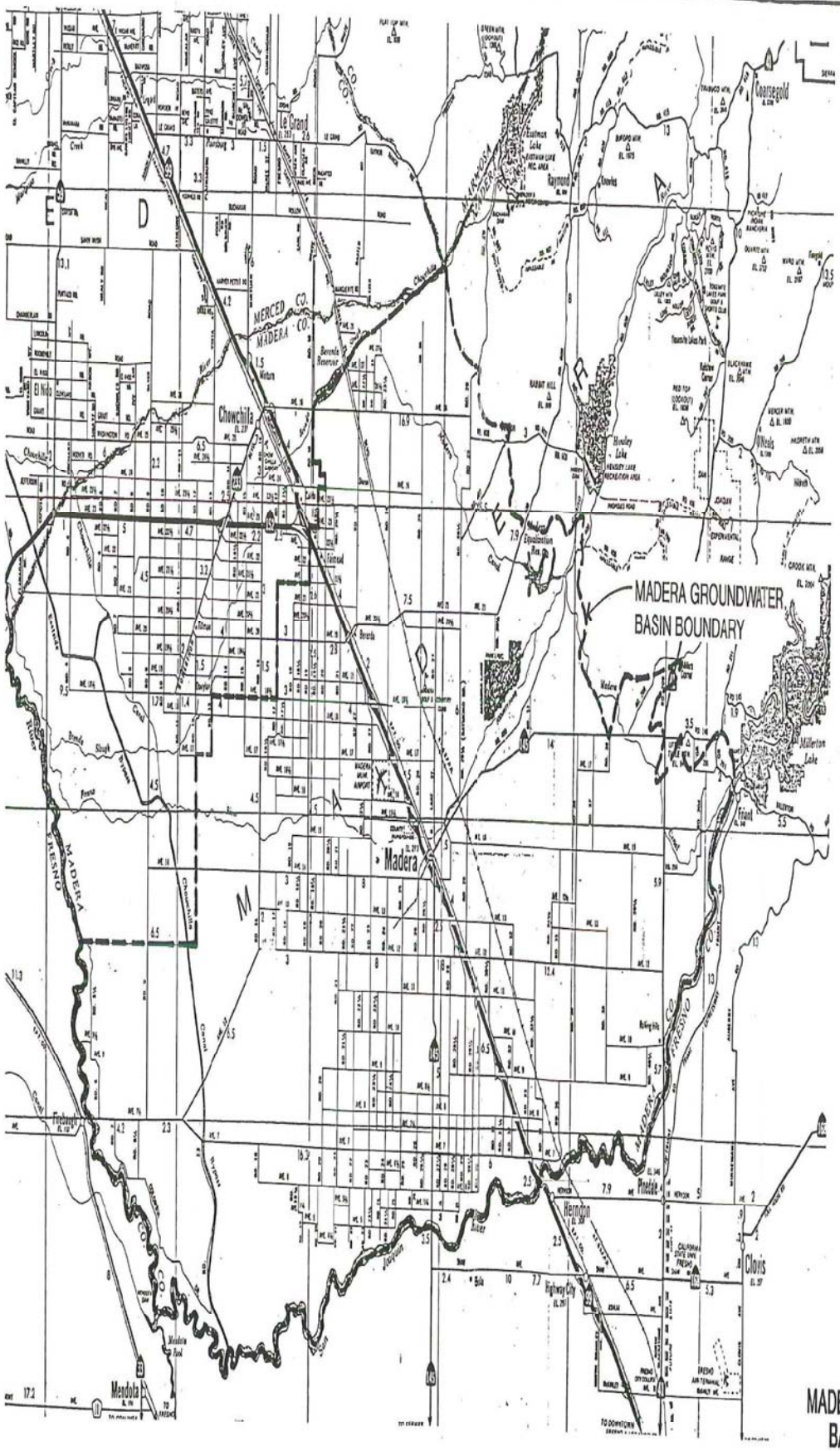
An unconfined aquifer is an aquifer in which the groundwater is not under pressure. In the area underlain by the Corcoran clay, the top of the clay layer is the base of the aquifer. To the west and above the Corcoran clay the top of the unconfined aquifer is the water table. The unconfined aquifer has areas which are locally confined by clay layers that are not continuous over long distances. These clay areas are referred to as isolated clay lenses. Groundwater in the unconfined aquifer flows south and west toward the San Joaquin and Fresno Rivers as discussed in Section 3.1.

A confined aquifer is an aquifer in which the groundwater is contained under pressure. The extent of the confined aquifer is limited to the extent of the Corcoran clay. The top of the confined aquifer is the bottom of the Corcoran clay layer. There is limited information available about the confined aquifer because so few wells extract groundwater from the confined aquifer.

The thickness of the Corcoran clay layer varies throughout the District but ranges between 0 and approximately 50 feet. The depth to the top of the Corcoran clay layer and ground level varies between 300 and 450 feet.

## 3.3 Water Level Changes (Mapping)

As mentioned in Section 2.10, the District semiannually monitors an average of 229 wells located throughout the District for water depth levels. This information enables the District to monitor


MADERA GROUNDWATER
BASIN BOUNDARY
Madera
Chowchilla
Le Grand
Coarsegold
Raymond
Hensley Lake
Millerton Lake
Fresno
Herndon
Clovis
Mendota
MERCED CO.
MADERA CO.
FRESNO CO.
SCALE 1" = 4 MILES
MADERA GROUNDWATER
BASIN BOUNDARY
MADERA IRRIGATION DISTRICT
GROUNDWATER MANAGEMENT PLAN
BOYLE ENGINEERING CORPORATION
FIGURE 3-1
M5010101

Source: State of California, The Resource Agency
Dept. of Water Resources, San Joaquin District

## LINES OF EQUAL ELEVATION

SPRING 1997

MADERA IRRIGATION DISTRICT
GROUNDWATER MANAGEMENT PLAN

BOYLE ENGINEERING CORPORATION

FIGURE 3-2

groundwater trends and estimate District-wide pumped groundwater quantities. Following the measurements, the District produces a semiannual groundwater report that identifies the conditions of the groundwater basin the past six months.

The Spring 1998 Groundwater Report showed a collective recovery of water in the basin and in adjacent lands. The annual recovery, to a large measure, can be attributed to the immediate past three years' abundant precipitation, San Joaquin River watershed yield, and the corresponding availability of surface water supply. The surface water resource significantly decreases agricultural demands for extraction from the groundwater basin to satisfy consumptive crop uses. However, the basin continues to be in an overdraft state, which resulted from the droughts between 1987 and 1992 and between 1976 and 1977. In addition, the high cost of surface water compared to groundwater pumping costs have resulted in greater groundwater use than might be expected. In certain areas, the basin groundwater level is on average 40 feet, with a maximum of 100 feet below the measured levels preceding the drought years.

The weighted data for spring 1998 reflects an annual recovery in static water levels of 0.47 feet. This data reflects a two-year increase in groundwater levels of 1.23 feet, or a basin recovery of 18,600 acre-feet for the two-year period. Of the 229 measured wells, 176 reflected elevated static levels from common data of 1997. The well level changes range from a recovery of 14.8 feet to a maximum decline of 11.0 feet.

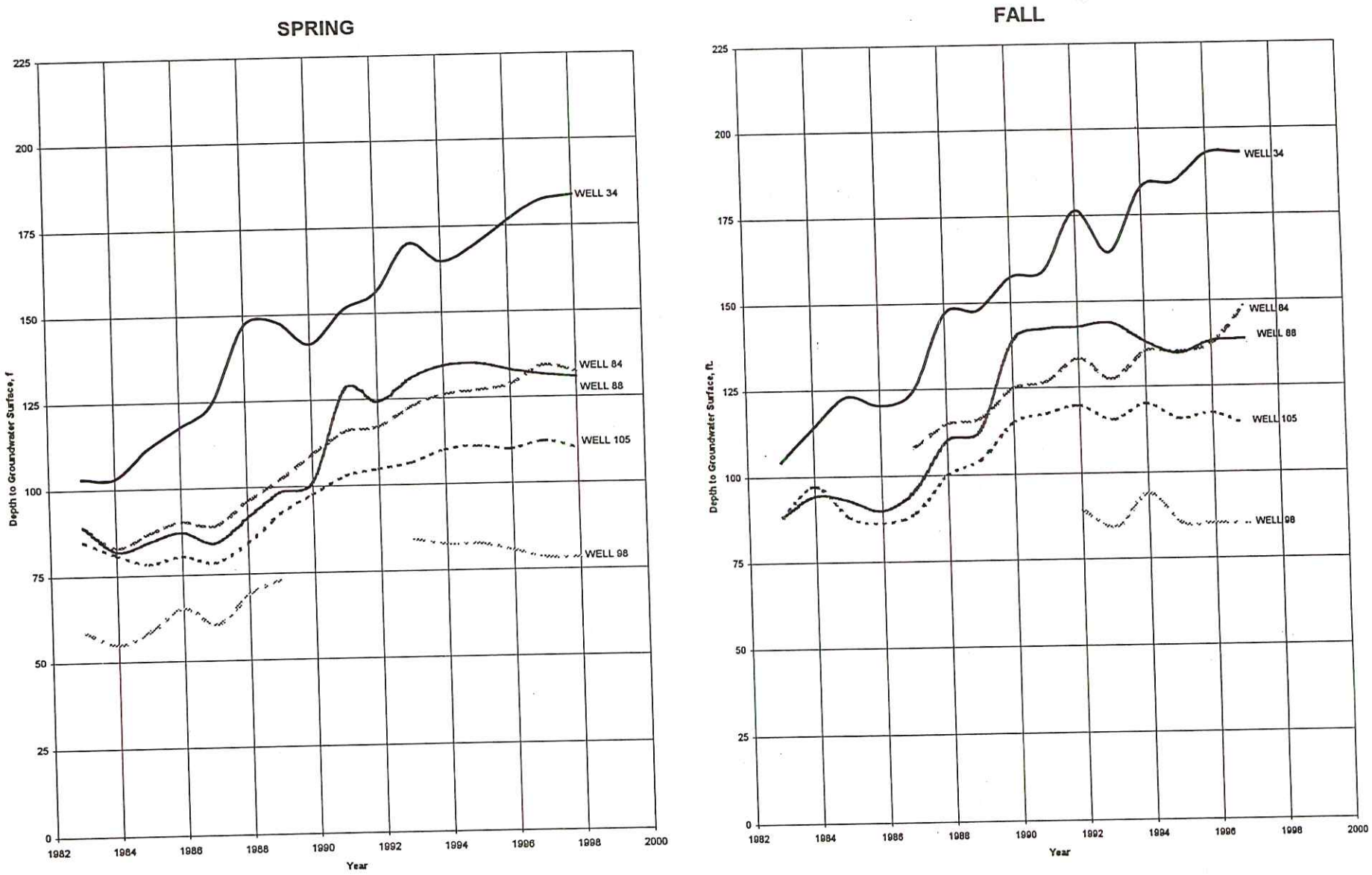
Each year, the Department of Water Resources produces a map entitled *Lines of Equal Elevation in Static Water Level*. This identifies areas of depth to groundwater that are the same. In general, the areas surrounding the city of Madera have experienced a decline in the elevation of the groundwater. This can be attributed to the urban development within and surrounding the city of Madera. Five wells within and surrounding the city of Madera were selected to be representative of the conditions of the groundwater basin within the city. Figure 3-3 shows the variation in the depth to groundwater of these five wells for both the spring and fall seasons. The graph demonstrates the fluctuations in the groundwater table from 1992. Figure 3-4 shows the projected groundwater elevations for the five wells. Urban growth continues to have a negative impact on the groundwater basin that underlies the city of Madera.

In contrast, the areas near the San Joaquin River and the Fresno River fluctuate depending on weather patterns. In recent years, the groundwater elevation in these areas has significantly increased. Figure 3-5 shows the spring and fall depth to groundwater from 1992 to present, and Figure 3-6 shows the projected groundwater elevations for the five wells. These five wells were selected to be a representative sample for the areas of the basin that lie near the perimeter of the District boundary. In comparing the depth to groundwater for wells near the city of Madera and the depth for wells along the San Joaquin River, it is apparent that the basin underlying the city is in a much more serious state of overdraft.

## 3.4 Areas of Concern

The primary concern of the District is the continuous decline in the elevation of the groundwater that is a result of urban growth within the District. A related concern is the increase in the cost of surface water

**Figure 3-3**
**Madera Irrigation District**
**Groundwater Management Plan**
**Depth to Groundwater Surface of Representative Wells Near City vs. Year[1]**




[1]Source of Data: MID Groundwater Survey Data Base

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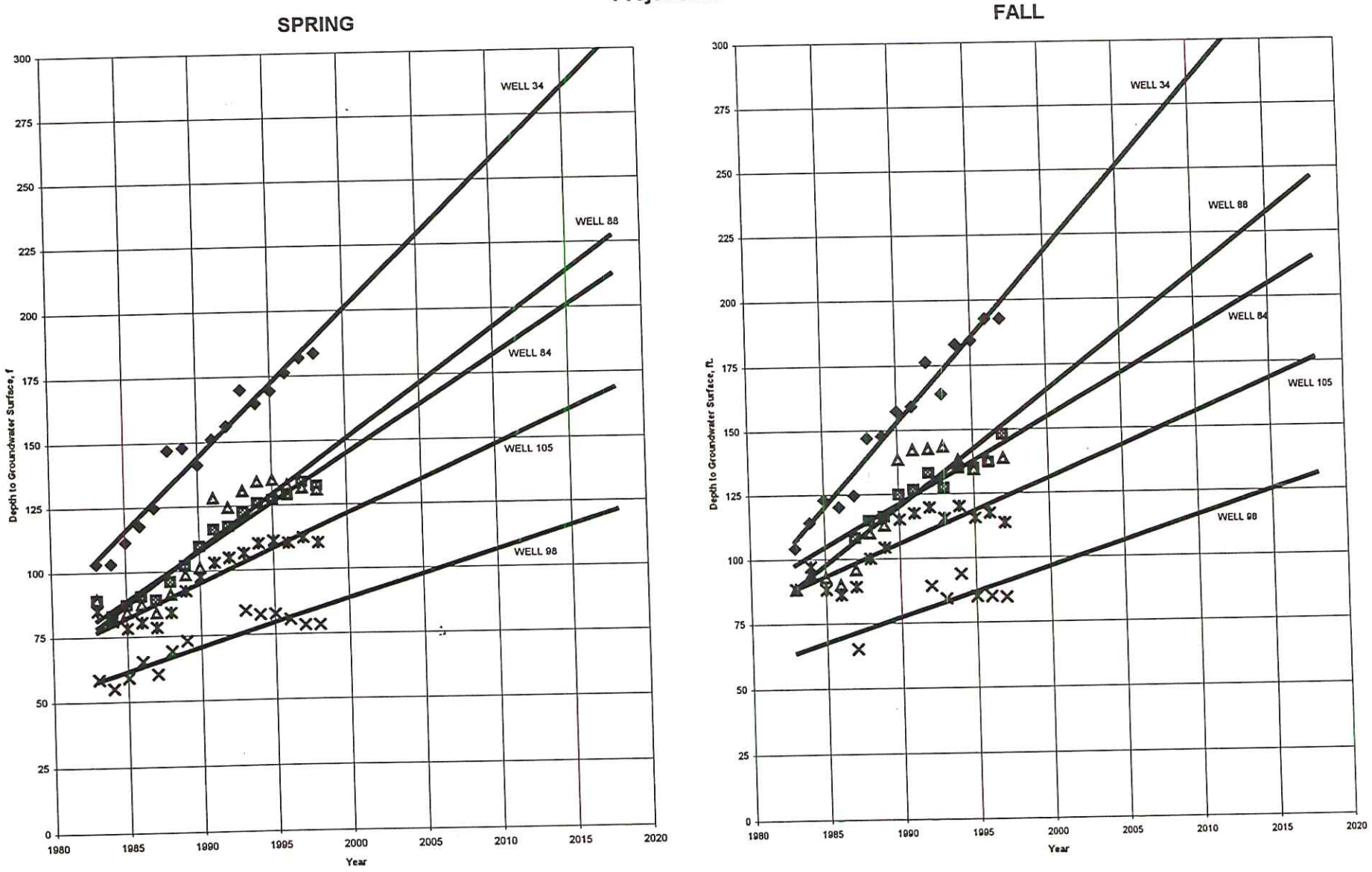
fig3-3,3-5.xls

BOYLE

**Figure 3-4**
**Madera Irrigation District**
**Groundwater Management Plan**
**Depth to Groundwater Surface of Representative Wells Near City vs. Year[1]**
**Projections**




[1]Source of Data: MID Groundwater Survey Data Base



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fig3-4,3-6.xls

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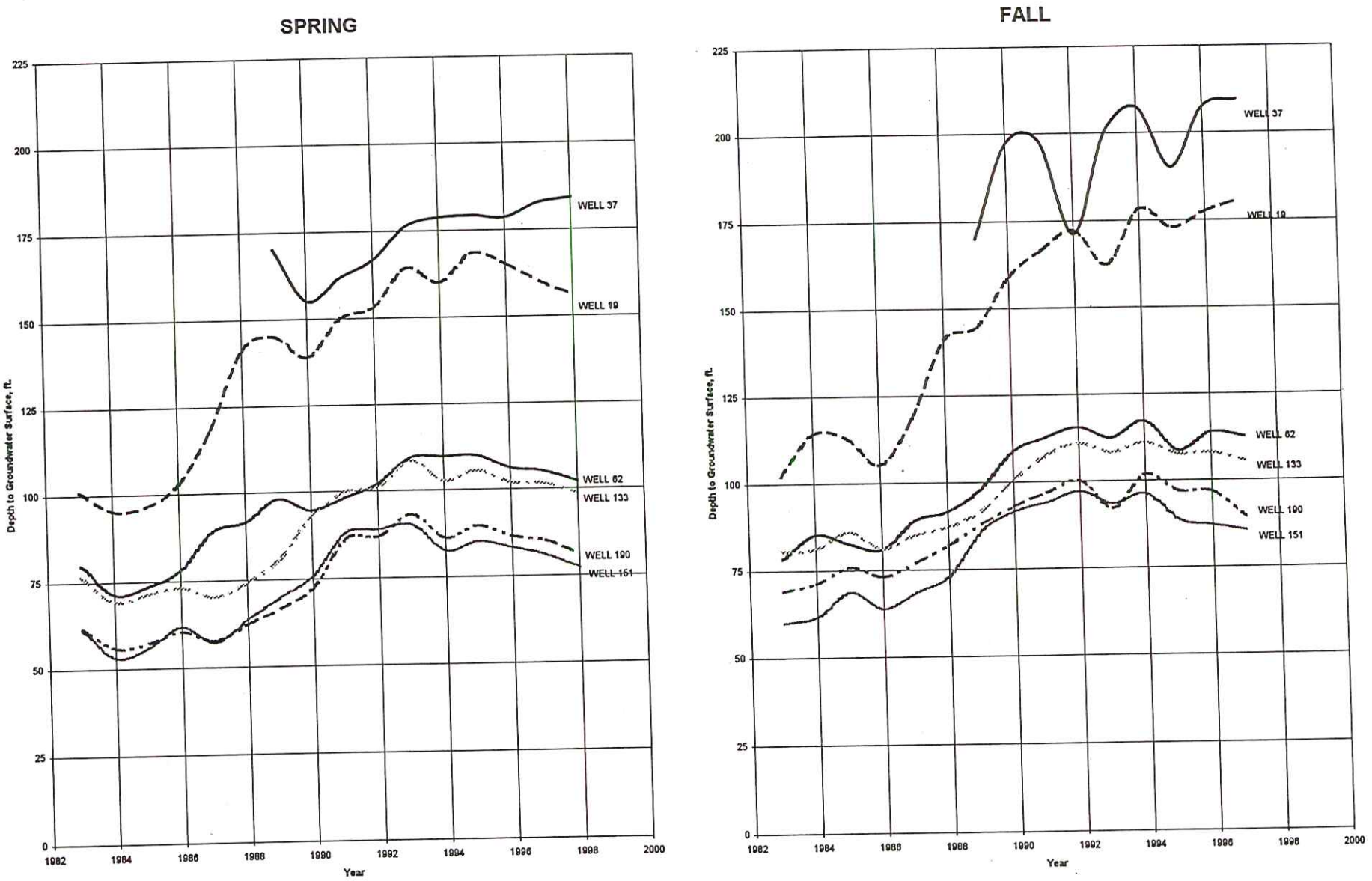
**Figure 3-5**
**Madera Irrigation District**
**Groundwater Management Plan**
**Depth to Groundwater Surface of Representative Wells Near Perimeter of District vs. Year[1]**




[1]Source of Data: MID Groundwater Survey Data Base



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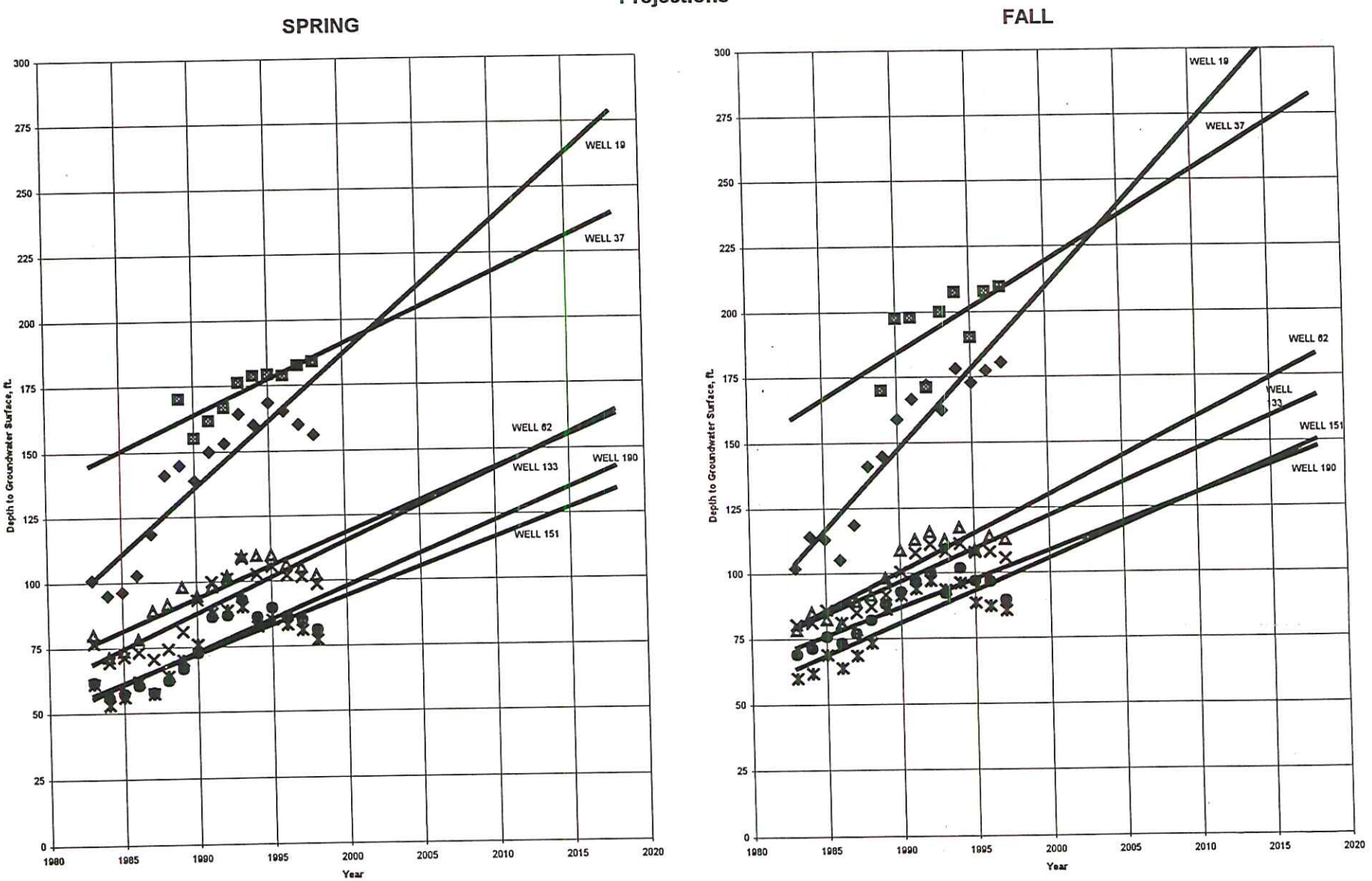
**Figure 3-6**
**Madera Irrigation District**
**Groundwater Management Plan**
**Depth to Groundwater Surface of Representative Wells Near Perimeter of District vs. Year[1]**
**Projections**




[1]Source of Data: MID Groundwater Survey Data Base



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fig3-4,3-6.xls

BOYLE

supplied to the District's users. In addition, some of the increased cost in surface water can be attributed to urban growth and the use of groundwater in areas that no longer contribute to recharge.

Agricultural and municipal agencies within the basin are concerned about maintaining adequate supplies of groundwater within the basin. Groundwater is the primary source of water for municipal and agricultural users in the basin. Many agencies like the District are concerned about the continued decline of groundwater levels. The municipalities are especially concerned about the supplies needed to meet the demand as their urban area continues to expand.

An equally important concern that many agencies have expressed is the quality of the groundwater. Currently, the groundwater basin has relatively good quality as discussed in Section 2.9. The concern is in maintaining the quality of groundwater. These items, such as saline intrusion and well construction, are addressed in Section 4 of this GMP.

# Section 4
# Plan Items

## 4.1 General

A successful GMP identifies items that may at some time affect the quality of the groundwater basin. Items should be identified despite whether the item is currently a problem. In addition, it is important for all districts and jurisdictions that control areas within the Madera Groundwater Basin to coordinate efforts to protect the basin. The following sections outline several plan items that should be considered when evaluating the condition of the basin.

## 4.2 Control of Saline Water Intrusion

Permanent degradation of good quality groundwater can occur if poor quality groundwater migrates into aquifer zones containing better quality water. Any degradation in the water quality can seriously affect the usability of the groundwater for various uses. Wide variations in the quality of groundwater, especially in the upper water-bearing zones of the aquifer, can result from soil conditions, soil types, geologic structure, irrigation practices, and irrigation water quality. Increased groundwater pumping can alter historical flow patterns and cause poor quality groundwater to mix with and contaminate the better quality groundwater.

Currently, saline groundwater intrusion is not a problem with the Madera Groundwater Basin. Therefore, the initial focus will be on monitoring the quality of the groundwater. If water quality changes occur, the cause will be investigated by the Regional Water Quality Control Board, and remedial action will be taken by the responsible party under the regulatory direction of the Regional Water Quality Control Board.

## 4.3 Identification and Management of Wellhead Protection Areas and Recharge Areas

The Federal Wellhead Protection Program (WPP) was established by Section 1428 of the Safe Drinking Water Act Amendments of 1986 and is designed to protect groundwater resources of public drinking water from contamination. This will minimize the need for costly treatment to meet drinking water standards. A wellhead protection area (WPA), as defined by the 1986 Amendments, is *the surface and subsurface area surrounding a water well or wellfield supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water or wellfield.* The basic task of wellhead and recharge area protection is the identification of zones around public water supply wells and groundwater recharge areas where land use must be controlled to minimize the possibility of contamination of the drinking water supply.

Madera Irrigation District does not provide public drinking water to its users. Therefore, WPAs are not currently applicable to this plan.

## 4.4 Responsibility for the Mitigation of Contaminated Groundwater

Groundwater contamination can originate from many sources or activities. Generally, once the groundwater table becomes contaminated, the cleanup of the contaminant is very complex and expensive. There are several agencies that play a role in mitigating groundwater contamination. Among them is the California Regional Water Quality Control Board (RWQCB), the California Department of Toxic Substances Control (DTSC), and the U.S. Environmental Protection Agency (EPA). Each agency has its own regulatory authorities and expertise to contribute to the mitigation and the degree to which each agency participant is dependent upon the nature of the problem. The primary role of the Madera Irrigation District is to report any contamination that they become aware of to the proper regulatory agency.

## 4.5 Administration of a Well Abandonment and Well Destruction Program

State regulations require that all unused or inactive wells be properly maintained as defined by the *Water Well Standards: State of California DWR Bulletins 74-871 and 74-90*. State regulations also require all inactive wells that are not being properly maintained to be properly destroyed. Improperly maintained wells act as a means for mixing of groundwater of different quality. Wells that are unpumped create a much greater threat than those wells that are periodically pumped. This is due in part to the fact that pumping will normally remove contaminants that may have migrated during idle periods.

Madera County has a similar ordinance regarding well destruction. The enforcement of this ordinance will remain in the control of Madera County.

## 4.6 Mitigation of Overdraft Conditions

Groundwater overdraft can lead to a variety of problems that include land subsidence and an increase in the cost of pumping. Overlooking overdraft can result in a limited supply of water during drought years, which would severely impact the long-term viability of the District, which is predominantly agriculture. Groundwater overdraft is due to an imbalance in the rates of extraction and replenishment. Several methods will help in the correction of overdraft. These methods are as follows:

- A decrease in the amount of extraction to match the rate of replenishment
- Increase in the replenishment to match or exceed the extraction
- Balance replenishment and extraction of the groundwater

Currently, the District is defined as being in a condition of overdraft, which is apparent from the observed decline in the depth to groundwater. Factors that affect the future rate of overdraft include the following:

- The future water demand within and adjacent to the District
- Future pumping rates within and adjacent to the District

Several mitigative measures can be taken to limit the overdraft problems. One such measure is for the District to increase the number of recharge areas maintained by the District. The District will actively pursue the acquisition of land that will be designated as groundwater recharge basins. In addition, the District will continue to support unlined canals and natural streams, such as the Fresno River, the channel under Fanchi weir, and Cottonwood Creek, as a means of conveying large amounts of surface water to the growers.

Another mitigative measure is to increase and modify the irrigation practices and efficiencies. This may be the most practical way to manage the District's groundwater extractions. This will reduce water use with minimal impacts to land use and the significant economic impacts are less likely to result from this approach. The efficiency of irrigation systems can vary significantly based on physical site conditions, climate, method of irrigation, irrigation system design, and management. There are several steps that can be taken that will result in a higher irrigation efficiency. These steps generally fall into two categories. These are:

- Installation/retrofitting of existing systems with improved equipment/technology and/or installing new systems using technology on existing or proposed future plantings.

- Implementing improved irrigation water management procedures of existing irrigation systems.

Several items will be actively supported by the District in an attempt to increase the irrigation efficiency. These items are listed below.

- Installation of flow meters will provide useful information needed to determining irrigation efficiency.

- Modification of the irrigation frequency and the duration will also help. During irrigation it is important to consider both the soil moisture conditions and the drop water requirements. The correct time to stop irrigation is when the soil reservoir has been filled and the water requirement for the crops has been satisfied.

- Improve the application uniformity used during irrigation. Irrigation systems will be designed to best utilize the available water and minimize the amount of water lost to runoff.

Another mitigative measure to correct the overdraft problem is to import additional surface water supply. The District will actively seek to make its sources of surface water more available. They will coordinate with surrounding districts and regulatory agencies in an attempt to acquire additional surface water supply. The more dependable surface water is, the less dependent the farmer will be to the groundwater.

In addition to acquiring additional surface water supply, the District will explore alternatives to be able to offer the growers economic incentives to use less groundwater. Again, the District will work with

local regulatory agencies in an attempt to be able to provide adequate surface water at an economically feasible cost.

## 4.7 Replenishment of Groundwater Levels and Storage

The District currently achieves groundwater replenishment using several different methods, including the following:

- The District currently has eight designated recharge basins, as shown on Figure 1-1, that are used to replenish the water levels within the District.
- There are currently 90 miles of unlined canals within the District's distribution/conveyance system. In addition, there are 102 miles of natural streams. Both the unlined canals and natural streams convey a large amount of water. A percentage of this water percolates and reaches the groundwater table.
- A percentage of the water applied to the fields of irrigation will percolate and reach the groundwater table.

To increase the replenishment of the groundwater table, additional surface water must be absorbed within the basin either by increasing surface water irrigation or by direct recharge areas. This will be accomplished by the District actively pursuing additional land designated for groundwater recharge. In addition, the District will encourage farmers to use surface water instead of groundwater. This is accomplished by investigating pricing mechanisms that will give the farmer an economic incentive to use the surface water when available.

The District currently monitors well water levels in about 229 wells located throughout the District. These measurements are taken once in the spring and once in the fall and are reported to the Bureau of Reclamation, as discussed in Section 2.10. The purpose of this water level monitoring is to identify areas of overdraft and provide information that will allow computation of the changes in groundwater quality and storage.

## 4.8 Monitoring of Groundwater Extracted by Water Producers

Monitoring the groundwater extracted by the water producers is best accomplished by placing flow meters on all the irrigation wells used to pump groundwater to the surface for irrigation. The District will recommend to landowners that an adequate flow meter be placed on their irrigation wells. The flow meter totalizer will indicate the total amount of water that was pumped. Growers will know their water use and can use this information for on-farm water conservation. In addition, the District will encourage the landowners to make this information available to the District. The District will implement this monitoring program as part of this GMP.

## 4.9 Facilitating Conjunctive Use Operations

Conjunctive use operation of a groundwater basin is defined in DWR Bulletin 118-80 as:

> *Operation of a groundwater basin in coordination with a surface water reservoir system. The basin is intentionally recharged in years of above average precipitation so groundwater can be extracted in years of below average precipitation when surface water supplies are below normal.*

In some years, the surface water supply is greater than the basin water demand; in other years. The surface water supply is less than the basin water demand. In wet years, surface water is used to recharge the groundwater basin with recharge being achieved either directly by surface recharge or by using surface water instead of groundwater whenever possible.

The District is in a conjunctive use program with the Bureau of Reclamation. Both agencies will work together to achieve the goals of this GMP.

## 4.10 Identification of Well Construction Policies

Improperly constructed wells serve as a primary means for contaminating the groundwater. Contaminated groundwater results from the mixing of water between aquifers with differing quality. Madera County has enacted and is responsible for enforcing the County Well Ordinance that regulates well construction. When a new well is drilled, a well construction permit is required, and a well driller's report must be filed with the Department of Water Resources and the County. This will ensure proper construction of wells within the District.

## 4.11 Construction and Operation of Groundwater Management Facilities

The District will actively pursue additional lands to be used as recharge facilities. Where possible, recharge activities will be coordinated with flood control activities. Following acquisition of land, the District would construct recharge basins that would maximize the amount of recharge of the groundwater table. These facilities would be located in areas where extraction can occur in times of limited surface supply. Such extraction would be conducted in a manner that allows incorporation of groundwater into District distribution facilities and only to the extent that there are no unreasonable adverse impacts on landowners and growers in the District. Trained District personnel will operate the facilities.

## 4.12 Development of Relationships with Federal, State, and Local Regulatory Agencies

Relationships between the groundwater management districts and the various regulatory agencies is an important part of an effective plan. The plan will be submitted to the Department of Water Resources

and the RWQCB. Groundwater management activities will be coordinated with these regulatory agencies and the agencies that also are a part of the Madera Groundwater Basin.

## 4.13 Review of Land Use Plans and Coordination with Land Use Planning Agencies

An important components of developing a groundwater management plan is the review of land use plans for the surrounding area or basin and coordinating efforts with regional and local land use planning agencies. Urbanization has a significant impact on groundwater management. It is important to plan for the impacts a developing area can have on the groundwater basin by compensating in other areas within the District. Compensation can be in a variety of forms, including adding recharge basins, importing additional surface water supplies, and limiting pumping within the developed area. Within developing areas, recharge basins should be planned for prior to development. Madera Irrigation District will work closely with Madera County and the City of Madera in evaluating land use plans to ensure the groundwater table is protected.

## SECTION 5: GROUNDWATER EXPORTATION, GROUNDWATER BANKING, IMPORTATION OF FOREIGN WATER, AND USE OF DISTRICT FACILITIES FOR SUCH PURPOSES

### Chapter .100
### Rules and Regulations Pertaining to Groundwater Banking; Importation of Foreign Water For the Purpose of Groundwater Banking; Exportation of Groundwater Outside the District; and Use of District Facilities for such Purposes.

#### .100.010 PURPOSE AND INTENT.

A. The lands within Madera Irrigation District ("District") are heavily dependent upon groundwater. The groundwater basin(s) underlying the District and surrounding areas are severely overdrafted.

B. It is essential to the continued prosperity of the landowners and water users within the District that the quality and quantity of the groundwater supply be maintained to meet the demands of District landowners and water users.

C. Areas within the District are or could be or become subject to land subsidence due to the extraction of groundwater.

D. The direct or indirect transfer of groundwater outside the District may have significant environmental impacts on the area within the District including, but not limited to, increased groundwater overdraft; land subsidence; uncontrolled movement of contaminated groundwater; uncontrolled movement of poor quality or contaminated groundwater; the lowering of groundwater levels; increased groundwater or soil degradation; and loss of aquifer capacity due to land subsidence.

E. The direct or indirect transfer of groundwater outside the District may have significant economic impacts on areas within the District including, but not limited to, loss of arable agricultural land; increased pumping costs due to lowered groundwater levels; increased groundwater quality treatment costs due to movement of contaminated or poor quality groundwater; replacement of wells due to declining groundwater levels, and replacement of damaged wells, conveyance facilities, roads, bridges and other structures due to land subsidence.

F. The importation of water originating outside of Madera County (whether or not conveyed through or pooled with facilities located in or adjacent to Madera County) for the purpose of Groundwater Banking such water ("Foreign Water") could, if unregulated, introduce water of an inferior quality into District aquifers, resulting in significant economic and environmental impacts on areas within the District, including, but not limited to, those specified in Paragraphs D. and E., above .

G. As used herein the term "Groundwater Banking" means the percolation, injection, or other recharge of a supply of water for the purpose of later extraction and delivery of such water outside of the District. Groundwater Banking can be reasonable and beneficial if it can be accomplished without:

(1) causing or increasing an overdraft of groundwater underlying the District;

(2) adversely affecting the ability of other groundwater users to use, store, or transmit groundwater within any aquifer(s) underlying the District (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 District;

(4) resulting in, expanding, or exacerbating degradation of the quality or quantity of surface or groundwater within the District, or groundwater basins and aquifers within the District;

(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 area within the District; or

(8) adversely affecting the recharge and storage ability on adjacent lands where passive recharge may take place.

H. For Groundwater Banking projects all or a portion of which will be located within the District, it is essential that the District be the agency that determines whether a permit should be issued to allow groundwater banking, exportation of groundwater, or importation of foreign water, within such areas. 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, exportation of groundwater, or importation of foreign water, nor a method to insure that groundwater banking will meet the requirements of Paragraph G., above.

I. The District, as the agency most familiar with local conditions affecting groundwater, should adopt reasonable regulatory measures in relation to exportation of groundwater, Groundwater Banking, and the importation of Foreign Water for the purpose of Groundwater Banking.

J. California Water Code section 1810(d) provides that use of a water conveyance facility to transfer water may be denied if the use of the water conveyance facility will injure any legal user of water, will unreasonably affect fish, wildlife or other in-stream beneficial uses, or will unreasonably affect the overall economy or the environment of the county from which the water is being transferred.

**.100.020 TITLE.**

These provisions shall be known as "Rules and Regulations Pertaining to Groundwater Banking; Importation of Foreign Water For the Purpose of Groundwater Banking; Exportation of Groundwater Outside the District; and Use of District Facilities for such Purposes."

**.100.030 DEFINITIONS**

The terms used in this Chapter have the following meanings, unless otherwise expressly provided:

A. "Damage Prevention Plan" means a written plan which specifically details the problems that may occur as a result of the operation of the project and details what actions will be

taken by the Applicant to mitigate or eliminate the problems in order to prevent damage to the site and surrounding properties.

B. "Emergency Action Plan" means a written plan which provides a complete and detailed evaluation of potential project failures that can occur during operation of the project and which details what actions the Applicant will take to prevent or minimize damage to the project and protect the public and surrounding properties.

C. "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.

D. "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.

E "Groundwater" means water that occurs beneath the land surface and fills the pore spaces of the alluvium, soil, or rock formation in which it is situated.

F. "Groundwater Banking" means the importation of a surface supply of water that is percolated or injected to groundwater for storage, or placed underground by means of in-lieu recharge, for later extraction and delivery.

G. "Groundwater Management Plan" means a groundwater management plan adopted pursuant to California Water Code section 10750 et seq.

H. "Local water agencies" means public agencies, districts, or mutual water companies located wholly or partly within Madera County which have as their primary function the supplying of water for domestic, agricultural, industrial, or municipal purposes.

I. "Operations and Maintenance Plan" means a written plan which provides complete details of how the Applicant plans to

operate and maintain the project after construction is completed. This Plan must show who will assume the responsibility for the operation and maintenance of the project and provide an organizational chart detailing the job responsibilities of each position shown.

J. "Person" means an individual, partnership, company, corporation, unincorporated association, public agency, or other form of business entity.

K. "Project Monitoring Plan" means a written plan which details how the Applicant will monitor the project site and properties outside of the project boundaries for possible damage from operation of the project.

L. "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 and where it will be installed.

M. "Safety Action Plan" means a written plan which provides information on who will be responsible for implementing the safety requirements for the project and which also provides details of all project safety requirements, including those needed to protect the public and surrounding properties.

**.100.040 LAND SUBJECT TO ARTICLE.**

This Chapter shall be applicable to all lands within the District boundaries. If a portion of a Groundwater Banking project lies within the District, and a portion lies outside the boundaries of the District, then this Chapter shall apply to that portion that lies within the boundaries of the District.

**.100.050 EXPORTATION OF GROUNDWATER BEYOND DISTRICT BOUNDARIES.**

A. REQUIREMENT OF PERMIT:

Except under a permit granted pursuant to this Section, no groundwater extracted from any well within the boundaries of the District and located on or under lands subject to this Chapter, shall be used on lands which are outside of the boundaries of the District, 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. A permit is required under this Section whether or not such exportation is pursuant to Groundwater Banking that is also subject to a separate permit under Section __.100.060. A permit for exportation under this Section may cover all exportation of water to a specified water user in amounts specified in the permit for a period not to exceed five years from the granting of the permit, after which a new permit shall be required.

B. APPLICATION FOR PERMIT:
Applications for permits under this Section shall be made to the District on forms provided by the District and shall contain all information and reports required therein. An Application shall be accompanied by a report ("Report") prepared at the applicant's expense by a qualified Registered Civil Engineer or Geologist, versed in geologic and hydraulic testing, which shows:

a. The source of the water to be exported.

b. The quantity and quality of water proposed to be exported.

c. The location to which and purpose for which the water is to be exported, including the reasonable and beneficial use to which the water is to be put.

d. The geologic and hydrologic properties of the aquifers from which extraction will be made, including possibilities or likelihood of subsidence problems.

e. Percolation tests to determine the ability of the aquifer(s) to recharge.

f. Clay layers and their effect on percolation.

g. The applicant's Project Water Measurement and Water Loss Accountability Plan.

h. The applicant's Damage Prevention Plan.

i. The applicant's Project Monitoring Plan.

j. The applicant's Safety Action Plan.

k. The applicant's Emergency Action Plan.

l. The location, size, spacing and depths of extraction wells.

m. Horizontal migration of groundwater from surrounding locations.

n. The means and criteria for determining any effects on surrounding lands and their groundwater supplies.

o. Such other matters as the District may require.

Five copies of the Application, Report, and other information submitted shall be provided.

C. ENVIRONMENTAL IMPACT REPORT:
An Application for extraction permit under this Section 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 District requirements. The EIR shall be prepared, and shall be paid for by the applicant, in accordance with the District's CEQA implementation procedures.

D. ADDITIONAL STUDIES AND REQUIREMENTS:
If, after receiving the Report as required by Paragraph B., above, and before or after receiving the EIR, the District Engineer desires more information, he or she may require preparation by applicant, at applicant's expense, of any additional geologic or hydrologic studies, or other information or studies, that he or she deems necessary to obtain information needed in order to make a recommendation on the application. The Engineer may review the application with potentially affected landowners and water users, with the staff of applicable local, state and federal agencies and with, and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION.
After reviewing the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D., above, the District Engineer shall prepare a written report, with all comments attached thereto, in which he or she either shall recommend denial of the permit, or granting the permit with suggested conditions for the project. The written report also shall include recommendations concerning the adequacy of the EIR. All documents shall be filed with the Secretary of the Board.

F. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD:
The permit may only be approved if the District finds that the proposed extraction and exportation will not have detrimental impacts on the District by determining that:

(1) The extraction and exportation will not cause or increase an overdraft on parts or all of the groundwater basins underlying the District.

(2) The extraction and exportation will not adversely affect the ability of other groundwater users to use, store, or transmit groundwater within any aquifer(s) underlying the District.

(3) The extraction and exportation will not adversely effect the reasonable and beneficial uses of groundwater by other groundwater users within the District.

(4) The extraction and exportation will not result in, expand, or exacerbate degradation of the quality or quantity of surface or groundwater within the District, or groundwater basins and aquifers within the District.

(5) The extraction and exportation will not result in injury to a water replenishment, storage, restoration, or conveyance project or facility;

(6) The extraction and exportation will not adversely affect the overall economy or environment of the area within the District.

If the Board determines that one or more of the findings required by this Section cannot be made, the Board shall deny the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

G. 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.

H. PAYMENT OF FEES.
The applicant at the time of filing shall pay such fees as are or may be established by the Board for processing the application and the giving and publication of required notices.

I. NOTICE TO LANDOWNERS:
Upon the filing of an application with the District, the District shall give written notice to all owners of lands located within five miles of the exterior boundaries of the proposed extraction 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 District. In addition thereto, the District 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 District. The District 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.

J. 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 Secretary of the Board after completion and filing of the Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, the location from which the water is proposed to be extracted and exported, and a general description of the project and that any interested person may submit evidence at the hearing. At least fifteen days must

elapse between filing the documents with the Secretary of the Board and the date of the hearing.

K. PROCEDURES FOR CONDUCTING HEARING:
At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from the public and the Engineer's Recommendation 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.

L. 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 F., above, subject to the terms and provisions authorized in Paragraph M., below. If the Board is unable to make the findings set forth in Paragraph F., above, then the application shall be denied and no permit shall be issued. The Board shall direct that written findings are prepared in conformity with its decision and shall adopt said findings when prepared.

M. TERMS AND CONDITIONS OF PERMIT:
If an application is approved, the Board may impose such terms and conditions 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.

N. REVOCATION OF PERMIT:
Any violation of the terms and conditions of the permit will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held in the manner described in the preceding Paragraphs.

O. INSPECTIONS:
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 District Engineer, or his representatives, at any reasonable time, and from time to time, 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.

representatives, at any reasonable time, and from time to time, 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.

P. 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.

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.

**__.100.060 GROUNDWATER BANKING.**

A. REQUIREMENT OF PERMIT:
No person, who is subject to this Ordinance, other than the District, shall engage in Groundwater Banking on or under land subject to this Ordinance without first obtaining a permit from the District in accordance with this Section. A permit for Groundwater Banking under this Section may cover all Groundwater Banking for amounts of storage specified in the permit for a period not to exceed five years from the granting of the permit, after which a new permit shall be required. A permit for Groundwater Banking is not a permit for importation of Foreign Water to the Groundwater Bank (which importation shall require a separate permit under Section __.100.070), and it is not a permit for exportation of groundwater beyond District boundaries (which exportation shall require a separate permit under Section __.100.050).

B. APPLICATION FOR PERMIT:
Applications for permits under this Section shall be made to the District on forms provided by the District and shall contain all information and reports required therein. An Application shall be accompanied by a report ("Report") prepared at the applicant's expense by a qualified Registered Civil Engineer or Geologist, versed in geologic and hydraulic testing, which shows:

a. The location, plans, and specifications of the proposed project.

c. The method of placement of water to be banked

d. The quantities of groundwater to be extracted.

e. The geologic and hydrologic properties of the aquifers into which recharge will occur and from which extraction will be made, including possibilities or likelihood of subsidence problems.

f. Percolation tests to determine the ability of the aquifer(s) to recharge.

g. Clay layers and their effect on percolation.

h. Design of spreading areas.

i. The applicant's Operations and Maintenance Plan.

j. The applicant's Project Water Measurement and Water Loss Accountability Plan.

k. The applicant's Damage Prevention Plan.

l. The applicant's Project Monitoring Plan.

m. The applicant's Safety Action Plan.

n. The applicant's Emergency Action Plan.

o. The location, size, spacing and depths of extraction wells.

p. Horizontal migration of groundwater from surrounding locations.

q. The means and criteria for determining any effects on surrounding lands and their groundwater supplies.

r. Such other matters as the District may require.

Five copies of the Application, Report, and other information submitted shall be provided.

C. ENVIRONMENTAL IMPACT REPORT:
An Application for Groundwater Banking under this Section 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 District requirements. The EIR shall be prepared, and shall be paid for by the applicant, in accordance with the District's CEQA implementation procedures.

D. ADDITIONAL STUDIES AND REQUIREMENTS:
If, after receiving the Report as required by Paragraph B., above, and before or after receiving the EIR, the District Engineer desires more information, he or she may require preparation by applicant, at applicant's expense, of any additional geologic or hydrologic studies, or other studies or information, that he or she deems necessary to obtain information needed in order to make a recommendation on the application. The Engineer may review the application with potentially affected landowners and water users, with the staff of applicable local, state and federal agencies, and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION.
After reviewing the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D., above, the District Engineer shall prepare a written report, with all comments attached thereto, in which he or she either shall recommend denial of the permit, or granting the permit with suggested conditions for the project. The written report also shall include recommendations concerning the adequacy of the EIR. All documents shall be filed with the Secretary of the Board.

F. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD:
The permit may only be approved if the District finds that the proposed Groundwater Banking project will not have detrimental impacts on the District by determining that:

(1) The project will not adversely affect the ability of other groundwater users to use, store, or transmit groundwater within any aquifer(s) underlying the District (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).

(2) The project will not adversely affect the reasonable and beneficial uses of groundwater by other groundwater users within the District.

(3) The project will not result in, expand, or exacerbate degradation of the quality or quantity of surface or groundwater within the District, or groundwater basins and aquifers within the District.

(4) The project will not result in injury to a water replenishment, storage, restoration, or conveyance project or facility.

(5) 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.

(6) The project will not adversely affect the overall economy or environment of the District.

(7) The project will not cause or increase an overdraft of groundwater underlying the District.

(8) The project will not adversely affect the storage ability on adjacent lands where passive recharge may take place.

If the Board determines that one or more of the findings required by this Section cannot be made, the Board shall deny the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

G. 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.

H. PAYMENT OF FEES.
The applicant at the time of filing shall pay such fees as are or may be established by the Board for processing the application and the giving and publication of required notices.

I. NOTICE TO LANDOWNERS:
Upon the filing of an application with the District, the District shall give written notice to all owners of lands located within the District which are located within five miles of 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 District. In addition thereto, the District 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 District. the District 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.

J. 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 Secretary of the Board after completion and filing of the Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, a general description of the proposed importation and that any interested person may submit evidence at the hearing. At least fifteen days must elapse between filing the documents with the Secretary of the Board and the date of the hearing.

K. PROCEDURES FOR CONDUCTING HEARING:
At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from the public and the Engineer's Recommendation 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.

L. 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 F., above, subject to the terms and provisions authorized in Paragraph M., below. If the Board is unable to make the findings set forth in Paragraph F., above, then the application shall be denied and no permit shall be issued. The Board shall direct that written findings are prepared in conformity with its decision and shall adopt said findings when prepared.

M. TERMS AND CONDITIONS OF PERMIT:
If an application is approved, the Board may impose such terms and conditions 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. Since direct or other subsurface injection of water into an aquifer entails an inherent risk of irreparable contamination due to the lack of natural filtering resulting from percolation, the permit shall prohibit the use of direct or other subsurface injection.

N. REVOCATION OF PERMIT:
Any violation of the terms and conditions of the permit will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held in the manner described in the preceding Paragraphs.

O. INSPECTIONS:
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 District Engineer, or his representatives, at any reasonable time, and from time to time, to enter the project site(s) 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.

P. 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.

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.

**.100.070 IMPORTATION OF FOREIGN WATER FOR GROUNDWATER BANKING.**

A. REQUIREMENT OF PERMIT:
Except under a permit granted pursuant to this Section, no person may import Foreign Water for the purpose of Groundwater Banking within the boundaries of the District and located on or under lands subject to this Chapter. A permit is required under this Section whether or not such importation is pursuant to Groundwater Banking that is also subject to a separate permit under Section __.100.060. A permit for importation under this Section may cover all importation of water from a specified water source (designated by specific location and type) in amounts specified in the permit for a period not to exceed five years from the granting of the permit, after which a new permit shall be required.

B. APPLICATION FOR PERMIT:
Applications for permits under this Section shall be made to the District on forms provided by the District and shall contain all information and reports required therein. An Application shall be accompanied by a report ("Report") prepared at the applicant's expense by a qualified Registered Civil Engineer or Geologist, versed in geologic and hydraulic testing, which shows:

a. The source of the water to be imported.

b. The quantity and quality of water proposed to be imported.

c. The manner in which the water is to be conveyed to the Groundwater Banking facility, including the specific location of conveyance facilities, and copies of all permits and agreements showing consent for the use of such conveyance facilities.

d. The proposed method of placement of water to be imported and banked

e. The physical, and where applicable the geologic and hydrologic, properties of the conveyance facilities, including possibilities or likelihood of contamination or degradation problems.

f. The applicant's Project Water Measurement and Water Accountability Plan.

g. The applicant's Damage Prevention Plan.

h. The applicant's Project Monitoring Plan.

i. The applicant's Safety Action Plan.

j. The applicant's Emergency Action Plan.

k. The means and criteria for determining any effects on lands surrounding or neighboring all conveyance facilities and on their groundwater or surface water supplies.

l. The means and criteria for determining any effects on all other water supplies into which the proposed Foreign Water may be commingled while being conveyed, such as in a pool or reservoir.

m. Such other matters as the District may require.

Five copies of the Application, Report, and other information submitted shall be provided.

C. ENVIRONMENTAL IMPACT REPORT:

An Application for Foreign Water Importation Permit under this Section 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 District requirements. The EIR shall be prepared, and shall be paid for by the applicant,

in accordance with the District's CEQA implementation procedures.

D. ADDITIONAL STUDIES AND REQUIREMENTS:
If, after receiving the Report as required by Paragraph B., above, and before or after receiving the EIR, the District Engineer desires more information, he or she may require preparation by applicant, at applicant's expense, of any additional geologic or hydrologic studies, or other studies or information, that he or she deems necessary to obtain information needed in order to make a recommendation on the application. The Engineer may review the application with potentially affected landowners and water users, with the staff of applicable state and federal agencies, and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION.
After reviewing the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D., above, the District Engineer shall prepare a written report, with all comments attached thereto, in which he or she either shall recommend denial of the permit, or granting the permit with suggested conditions for the project. The written report also shall include recommendations concerning the adequacy of the EIR. All documents shall be filed with the Secretary of the Board.

F. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD:
The permit may only be approved if the District finds that the proposed importation of Foreign Water will not have detrimental impacts on the District by determining that:

(1) The importation will not adversely affect the ability of other groundwater users to use, store, or transmit groundwater within any aquifer(s) underlying the District.

(2) The importation will not adversely affect the reasonable and beneficial uses of groundwater by other groundwater users within the District.

(3) The importation will not result in, expand, or exacerbate degradation of the quality or quantity of surface or groundwater within the District, or groundwater basins and aquifers within the District.

(4) The importation will not result in injury to a water replenishment, storage, restoration, or conveyance project or facility.

(5) 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.

(6) The importation will not adversely affect the overall economy or environment of the District.

(7) The existing qualities of the underground aquifers will not be degraded by the importation.

(8) The importation will not adversely affect the storage ability on adjacent lands where passive recharge may take place.

If the Board determine that one or more of the findings required by this Section cannot be made, the Board shall deny the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

G. 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.

H. PAYMENT OF FEES.
The applicant at the time of filing shall pay such fees as are or may be established by the Board for processing the application and the giving and publication of required notices.

I. NOTICE TO LANDOWNERS:
Upon the filing of an application with the District, the District shall give written notice to all owners of lands located within the District which are located within five miles of any conveyance facilities that are within or adjacent to the District, 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 District. In addition thereto, the District 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 District. The District 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.

J. 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 Secretary of the Board after completion and filing of the Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, a general description of the proposed importation and that any interested person may submit evidence at the hearing. At least fifteen days must elapse between filing the documents with the Secretary of the Board and the date of the hearing.

K. PROCEDURES FOR CONDUCTING HEARING:
At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from the public and the Engineer's Recommendation 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.

L. 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 F., above, subject to the terms and provisions authorized in Paragraph M., below. If the Board is unable to make the findings set forth in Paragraph F., above, then the application shall be denied and no permit shall be issued. The Board shall direct that written findings are prepared in conformity with its decision and shall adopt said findings when prepared.

M. TERMS AND CONDITIONS OF PERMIT:
If an application is approved, the Board may impose such terms and conditions 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.

N. REVOCATION OF PERMIT:
Any violation of the terms and conditions of the permit will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held in the manner described in the preceding Paragraphs.

O. INSPECTIONS:
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 District Engineer, or his representatives, at any reasonable time, and from time to time, to enter the project site(s) 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.

P. 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.

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.

**.100.080 DISTRICT CONVEYANCE FACILITIES:**

A. REQUIREMENT OF PERMIT:
In order to avoid injury to any legal user of water, and to avoid unreasonably affecting the overall economy or the environment of Madera county, no person may use any District-owned conveyance facility as a part of, or in connection with, Groundwater Banking for which a permit is required under this Chapter, or the importation of Foreign Water for which a permit is required under this Chapter, or the exportation of groundwater for which a permit is required under this Chapter, except under a permit granted pursuant to this Section. A permit is required under this Section whether or not such use is in connection with groundwater banking, importation of foreign water, or exportation of groundwater for which a separate permit or permits are required under other Sections of this Chapter. A permit for use of a district conveyance facility under this Section may cover all importation of water from a specified water source (designated by specific location and type) in amounts specified in the

permit for a period not to exceed two years from the granting of the permit, after which a new permit shall be required.

B. APPLICATION FOR PERMIT:
Applications for permits under this Section shall be made to the District on forms provided by the District and shall contain all information and reports required therein. An Application shall be accompanied by a report ("Report") prepared at the applicant's expense by a qualified Registered Civil Engineer or Geologist, versed in geologic and hydraulic testing, which shows:

a. The source of the water to be conveyed through the conveyance facility.

b. The quantity and quality of water proposed to be conveyed.

c. The manner in which the water is to be delivered to and withdrawn from the District conveyance facility and how the water is to conveyed from its source to the District's conveyance facility.

d. The physical, and where applicable the geologic and hydrologic, properties of the conveyance facilities through which the water will be delivered into the District's conveyance facilities, including possibilities or likelihood of contamination or degradation problems.

e. The applicant's Project Water Measurement and Water Accountability Plan.

f. The applicant's Damage Prevention Plan.

g. The applicant's Project Monitoring Plan.

h. The applicant's Safety Action Plan.

i. The applicant's Emergency Action Plan.

j. The means and criteria for determining any effects on lands within the District and otherwise surrounding or neighboring all conveyance facilities and on their groundwater or surface water supplies.

k. The means and criteria for determining any effects on all other water supplies with which the water proposed to be conveyed may be commingled while being conveyed.

l. The means and criteria for determining any effects of the use of the District conveyance facility on any other legal user of water conveyed or to be conveyed through such facilities.

m. The means and criteria for determining any effects of the use of the District conveyance facility on fish, wildlife, other instream beneficial uses, or the environment within the District and within Madera County.

n. The means and criteria for determining any effects of the use of the District conveyance facility on the economy within the District and within Madera County.

o. Such other matters as the District may require.

Five copies of the Application, Report, and other information submitted shall be provided.

C. ENVIRONMENTAL IMPACT REPORT:
An Application for Use of District Conveyance Facility under this Section 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 District requirements. The EIR shall be prepared, and shall be paid for by the applicant, in accordance with the District's CEQA implementation procedures.

D. ADDITIONAL STUDIES AND REQUIREMENTS:
If, after receiving the Report as required by Paragraph B., above, and before or after receiving the EIR, the District

Engineer desires more information, he or she may require preparation by applicant, at applicant's expense, of any additional physical, geologic or hydrologic studies, or other studies or information, that he or she deems necessary to obtain information needed in order to make a recommendation on the application. The Engineer may review the application with potentially affected landowners and water users, with the staff of applicable state and federal agencies, and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION.

After reviewing the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D., above, the District Engineer shall prepare a written report, with all comments attached thereto, in which he or she either shall recommend denial of the permit, or granting the permit with suggested conditions for the project. The written report also shall include recommendations concerning the adequacy of the EIR. All documents shall be filed with the Secretary of the Board.

F. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD:

The permit may only be approved if the District finds that the proposed use of District conveyance facility will not:

(1) Injure any legal user of water.

(2) Unreasonably affect the delivery of water to any District landowners.

(3) Unreasonably affect fish, wildlife, or other instream beneficial uses.

(4) Unreasonably affect the overall economy of the county from which the water is to be transferred.

(5) Unreasonably affect the environment of the county from which the water is to be transferred.

If the Board determines that one or more of the findings required by this Section cannot be made, the Board shall deny the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

G. 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.

H. PAYMENT OF FEES.
The applicant at the time of filing shall pay such fees as are or may be established by the Board for processing the application and the giving and publication of required notices.

I. NOTICE TO LANDOWNERS:
Upon the filing of an application with the District, the District shall give written notice to all owners of lands located within the District which are located within five miles of any conveyance facilities that are within or adjacent to the District, setting forth the name of the applicant, a description of the applicant's proposal, a description or map of the District facility involved, and a statement that all documents submitted in connection with the application are public records subject to inspection at the office of the District. In addition thereto, the District 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 applicant's proposal, a description or map of the District facility involved, and a statement that all documents submitted in connection with the application are public records subject to inspection at the office of the District. The District 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.

J. 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 Secretary of the Board after completion and filing of the Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, a general description of the proposed importation and that any interested person may submit evidence at the hearing. At least fifteen days must elapse between filing the documents with the Secretary of the Board and the date of the hearing.

K. PROCEDURES FOR CONDUCTING HEARING:
At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from the public and the Engineer's Recommendation 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.

L. 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 F., above, subject to the terms and provisions authorized in Paragraph M., below. If the Board is unable to make the findings set forth in Paragraph F., above, then the application shall be denied and no permit shall be issued. The Board shall direct that written findings are prepared in conformity with its decision and shall adopt said findings when prepared.

M. TERMS AND CONDITIONS OF PERMIT:
If an application is approved, the Board may impose such terms and conditions thereon as the Board deems necessary to prevent adverse effects described in Paragraph F, above.

N. REVOCATION OF PERMIT:
Any violation of the terms and conditions of the permit will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held in the manner described in the preceding Paragraphs.

O. INSPECTIONS:
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 District Engineer, or his representatives, at any reasonable time, and from time to time, to enter the applicant's site(s) and make such observations and measurements as are deemed necessary to assure that the applicant's proposed use is being carried out under the terms of the permit.

P. 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.

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 Cal. Code of Civil Procedure Section 1094.5 and within the time limits prescribed in Cal. Code of Civil Procedure section 1094.6.

**.100.090 PENALTIES FOR VIOLATION:**

These rules and regulations are enacted to secure distribution of water in accordance with determined rights within the District pursuant to California Water Code Section 22085. Supervision and enforcement of these regulations shall be by District watermasters appointed under Water Code Section 22081. The District may elect to proceed with any or all of the following remedies for violation of this Chapter:

(a) A civil action against the violator for damages and/or injunctive relief.

(b) A misdemeanor criminal action against any violator who willfully and without authority closes, changes, or interferes with any headgate, waterbox, or measuring device while it is under the control of the watermaster, or who willfully takes, uses, or conveys water which has been denied him by the watermaster as not allowed under permit or in violation of the provisions of this Ordinance is guilty of a misdemeanor pursuant to Water Code Section 22088. Under Water Code Section 22089.5, a watermaster has the power to arrest any person violating any of the provisions of this article and to give him into the custody of the sheriff or other competent police officer within the county, and immediately thereafter make a complaint before a magistrate against the person so arrested. Every person who violates any of the provisions of this article is guilty of a misdemeanor and is punishable by a fine of not less than twenty-five dollars ($25), nor more than two hundred fifty dollars ($250), or by imprisonment in the county jail for not less than 10 days nor more than six months, or by both such fine and imprisonment pursuant to Water Code Section 22089.

(c) A referral to the Madera County District Attorney for prosecution of a misdemeanor criminal action against any violator without authority of the owner or managing agent, and with intent to defraud, take water from any canal, ditch, flume, or reservoir used for the purpose of holding or conveying is guilty of a misdemeanor under California Penal Code Section 592. If the total retail value of all the water taken is more than

four hundred dollars ($400), or if the defendant has previously been convicted of an offense under Penal Code Section 592 or any former section that would be an offense under Section 592, or of an offense under the laws of another state or of the United States that would have been an offense under this section if committed in this state, then the violation is punishable by imprisonment in the county jail for not more than one year, or in the state prison.

**.100.100 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.

# MADERA IRRIGATION DISTRICT
# SPECIAL BOARD OF DIRECTORS MEETING
# AUGUST 10, 1999

The Special Board of Directors Meeting of the Madera Irrigation District was called to order at 6:00 p.m. by President Pistoresi.

**PRESENT:** Directors Pistoresi, Bursey, Janzen, Galleano and Teranishi
**ABSENT:** None

Also Present:
S.H. Ottemoeller, General Manager
D.D. Roberts, Assistant General Manager-Chief Engineer
D. Green, Legal Counsel
C.A. Rascoe, Secretary to the Board

Seated in the audience was Rhonda Cargill, Michelle Lasgoity, Doug Sordi and Larry Howard.

1-0007 The Board moved into Closed Session at 6:05 p.m. for the purpose of discussing potential litigation with Special Counsel Mike Campos pursuant to Government Code 54956.9 and reconvened at 6:55 p.m.

President Pistoresi stated that there was no action taken in Closed Session.

President Pistoresi adjourned the Special Board Meeting and opened the Hearing for the Proposed Groundwater Management Plan.

1-0015 President Pistoresi opened the discussion stating that on October 1, 1997 the Madera Irrigation District Board of Directors passed a Resolution of Intent to prepare a Groundwater Management Plan following the first public hearing pursuant to California Water Code Section 10750 –10755. Now is the time and place of the second public hearing to determine whether or not to adopt a Proposed Ground Water Management Plan. This hearing was duly noticed as required by law and copies of the proposed plan are available for inspection or acquisition.

Any landowner in the District may file a written protest to the adoption of the plan any time prior to the conclusion of this hearing.

A majority protest will exist if landowners representing less than 50% of the assessed value of the land according to the District benefit assessment rules have filed written protest prior to the hearing. At this time no written protest has been file with the District. If a majority protest does not exist, the Board may adopt a plan at a conclusive hearing or subsequent Board Meeting within 35 days of this hearing.

1-0076 GM Ottemoeller started the presentation on the Groundwater Management Plan by going over a few of the background items. The plan is being done pursuant to the AB3030 that was passed in 1992 by the State Legislature. Partially in response to a large majority of the people who were trying to get the State to pass groundwater ordinances, this was done voluntarily by local agencies so they could demonstrate they were being responsible. CVPIA which also passed in 1992 and water conservation requirements by Bureau guidelines require that Districts go through a plan like AB3030. It's very important that the District have a strategic plan for its future decisions. The plan states a number of goals, all of them are consistent with the District's mission which is to obtain and manage affordable service and groundwater supplies to sustain agriculture long-term. Key goals are to assure long-term availability of groundwater, maximize surface water, prohibit the net export groundwater, protect the quality of the supply and prevent unnecessary restrictions on private well use. Due in part to urban growth, the depth to groundwater close to the City clearly is increasing at a higher rate than other parts of the District. The plan describes a number of efforts that the District can and will take, if necessary, to increase recharge areas within the District. The District would look to aquire land for groundwater recharge basins, continue the conveyance of surface water, increase or modify irrigation practices and efficiencies as necessary and encourage the use of flow meters on wells.

GM Ottemoeller addressed the issue of replenishment of ground water levels in storage. The District needs to pursue additional land for groundwater recharge, encourage farmers to use surface water instead of groundwater and also find some kind of economic incentives for a general encouragement to use the service water. Another stated part of the plan is to open relations with local and state agencies, like the City of Madera that will allow joint use of flood controlled basins as recharge basins during the irrigation season. Coordination with City and County on review of land use plans and other planning activities is also helpful.

In regard to groundwater banking and export, terms and conditions may be established by the District as part of a permit and there would be the ability to revoke permits if terms and conditions are violated. Inspection would be allowed as necessary to verify clients of the plan. Finally, the decision of the Board would be final and violations would be considered a misdemeanor.

1-0565 President Pistoresi opened the meeting to the public for comments or questions pertaining to the plan.

Doug Sordi questioned what the elements of the plan are to convey surface water to the canal. President Pistoresi addressed the questions stating that there is an upcoming meeting scheduled for Thursday, September 9th regarding flow control where this topic is to be addressed. GM Ottemoeller will investigate.

Michelle Lasgoity questioned how the District will ensure that the goals of the groundwater management plan are followed.

President Pistoresi stated the District currently has over 200 wells that it monitors. One of the District's goals is to implement a better plan in monitoring groundwater management. President Pistoresi emphasized that the District would look into the possibility of conducting a review once every six months or so in order to monitor this situation.

Larry Howard questioned how the discussions are progressing with the City and its commitments.

GM Ottemoeller responded that meetings have taken place with the City and are in the process of considering a storm drainage plan that includes additional storm basins. The City's plan looks as though it will take care of most of their future drainage and some of the existing storm drainage.

President Pistoresi thanked everyone involved for participating in the discussion and voicing their concerns in helping protect agriculture.

President Pistoresi closed the public hearing portion of the meeting at 7:35 p.m. and adjourned back into regular session.

# MADERA IRRIGATION DISTRICT
# RESOLUTION NO. 22-99

**WHEREAS,** the District has caused a Groundwater Management Plan to be prepared, and

**WHEREAS,** a noticed public hearing is required prior to the adoption of the Plan, and

**WHEREAS,** all notices required by law were duly made and given, announcing the time and place of the meeting to be on August 10, 1999, at the hour of 7:00 p.m. at the Board Room of the District, located at 12152 Road 28 ¼, Madera, CA 93637, and

**WHEREAS,** copies of the proposed plan were available at the office of the District for inspection or acquisition at the cost of reproduction, and

**WHEREAS,** said public meeting was duly held and evidence both oral and documentary having been introduced, and at the conclusion thereof, the hearing closed, and

**WHEREAS,** prior to the close of the hearing no written protests to the adoption of the plan were filed by any landowner within the District, and

**WHEREAS,** it is to the best interest of the District that the plan be adopted.

**NOW, THEREFORE, BE IT RESOLVED:**

**1.** The AB3030 Groundwater Management Plan, dated May 1999, prepared by Boyle Engineering Corporation is hereby adopted and shall be implemented by the Board of Directors of the District.

**2.** The Plan shall apply to all lands within the boundaries of the District except lands located within the City of Madera.

**3.** Lands located within the City of Madera shall not become subject to the Plan, unless and until the City Council by a majority vote declines to exercise the authority granted by Division 6, Part 2.75, and an agreement pursuant to Water Code §10750.8 is executed by the City and the District, or the City of Madera joins with the District in the adoption of the plan either directly or through a joint powers agreement.

The foregoing resolution was duly and regularly adopted at a regular adjourned meeting of the Board of Directors of the MADERA IRRIGATION DISTRICT, held at the offices of the District on the 10th day of August, 1999, on motion of Director Galleano, seconded by Director Janzen, on the following vote:

Directors voting aye: Pistoresi, Galleano, Bursey, Janzen and Teranishi

Directors voting no: None

Directors abstaining: None

Directors absent: None

Ronald H. Pistoresi, President

Attest:

Cynthia A. Rascoe, Secretary

**MOTION** **Director Galleano moved to approve Resolution No. 22-99, second by Director Janzen. Motion Carried by unanimous vote.**

**Director Galleano read as a matter of record Resolution No. 22-99.**

Director Galleano moved to adjourn the meeting at 7:40 p.m., seconded by Director Janzen. Motion carried.

**APPROVED FOR THE BOARD:**

Ronald H. Pistoresi
President

Cynthia A. Rascoe
Secretary of the Board

Date: Dec. 7, 1999

# MADERA IRRIGATION DISTRICT
## NOTICE OF PUBLIC HEARING ON AMENDMENT TO DISTRICT'S AB 3030 GROUNDWATER MANAGEMENT PLAN

**NOTICE IS HEREBY GIVEN** that on October 31, 2000 at 2:00 p.m. at the Board Room of the Board of Directors of the Madera Irrigation District located at 12152 Road 28 1/4, Madera, CA 93637, the District will hold a public hearing to determine whether or not to adopt an Amendment to the District AB 3030 Groundwater Management Plan as adopted August 10, 1999, pursuant to California Water Code Sections 10750 through 10755.

### I. Summary of the Amendment

The primary goal of the Amendment is to delete the current Section 5 (Regulations Pertaining to Exportation of Groundwater) of the District's AB 3030 Groundwater Management Plan and replace it with a new Section 5 (District Groundwater Import, Export and Banking Ordinance).

### II. Primary Goals of the Amendment

- Ensure the long-term availability of high-quality groundwater.
- Maintain local control of groundwater resources within the District.
- Minimize the cost of groundwater use.
- Prohibit the net export of groundwater from the District and use of groundwater to replace surface water removed from the District as result of a transfer.
- Minimize the impacts of groundwater pumping, including subsidence, overdraft, and soil productivity.
- Prevent unnecessary restrictions on the private use of the District's groundwater resources.
- Ensure coordination between the District, local, and regional groundwater management activities.
- Ensure efficient use of the District's groundwater resources and minimize deep percolation in areas where it may contribute to the shallow groundwater problem through the use of an effective water conservation and management program.
- Coordinate with other local irrigation districts and the city and county of Madera to preserve local water rights.
- Ensure that mitigation is provided for environmental and economic impacts within the District that could result from groundwater banking, groundwater exportation or importation of foreign water.

## III. Items considered during preparation of the Amendment

The District evaluated the condition of the Madera Groundwater Basin and considered the following items when preparing the Amendment.

## IV. District Proposals

The proposed Amendment includes the following elements:

- Rules and regulations pertaining to groundwater banking; importation of foreign water for the purpose of groundwater banking; exportation of groundwater outside the District; and use of District facilities for such purposes.

- The Amendment requires persons who use lands within the District for groundwater banking, importing foreign water for groundwater banking, and exporting groundwater outside of the District or use District facilities to obtain a permit for such use from the District, after presentation of the plan including geological and hydrological reports and public hearings.

## V. Procedures for the Amendment Approval

Any landowner in the District may examine a copy of the Amendment at the office of the District and obtain a copy of the Amendment by paying the cost of reproduction.

Any landowner within the District may file a written protest to the adoption of the Amendment, or withdraw protest previously filed, at any time prior to the conclusion of the hearing.

A majority protest exists if landowners representing more than fifty percent of the assessed value of the land within the District file and do not withdraw protests to the adoption of the Amendment. In such event the Amendment will not be adopted.

If majority protest does not exist, the District may adopt the Amendment within thirty-five days after the conclusion of the hearing.

Dated: October 13, 2000

Cynthia Rascoe, Secretary to the Board

# MADERA IRRIGATION DISTRICT

BOARD OF DIRECTORS MEETING
October 31, 2000

AGENDA ITEM NO. 4

SUBJECT: AB 3030 Groundwater Management Plan Hearing

DISCUSSION:

District Legal Counsel has drafted proposed revisions to the District's AB3030 Groundwater Management Plan that incorporate provisions for permitting importation, banking and exportation of water from the District. The proposed changes are consistent with the ordinance approved by Madera County in July.

RECOMMENDATION:

Approve the proposed revisions to the Groundwater Management Plan.

CFAS Low stated that a copy of a letter dated October 19 from Madera County Counsel that was written to the Attorney General requesting an opinion from the Attorney General on the Prop 13 one percent property tax allocation. The letter noted that the City of Madera has challenged the District receiving this money. It also stated that the Madera County Auditor, based on his review of the Revenue and Taxation Codes and the Water Code, feels the District qualifies for this money but the City is requesting the opinion of the Attorney General. A reply has yet to be received.

*Director Galleano entered the meeting at 2:00 p.m.*

President Pistoresi questioned if there is anything more that District staff needs to do in order to obtain a reply from the Attorney General. GM Ottemoeller stated that staff will look into this to see if more can be done.

*Mr. Dick Johnson entered the meeting at 2:00 p.m.*

GM Ottemoeller commended the staff for the job they did getting out such a large amount of assessments in a relatively short period of time. He added that there was a lot less time spent this year on getting the assessments out due to the speed of the new computer and printer. It was reduced down to three days from over seven.

1-0785 **AB 3030 GROUNDWATER MANAGEMENT PLAN HEARING**

GM Ottemoeller stated that this process is about the District approving a Groundwater Management Plan on August 10, 1999. One of the aspects of that Groundwater Management Plan was Chapter 5 which included a permitting requirement for groundwater exportation and groundwater banking. Since that time, the County of Madera has passed an ordinance that was similar in intent but added groundwater importation as one of the issues that would require a permit for County lands and requested that districts within the County amend whatever ordinance or rules they have to be essentially consistent with the County's ordinance.

The District had its legal counsel use the County's ordinance as a model and it's also very close to work that they were doing for the Gravelly Ford Water District in terms of developing an ordinance. This ordinance is basically a total rewrite from the District's original Chapter 5 of its Groundwater Management Plan.

GM Ottemoeller stated that what the District would be doing is amending the Groundwater Management Plan, so the current Chapter 5 would be taken out and this would be inserted as the new Chapter 5 of the

Groundwater Management Plan. Consistent with that, legal counsel has advised the District to pass an ordinance so it has the ability to enforce the rules set up by the Groundwater Management Plan. Essentially, they would be identical except one would be considered a Groundwater Management Plan and the other would be considered an ordinance.

The basic differences are simply that instead of the two aspects requiring a permit the District now has four separate ones. One of them is the exportation of groundwater from the District. The second one would be groundwater banking within the District. The third permitting requirement would be importation of groundwater. There is also a section that deals with the advance of water through the District system for the purpose of groundwater exportation/importation of banking. Another aspect of this that isn't in the District's current Groundwater Management Plan is provision from the State Water Code for penalties for violations. This was basically pulled out of the Water Code since the District doesn't have separate authority to impose fines.

GM Ottemoeller recommended that the proposed revisions not be approved of today but take any comments from the Hearing and then consider them for approval at the next meeting, the revision to the Groundwater Management Plan and the Ordinance.

Director Janzen stated that on Page 13, Terms and Conditions of Permit, where it states, "...the Board deems necessary to prevent adverse effects on the aquifer(s), the quality and quantity..." he would like to insert somewhere in that statement "the depth" whether it be too high or too low.

President Pistoresi asked if there was anyone in the audience who wanted to comment on AB 3030 Groundwater Management Plan.

There were no comments from the public.

1-1034 GM Ottemoeller commented regarding the requirements for the application on Page 15, Application for Permit, he would want to insert the method of the placement of the water to be banked. In otherwords, is it spreading ponds, injection wells, in-lieu banking. He also had a similar type comment on Page 23, on the importation. Basically the same thing, the proposed method of placement and disposition of the water that is going to be imported. He would like this added to the list of things that they have to provide in the application.

On Page 34, Findings Required for Permit Approval or Denial by the Board, GM Ottemoeller stated he would like to insert that "it would not unreasonably affect the delivery of water to District landowners."

Director Galleano stated if a groundwater banking project went in, they would only be entitled to current state law, which would be excess capacity. In otherwords, their growers would be serviced first at all times. GM Ottemoeller stated that would need to be made clear because the way it was written, it wasn't very clear to him.

As there were no further comments, President Pistoresi closed this portion of the Groundwater Management Plan Hearing stating that it would be continued for approval at the next MID Board Meeting on November 21, 2000.

GM Ottemoeller stated that under the rules of the Groundwater Management Plan if 50% of the landowners had protested, these changes couldn't have been made. Since there wasn't a protest, the Board now has 30 days to approve the changes to the Groundwater Management Plan. It won't be necessary to advertise again. Posting requirements have been met and no one requested copies of the proposed changes.

President Pistoresi pointed out that seated in the audience was Mr. Tom Petrucci, who is the MID incoming director for District 1. He will be replacing Director Teranishi who will be retiring from the District in December.

1-1231 **ENGINEERING REPORT**

CE Roberts stated since the last meeting the Engineering Department has been entering the Fall Groundwater measurement data into the computer. Over the past 15 years, average groundwater depth has dropped an average of 45 feet in the District. The crop survey input has also been entered into the computer and it will be printed out and sent to the Bureau. Work continues on the Underground Service Alert notices; splits have been completed for this year's assessments; City/County letters; finished the riparian program until more changes are needed; and data is being gathered for the paperwork on the annexation for Prudential for Legal Counsel Campos.

CE Roberts also reported on the Watershed Committee Meeting he attended in Oakhurst. At this time they are basically looking at water quality in various rivers and the ones they have started on are the Merced and Chowchilla Rivers. They are looking at things along the watershed that have potential for contamination into the rivers. As an example, there are some old gas stations along the Merced River and a lot of old mines in that area. The County has received some funding, so they will be doing some water quality testing on the Fresno River. They have about 25 sites

# MADERA IRRIGATION DISTRICT

**BOARD OF DIRECTORS METING**
**November 21, 2000**

**AGENDA ITEM NO.** 7

**SUBJECT:** AB 3030 Groundwater Management Plan Amendment

**DISCUSSION:**

The Board held a hearing on October 31 regarding proposed amendments to the District's AB3030 Groundwater Management Plan. The amendments are related to permitting requirements for exportation of groundwater from the District, groundwater banking in the District or importation of surface water for purposes of banking in the District. The Board will consider for approval the proposed rules and regulations as presented at the hearing and as modified to reflect discussion or comments during the hearing.

District legal counsel has also recommended that the District adopt an ordinance consistent with the proposed amendments that will provide the District the necessary authority to enforce the Groundwater Management Plan.

**RECOMMENDATION:**

Approve the proposed amendment of the Districts Groundwater Management Plan and adopt an Ordinance Adding Rules and Regulations Relating to Groundwater Exportation, Groundwater Banking and Importation of Foreign Water.

raised on the amount of annexation and included if they detach or have a land use change, then the landowner is forced to detach at the landowner's cost. There is also a buy out provision in the agreement.

President Pistoresi stated there were some concerns about people who purchased the lands and excess lands, and where they are moving their water. CE Roberts stated the agreement has a provision that states the lands brought in as excess shall remain excess even if they change ownership to a person that could make it non-excess.

President Pistoresi stated that the main provision was access onto their lands and MID's ability to monitor the water. There was concern as to whether MID could drive on the land to check and see if the water has been taken onto land that is not being paid for. GM Ottemoeller stated that MID has that ability on land that is within the District. Land that is outside the District, there is the issue in which we need a warrant to check on the water use.

President Pistoresi stated he would like to see this issue clarified in the annexation agreement. The Directors were asked for their comments. Director Teranishi stated that this is a legitimate concern and if it is possible to incorporate language in the agreement to cover the District, it should be done. Director Janzen stated that the excess land would be part of all of the land and he believes MID would have the right to go on the land. Director Galleano stated that staff should clarify this issue with legal counsel.

President Pistoresi directed staff to inform the landowners that there is a provision to be incorporated in the annexation agreements that was left out from previous discussions. This item will be placed on the agenda for approval at the next board meeting.

*Director Galleano left the meeting at 5:05 p.m.*

2-3183 **AB 3030 GROUNDWATER MANAGEMENT PLAN AMENDMENT**

The Board held a hearing on October 31 regarding proposed amendments to the District's AB 3030 Groundwater Management Plan. The amendments are related to permitting requirements for exportation of groundwater from the District, groundwater banking in the District, or importation of surface water for purposes of banking in the District.

GM Ottemoeller stated the proposed rules and regulations have been modified based on his comments and any comments during the Hearing. GM Ottemoeller reported the changes he was proposing and stated that these changes were identified or discussed during the hearing.

MOTION **Director Janzen moved to approve the amendment of the District's Groundwater Management Plan and adopt an Ordinance Adding Rules and Regulations Relating to Groundwater Exportation, Groundwater Banking and Importation of Foreign Water, seconded by Director Bursey. Motion carried.**

3-310 **JANITORIAL BIDS**

CFAS Low reported that bids for janitorial services were opened and reviewed Monday, November 20, 2000 at 9:30 a.m. Proposals were sent out to 10 vendors and 3 were returned as "No bid". The bids received ranged from $500 per month up to $1,800 per month for service 3 days per week. Professional Building Maintenance is the District's current janitorial service. The Board reviewed the Janitorial Bid Summary Sheet.

CFAS Low recommended that the bid be awarded to Professional Building Maintenance and stated that they are holding the same rate as last year. A rating system will be incorporated to allow the District to monitor the cleaning services.

MOTION **Director Janzen moved to accept the low bid from Professional Building Maintenance in the amount of $960 per month as recommended by staff, seconded by Director Bursey. Motion carried.**

3-640 **UNDERGROUND SERVICE ALARM MODEM AND PRINTER**

CE Roberts reported that MID belongs to Underground Service Alert (USA) which provides the proposed location of projects near District facilities. The District receives the daily information through a dedicated modem that is programmed to receive only the USA messages. The current modem/printer is about seven years old and has shut down on several occasions recently because it is wearing out.

The new modem/printer with priority back-up service will cost $1,241.67 and is only available from a single source company.

MOTION **Director Janzen moved to approve the purchase of a new modem/printer unit with priority back-up service for $1,241.67 for the Underground Service Alert (USA) notification, seconded by Director Bursey. Motion carried.**

**BEFORE**
**THE BOARD OF DIRECTORS**
**OF THE**
**MADERA IRRIGATION DISTRICT**
**STATE OF CALIFORNIA**

# ORDINANCE

## GROUNDWATER EXPORTATION, GROUNDWATER BANKING, IMPORTATION OF FOREIGN WATER, AND USE OF DISTRICT FACILITIES FOR SUCH PURPOSES

**Chapter .100**
**Rules and Regulations Pertaining to Groundwater Banking; Importation of Foreign Water For the Purpose of Groundwater Banking; Exportation of Groundwater Outside the District; and Use of District Facilities for such Purposes.**

**.100.010 PURPOSE AND INTENT.**

A. The lands within Madera Irrigation District ("District") are heavily dependent upon groundwater. The groundwater basin(s) underlying the District and surrounding areas are severely overdrafted.

B. It is essential to the continued prosperity of the landowners and water users within the District that the quality and quantity of the groundwater supply be maintained to meet the demands of District landowners and water users.

C. Areas within the District are or could be or become subject to land subsidence due to the extraction of groundwater.

D. The direct or indirect transfer of groundwater outside the District may have significant environmental impacts on the area within the District including, but not limited to, increased groundwater overdraft; land subsidence; uncontrolled movement of contaminated groundwater; uncontrolled movement of poor quality or contaminated groundwater; the lowering of groundwater levels; increased groundwater or soil degradation; and loss of aquifer capacity due to land subsidence.

E. The direct or indirect transfer of groundwater outside the District may have significant economic impacts on areas within the District including, but not limited to, loss of arable

agricultural land; increased pumping costs due to lowered groundwater levels; increased groundwater quality treatment costs due to movement of contaminated or poor quality groundwater; replacement of wells due to declining groundwater levels, and replacement of damaged wells, conveyance facilities, roads, bridges and other structures due to land subsidence.

F. The importation of water originating outside of Madera County (whether or not conveyed through or pooled with facilities located in or adjacent to Madera County) for the purpose of Groundwater Banking such water ("Foreign Water") could, if unregulated, introduce water of an inferior quality into District aquifers, resulting in significant economic and environmental impacts on areas within the District, including, but not limited to, those specified in Paragraphs D. and E., above .

G. As used herein the term "Groundwater Banking" means the percolation, injection, or other recharge of a supply of water for the purpose of later extraction and delivery of such water outside of the District. Groundwater Banking can be reasonable and beneficial if it can be accomplished without:

(1) causing or increasing an overdraft of groundwater underlying the District;

(2) adversely affecting the ability of other groundwater users to use, store, or transmit groundwater within any aquifer(s) underlying the District (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 District;

(4) resulting in, expanding, or exacerbating degradation of the quality or quantity of surface or groundwater within the District, or groundwater basins and aquifers within the District;

(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 area within the District; or

(8) adversely affecting the recharge and storage ability on adjacent lands where passive recharge may take place.

H. For Groundwater Banking projects all or a portion of which will be located within the District, it is essential that the District be the agency that determines whether a permit should be issued to allow groundwater banking, exportation of groundwater, or importation of foreign water, within such areas. 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, exportation of groundwater, or importation of foreign water, nor a method to insure that groundwater banking will meet the requirements of Paragraph G., above.

I. The District, as the agency most familiar with local conditions affecting groundwater, should adopt reasonable regulatory measures in relation to exportation of groundwater, Groundwater Banking, and the importation of Foreign Water for the purpose of Groundwater Banking.

J. California Water Code section 1810(d) provides that use of a water conveyance facility to transfer water may be denied if the use of the water conveyance facility will injure any legal user of water, will unreasonably affect fish, wildlife or other in-stream beneficial uses, or will unreasonably affect the overall economy or the environment of the county from which the water is being transferred.

**.100.020 TITLE.**

These provisions shall be known as "Rules and Regulations Pertaining to Groundwater Banking; Importation of Foreign Water For the Purpose of Groundwater Banking; Exportation of Groundwater Outside the District; and Use of District Facilities for such Purposes."

## .100.030 DEFINITIONS

The terms used in this Chapter have the following meanings, unless otherwise expressly provided:

A. "Damage Prevention Plan" means a written plan which specifically details the problems that may occur as a result of the operation of the project and details what actions will be taken by the Applicant to mitigate or eliminate the problems in order to prevent damage to the site and surrounding properties.

B. "Emergency Action Plan" means a written plan which provides a complete and detailed evaluation of potential project failures that can occur during operation of the project and which details what actions the Applicant will take to prevent or minimize damage to the project and protect the public and surrounding properties.

C. "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.

D. "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.

E "Groundwater" means water that occurs beneath the land surface and fills the pore spaces of the alluvium, soil, or rock formation in which it is situated.

F. "Groundwater Banking" means the importation of a surface supply of water that is percolated or injected to groundwater for storage, or placed underground by means of in-lieu recharge, for later extraction and delivery.

G. "Groundwater Management Plan" means a groundwater management plan adopted pursuant to California Water Code section 10750 et seq.

H. "Local water agencies" means public agencies, districts, or mutual water companies located wholly or partly within Madera County which have as their primary function the supplying of water for domestic, agricultural, industrial, or municipal purposes.

I. "Operations and Maintenance Plan" means a written plan which provides complete details of how the Applicant plans to operate and maintain the project after construction is completed. This Plan must show who will assume the responsibility for the operation and maintenance of the project and provide an organizational chart detailing the job responsibilities of each position shown.

J. "Person" means an individual, partnership, company, corporation, unincorporated association, public agency, or other form of business entity.

K. "Project Monitoring Plan" means a written plan which details how the Applicant will monitor the project site and properties outside of the project boundaries for possible damage from operation of the project.

L. "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 and where it will be installed.

M. "Safety Action Plan" means a written plan which provides information on who will be responsible for implementing the safety requirements for the project and which also provides details of all project safety requirements, including those needed to protect the public and surrounding properties.

**.100.040 LAND SUBJECT TO ARTICLE.**

This Chapter shall be applicable to all lands within the District boundaries. If a portion of a Groundwater Banking project lies within the District, and a portion lies outside the boundaries of the District, then this Chapter shall apply to that portion that lies within the boundaries of the District.

**__.100.050 EXPORTATION OF GROUNDWATER BEYOND DISTRICT BOUNDARIES.**

A. REQUIREMENT OF PERMIT:

Except under a permit granted pursuant to this Section, no groundwater extracted from any well within the boundaries of the District and located on or under lands subject to this Chapter, shall be used on lands which are outside of the boundaries of the District, 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. A permit is required under this Section whether or not such exportation is pursuant to Groundwater Banking that is also subject to a separate permit under Section __.100.060. A permit for exportation under this Section may cover all exportation of water to a specified water user in amounts specified in the permit for a period not to exceed five years from the granting of the permit, after which a new permit shall be required.

B. APPLICATION FOR PERMIT:

Applications for permits under this Section shall be made to the District on forms provided by the District and shall contain all information and reports required therein. An Application shall be accompanied by a report ("Report") prepared at the applicant's expense by a qualified Registered Civil Engineer or Geologist, versed in geologic and hydraulic testing, which shows:

a. The source of the water to be exported.

b. The quantity and quality of water proposed to be exported.

c. The location to which and purpose for which the water is to be exported, including the reasonable and beneficial use to which the water is to be put.

d. The geologic and hydrologic properties of the aquifers from which extraction will be made, including possibilities or likelihood of subsidence problems.

e. Percolation tests to determine the ability of the aquifer(s) to recharge.

f. Clay layers and their effect on percolation.

g. The applicant's Project Water Measurement and Water Loss Accountability Plan.

h. The applicant's Damage Prevention Plan.

i. The applicant's Project Monitoring Plan.

j. The applicant's Safety Action Plan.

k. The applicant's Emergency Action Plan.

l. The location, size, spacing and depths of extraction wells.

m. Horizontal migration of groundwater from surrounding locations.

n. The means and criteria for determining any effects on surrounding lands and their groundwater supplies.

o. Such other matters as the District may require.

Five copies of the Application, Report, and other information submitted shall be provided.

C. ENVIRONMENTAL IMPACT REPORT:
An Application for extraction permit under this Section 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 District requirements. The EIR shall be prepared, and shall be paid for by the applicant, in accordance with the District's CEQA implementation procedures.

D. ADDITIONAL STUDIES AND REQUIREMENTS:
If, after receiving the Report as required by Paragraph B., above, and before or after receiving the EIR, the District Engineer desires more information, he or she may require preparation by applicant, at applicant's expense, of any additional geologic or hydrologic studies, or other information

or studies, that he or she deems necessary to obtain information needed in order to make a recommendation on the application. The Engineer may review the application with potentially affected landowners and water users, with the staff of applicable local, state and federal agencies and with, and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION.
After reviewing the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D., above, the District Engineer shall prepare a written report, with all comments attached thereto, in which he or she either shall recommend denial of the permit, or granting the permit with suggested conditions for the project. The written report also shall include recommendations concerning the adequacy of the EIR. All documents shall be filed with the Secretary of the Board.

F. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD:
The permit may only be approved if the District finds that the proposed extraction and exportation will not have detrimental impacts on the District by determining that:

(1) The extraction and exportation will not cause or increase an overdraft on parts or all of the groundwater basins underlying the District.

(2) The extraction and exportation will not adversely affect the ability of other groundwater users to use, store, or transmit groundwater within any aquifer(s) underlying the District.

(3) The extraction and exportation will not adversely effect the reasonable and beneficial uses of groundwater by other groundwater users within the District.

(4) The extraction and exportation will not result in, expand, or exacerbate degradation of the quality or quantity of surface or groundwater within the District, or groundwater basins and aquifers within the District.

(5) The extraction and exportation will not result in injury to a water replenishment, storage, restoration, or conveyance project or facility;

(6) The extraction and exportation will not adversely affect the overall economy or environment of the area within the District.

If the Board determines that one or more of the findings required by this Section cannot be made, the Board shall deny the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

G. 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.

H. PAYMENT OF FEES.
The applicant at the time of filing shall pay such fees as are or may be established by the Board for processing the application and the giving and publication of required notices.

I. NOTICE TO LANDOWNERS:
Upon the filing of an application with the District, the District shall give written notice to all owners of lands located within five miles of the exterior boundaries of the proposed extraction 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 District. In addition thereto, the District 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 District. The District 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.

J. 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 Secretary of the Board after completion and filing of the Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, the location from which the water is proposed to be extracted and exported, and a general description of the project and that any interested person may submit evidence at the hearing. At least fifteen days must elapse between filing the documents with the Secretary of the Board and the date of the hearing.

K. PROCEDURES FOR CONDUCTING HEARING:
At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from the public and the Engineer's Recommendation 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.

L. 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 F., above, subject to the terms and provisions authorized in Paragraph M., below. If the Board is unable to make the findings set forth in Paragraph F., above, then the application shall be denied and no permit shall be issued. The Board shall direct that written findings are prepared in conformity with its decision and shall adopt said findings when prepared.

M. TERMS AND CONDITIONS OF PERMIT:
If an application is approved, the Board may impose such terms and conditions 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.

N. REVOCATION OF PERMIT:
Any violation of the terms and conditions of the permit will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held in the manner described in the preceding Paragraphs.

O. INSPECTIONS:
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 District Engineer, or his

representatives, at any reasonable time, and from time to time, 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.

P. 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.

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.

**__.100.060 GROUNDWATER BANKING.**

A. REQUIREMENT OF PERMIT:
No person, who is subject to this Ordinance, other than the District, shall engage in Groundwater Banking on or under land subject to this Ordinance without first obtaining a permit from the District in accordance with this Section. A permit for Groundwater Banking under this Section may cover all Groundwater Banking for amounts of storage specified in the permit for a period not to exceed five years from the granting of the permit, after which a new permit shall be required. A permit for Groundwater Banking is not a permit for importation of Foreign Water to the Groundwater Bank (which importation shall require a separate permit under Section __.100.070), and it is not a permit for exportation of groundwater beyond District boundaries (which exportation shall require a separate permit under Section __.100.050).

B. APPLICATION FOR PERMIT:
Applications for permits under this Section shall be made to the District on forms provided by the District and shall contain all information and reports required therein. An Application shall be accompanied by a report ("Report") prepared at the applicant's expense by a qualified Registered Civil Engineer or Geologist, versed in geologic and hydraulic testing, which shows:

a. The location, plans, and specifications of the proposed project.

b. The quantity of water proposed to be imported, and the quality standards thereof, including possibilities or likelihood of contamination or degradation problems.

c. The method of placement of water to be banked

d. The quantities of groundwater to be extracted.

e. The geologic and hydrologic properties of the aquifers into which recharge will occur and from which extraction will be made, including possibilities or likelihood of subsidence problems.

f. Percolation tests to determine the ability of the aquifer(s) to recharge.

g. Clay layers and their effect on percolation.

h. Design of spreading areas.

i. The applicant's Operations and Maintenance Plan.

j. The applicant's Project Water Measurement and Water Loss Accountability Plan.

k. The applicant's Damage Prevention Plan.

l. The applicant's Project Monitoring Plan.

m. The applicant's Safety Action Plan.

n. The applicant's Emergency Action Plan.

o. The location, size, spacing and depths of extraction wells.

p. Horizontal migration of groundwater from surrounding locations.

q. The means and criteria for determining any effects on surrounding lands and their groundwater supplies.

r. Such other matters as the District may require.

Five copies of the Application, Report, and other information submitted shall be provided.

C. ENVIRONMENTAL IMPACT REPORT:
An Application for Groundwater Banking under this Section 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 District requirements. The EIR shall be prepared, and shall be paid for by the applicant, in accordance with the District's CEQA implementation procedures.

D. ADDITIONAL STUDIES AND REQUIREMENTS:
If, after receiving the Report as required by Paragraph B., above, and before or after receiving the EIR, the District Engineer desires more information, he or she may require preparation by applicant, at applicant's expense, of any additional geologic or hydrologic studies, or other studies or information, that he or she deems necessary to obtain information needed in order to make a recommendation on the application. The Engineer may review the application with potentially affected landowners and water users, with the staff of applicable local, state and federal agencies, and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION.
After reviewing the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D., above, the District Engineer shall prepare a written report, with all comments attached thereto, in which he or she either shall recommend denial of the permit, or granting the permit with suggested conditions for the project. The written report also shall include recommendations concerning the adequacy of the EIR. All documents shall be filed with the Secretary of the Board.

F. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD:

The permit may only be approved if the District finds that the proposed Groundwater Banking project will not have detrimental impacts on the District by determining that:

(1) The project will not adversely affect the ability of other groundwater users to use, store, or transmit groundwater within any aquifer(s) underlying the District (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).

(2) The project will not adversely affect the reasonable and beneficial uses of groundwater by other groundwater users within the District.

(3) The project will not result in, expand, or exacerbate degradation of the quality or quantity of surface or groundwater within the District, or groundwater basins and aquifers within the District.

(4) The project will not result in injury to a water replenishment, storage, restoration, or conveyance project or facility.

(5) 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.

(6) The project will not adversely affect the overall economy or environment of the District.

(7) The project will not cause or increase an overdraft of groundwater underlying the District.

(8) The project will not adversely affect the storage ability on adjacent lands where passive recharge may take place.

If the Board determines that one or more of the findings required by this Section cannot be made, the Board shall deny the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

G. 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.

H. PAYMENT OF FEES.
The applicant at the time of filing shall pay such fees as are or may be established by the Board for processing the application and the giving and publication of required notices.

I. NOTICE TO LANDOWNERS:
Upon the filing of an application with the District, the District shall give written notice to all owners of lands located within the District which are located within five miles of 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 District. In addition thereto, the District 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 District. the District 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.

J. 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 Secretary of the Board after completion and filing of the Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, a general description of the proposed importation and that any interested person may submit evidence at the hearing. At least fifteen days must elapse between filing the documents with the Secretary of the Board and the date of the hearing.

K. PROCEDURES FOR CONDUCTING HEARING:
At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from the public and the Engineer's Recommendation 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.

L. 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 F., above, subject to the terms and provisions authorized in Paragraph M., below. If the Board is unable to make the findings set forth in Paragraph F., above, then the application shall be denied and no permit shall be issued. The Board shall direct that written findings are prepared in conformity with its decision and shall adopt said findings when prepared.

M. TERMS AND CONDITIONS OF PERMIT:
If an application is approved, the Board may impose such terms and conditions 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. Since direct or other subsurface injection of water into an aquifer entails an inherent risk of irreparable contamination due to the lack of natural filtering resulting from percolation, the permit shall prohibit the use of direct or other subsurface injection.

N. REVOCATION OF PERMIT:
Any violation of the terms and conditions of the permit will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held in the manner described in the preceding Paragraphs.

O. INSPECTIONS:
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 District Engineer, or his representatives, at any reasonable time, and from time to time, to enter the project site(s) 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.

P. 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.

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.

**__.100.070 IMPORTATION OF FOREIGN WATER FOR GROUNDWATER BANKING.**

A. REQUIREMENT OF PERMIT:
Except under a permit granted pursuant to this Section, no person may import Foreign Water for the purpose of Groundwater Banking within the boundaries of the District and located on or under lands subject to this Chapter. A permit is required under this Section whether or not such importation is pursuant to Groundwater Banking that is also subject to a separate permit under Section __.100.060. A permit for importation under this Section may cover all importation of water from a specified water source (designated by specific location and type) in amounts specified in the permit for a period not to exceed five years from the granting of the permit, after which a new permit shall be required.

B. APPLICATION FOR PERMIT:
Applications for permits under this Section shall be made to the District on forms provided by the District and shall contain all information and reports required therein. An Application shall be accompanied by a report ("Report") prepared at the applicant's expense by a qualified Registered Civil Engineer or Geologist, versed in geologic and hydraulic testing, which shows:

a. The source of the water to be imported.

b. The quantity and quality of water proposed to be imported.

c. The manner in which the water is to be conveyed to the Groundwater Banking facility, including the specific location of conveyance facilities, and copies of all permits and agreements showing consent for the use of such conveyance facilities.

d. The proposed method of placement of water to be imported and banked

e. The physical, and where applicable the geologic and hydrologic, properties of the conveyance facilities, including possibilities or likelihood of contamination or degradation problems.

f. The applicant's Project Water Measurement and Water Accountability Plan.

g. The applicant's Damage Prevention Plan.

h. The applicant's Project Monitoring Plan.

i. The applicant's Safety Action Plan.

j. The applicant's Emergency Action Plan.

k. The means and criteria for determining any effects on lands surrounding or neighboring all conveyance facilities and on their groundwater or surface water supplies.

l. The means and criteria for determining any effects on all other water supplies into which the proposed Foreign Water may be commingled while being conveyed, such as in a pool or reservoir.

m. Such other matters as the District may require.

Five copies of the Application, Report, and other information submitted shall be provided.

C. ENVIRONMENTAL IMPACT REPORT:
An Application for Foreign Water Importation Permit under this Section 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 District requirements. The EIR shall be prepared, and shall be paid for by the applicant, in accordance with the District's CEQA implementation procedures.

D. ADDITIONAL STUDIES AND REQUIREMENTS:
If, after receiving the Report as required by Paragraph B., above, and before or after receiving the EIR, the District Engineer desires more information, he or she may require preparation by applicant, at applicant's expense, of any additional geologic or hydrologic studies, or other studies or information, that he or she deems necessary to obtain information needed in order to make a recommendation on the application. The Engineer may review the application with potentially affected landowners and water users, with the staff of applicable state and federal agencies, and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION.
After reviewing the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D., above, the District Engineer shall prepare a written report, with all comments attached thereto, in which he or she either shall recommend denial of the permit, or granting the permit with suggested conditions for the project. The written report also shall include recommendations concerning the adequacy of the EIR. All documents shall be filed with the Secretary of the Board.

F. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD:
The permit may only be approved if the District finds that the proposed importation of Foreign Water will not have detrimental impacts on the District by determining that:

(1) The importation will not adversely affect the ability of other groundwater users to use, store, or transmit groundwater within any aquifer(s) underlying the District.

(2) The importation will not adversely affect the reasonable and beneficial uses of groundwater by other groundwater users within the District.

(3) The importation will not result in, expand, or exacerbate degradation of the quality or quantity of surface or groundwater within the District, or groundwater basins and aquifers within the District.

(4) The importation will not result in injury to a water replenishment, storage, restoration, or conveyance project or facility.

(5) 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.

(6) The importation will not adversely affect the overall economy or environment of the District.

(7) The existing qualities of the underground aquifers will not be degraded by the importation.

(8) The importation will not adversely affect the storage ability on adjacent lands where passive recharge may take place.

If the Board determine that one or more of the findings required by this Section cannot be made, the Board shall deny the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

G. 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.

H. PAYMENT OF FEES.
The applicant at the time of filing shall pay such fees as are or may be established by the Board for processing the application and the giving and publication of required notices.

I. NOTICE TO LANDOWNERS:
Upon the filing of an application with the District, the District shall give written notice to all owners of lands located within the District which are located within five miles of any conveyance facilities that are within or adjacent to the District, 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 District. In addition thereto, the District 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 District. The District 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.

J. 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 Secretary of the Board after completion and filing of the Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, a general description of the proposed importation and that any interested person may submit evidence at the hearing. At least fifteen days must elapse between filing the documents with the Secretary of the Board and the date of the hearing.

K. PROCEDURES FOR CONDUCTING HEARING:
At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from the public and the Engineer's Recommendation 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.

L. 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 F., above, subject to the terms

and provisions authorized in Paragraph M., below. If the Board is unable to make the findings set forth in Paragraph F., above, then the application shall be denied and no permit shall be issued. The Board shall direct that written findings are prepared in conformity with its decision and shall adopt said findings when prepared.

M. TERMS AND CONDITIONS OF PERMIT:
If an application is approved, the Board may impose such terms and conditions 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.

N. REVOCATION OF PERMIT:
Any violation of the terms and conditions of the permit will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held in the manner described in the preceding Paragraphs.

O. INSPECTIONS:
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 District Engineer, or his representatives, at any reasonable time, and from time to time, to enter the project site(s) 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.

P. 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.

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.

**__.100.080 DISTRICT CONVEYANCE FACILITIES:**

A. REQUIREMENT OF PERMIT:
In order to avoid injury to any legal user of water, and to avoid unreasonably affecting the overall economy or the environment of Madera county, no person may use any

District-owned conveyance facility as a part of, or in connection with, Groundwater Banking for which a permit is required under this Chapter, or the importation of Foreign Water for which a permit is required under this Chapter, or the exportation of groundwater for which a permit is required under this Chapter, except under a permit granted pursuant to this Section. A permit is required under this Section whether or not such use is in connection with groundwater banking, importation of foreign water, or exportation of groundwater for which a separate permit or permits are required under other Sections of this Chapter. A permit for use of a district conveyance facility under this Section may cover all importation of water from a specified water source (designated by specific location and type) in amounts specified in the permit for a period not to exceed two years from the granting of the permit, after which a new permit shall be required.

B. APPLICATION FOR PERMIT:

Applications for permits under this Section shall be made to the District on forms provided by the District and shall contain all information and reports required therein. An Application shall be accompanied by a report ("Report") prepared at the applicant's expense by a qualified Registered Civil Engineer or Geologist, versed in geologic and hydraulic testing, which shows:

a. The source of the water to be conveyed through the conveyance facility.

b. The quantity and quality of water proposed to be conveyed.

c. The manner in which the water is to be delivered to and withdrawn from the District conveyance facility and how the water is to conveyed from its source to the District's conveyance facility.

d. The physical, and where applicable the geologic and hydrologic, properties of the conveyance facilities through which the water will be delivered into the District's conveyance facilities, including possibilities or likelihood of contamination or degradation problems.

e. The applicant's Project Water Measurement and Water Accountability Plan.

f. The applicant's Damage Prevention Plan.

g. The applicant's Project Monitoring Plan.

h. The applicant's Safety Action Plan.

i. The applicant's Emergency Action Plan.

j. The means and criteria for determining any effects on lands within the District and otherwise surrounding or neighboring all conveyance facilities and on their groundwater or surface water supplies.

k. The means and criteria for determining any effects on all other water supplies with which the water proposed to be conveyed may be commingled while being conveyed.

l. The means and criteria for determining any effects of the use of the District conveyance facility on any other legal user of water conveyed or to be conveyed through such facilities.

m. The means and criteria for determining any effects of the use of the District conveyance facility on fish, wildlife, other instream beneficial uses, or the environment within the District and within Madera County.

n. The means and criteria for determining any effects of the use of the District conveyance facility on the economy within the District and within Madera County.

o. Such other matters as the District may require.

Five copies of the Application, Report, and other information submitted shall be provided.

C. ENVIRONMENTAL IMPACT REPORT:
An Application for Use of District Conveyance Facility under this Section 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 District requirements. The EIR shall be prepared, and shall be paid for by the applicant, in accordance with the District's CEQA implementation procedures.

D. ADDITIONAL STUDIES AND REQUIREMENTS:
If, after receiving the Report as required by Paragraph B., above, and before or after receiving the EIR, the District Engineer desires more information, he or she may require preparation by applicant, at applicant's expense, of any additional physical, geologic or hydrologic studies, or other studies or information, that he or she deems necessary to obtain information needed in order to make a recommendation on the application. The Engineer may review the application with potentially affected landowners and water users, with the staff of applicable state and federal agencies, and with the Madera County Water Oversight Committee.

E. REVIEW OF APPLICATION.
After reviewing the Application, Report, Environmental Impact Report, and any additional studies and other information required under Paragraph D., above, the District Engineer shall prepare a written report, with all comments attached thereto, in which he or she either shall recommend denial of the permit, or granting the permit with suggested conditions for the project. The written report also shall include recommendations concerning the adequacy of the EIR. All documents shall be filed with the Secretary of the Board.

F. FINDINGS REQUIRED FOR PERMIT APPROVAL OR DENIAL BY THE BOARD:
The permit may only be approved if the District finds that the proposed use of District conveyance facility will not:

(1) Injure any legal user of water.

(2) Unreasonably affect the delivery of water to any District landowners.

(3) Unreasonably affect fish, wildlife, or other instream beneficial uses.

(4) Unreasonably affect the overall economy of the county from which the water is to be transferred.

(5) Unreasonably affect the environment of the county from which the water is to be transferred.

If the Board determines that one or more of the findings required by this Section cannot be made, the Board shall deny the permit application. The basis for any such denial shall be reflected in the Board's official record of proceedings.

G. 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.

H. PAYMENT OF FEES.
The applicant at the time of filing shall pay such fees as are or may be established by the Board for processing the application and the giving and publication of required notices.

I. NOTICE TO LANDOWNERS:
Upon the filing of an application with the District, the District shall give written notice to all owners of lands located within the District which are located within five miles of any conveyance facilities that are within or adjacent to the District, setting forth the name of the applicant, a description of the applicant's proposal, a description or map of the District facility involved, and a statement that all documents submitted in connection with the application are public records subject to inspection at the office of the District. In addition thereto, the District 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 applicant's proposal, a description or map of the District facility involved, and a statement that all documents submitted in connection with the application are public records subject to inspection at the office of the District. The District 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.

J. 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 Secretary of the Board after completion and filing of the Engineer's Report and the environmental review process. The notice shall specify the time and place of the hearing, a general description of the proposed importation and that any interested person may submit evidence at the hearing. At least fifteen days must elapse between filing the documents with the Secretary of the Board and the date of the hearing.

K. PROCEDURES FOR CONDUCTING HEARING:
At the hearing, the Application, Report, Environmental Impact Report, additional submittals, comments from the public and the Engineer's Recommendation 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.

L. 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 F., above, subject to the terms and provisions authorized in Paragraph M., below. If the Board is unable to make the findings set forth in Paragraph F., above, then the application shall be denied and no permit shall be issued. The Board shall direct that written findings are prepared in conformity with its decision and shall adopt said findings when prepared.

M. TERMS AND CONDITIONS OF PERMIT:
If an application is approved, the Board may impose such terms and conditions thereon as the Board deems necessary to prevent adverse effects described in Paragraph F, above.

N. REVOCATION OF PERMIT:
Any violation of the terms and conditions of the permit will constitute grounds for revocation of the permit after a duly noticed public hearing thereon held in the manner described in the preceding Paragraphs.

O. INSPECTIONS:
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 District Engineer, or his representatives, at any reasonable time, and from time to time, to enter the applicant's site(s) and make such observations and measurements as are deemed necessary

to assure that the applicant's proposed use is being carried out under the terms of the permit.

P. 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.

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 Cal. Code of Civil Procedure Section 1094.5 and within the time limits prescribed in Cal. Code of Civil Procedure section 1094.6.

**.100.090 PENALTIES FOR VIOLATION:**
These rules and regulations are enacted to secure distribution of water in accordance with determined rights within the District pursuant to California Water Code Section 22085. Supervision and enforcement of these regulations shall be by District watermasters appointed under Water Code Section 22081. The District may elect to proceed with any or all of the following remedies for violation of this Chapter:

(a) A civil action against the violator for damages and/or injunctive relief.

(b) A misdemeanor criminal action against any violator who willfully and without authority closes, changes, or interferes with any headgate, waterbox, or measuring device while it is under the control of the watermaster, or who willfully takes, uses, or conveys water which has been denied him by the watermaster as not allowed under permit or in violation of the provisions of this Ordinance is guilty of a misdemeanor pursuant to Water Code Section 22088. Under Water Code Section 22089.5, a watermaster has the power to arrest any person violating any of the provisions of this article and to give him into the custody of the sheriff or other competent police officer within the county, and immediately thereafter make a complaint before a magistrate against the person so arrested. Every person who violates any of the provisions of this article is guilty of a misdemeanor and is punishable by a fine of not less than twenty-five dollars ($25), nor more than two hundred fifty dollars ($250), or by imprisonment in the county jail for not less than 10 days nor more than six months, or by both such fine and imprisonment pursuant to Water Code Section 22089.

(c) A referral to the Madera County District Attorney for prosecution of a misdemeanor criminal action against any violator without authority of the owner or managing agent, and with intent to defraud, take water from any canal, ditch, flume, or reservoir used for the purpose of holding or conveying is guilty of a misdemeanor under California Penal Code Section 592. If the total retail value of all the water taken is more than four hundred dollars ($400), or if the defendant has previously been convicted of an offense under Penal Code Section 592 or any former section that would be an offense under Section 592, or of an offense under the laws of another state or of the United States that would have been an offense under this section if committed in this state, then the violation is punishable by imprisonment in the county jail for not more than one year, or in the state prison.

**.100.100 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.

# Attachment 1.1, RCWD Groundwater Management Plan

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# GROUND WATER MANAGEMENT PLAN

for

# ROOT CREEK WATER DISTRICT

October 13, 1997

Prepared by

Provost and Pritchard, Inc.

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# I. INTRODUCTION

## A. General

The Root Creek Water District was formed on October 14, 1996 under the California Government Code. The District covers approximately 9,234 acres wholly within Madera County north of the San Joaquin River and west of Highway 41 (Figures 1 and 2).

On April 14, 1997 the District's board of directors adopted a resolution of intention to draft a Ground Water Management Plan, pursuant to California Assembly Bill No. 3030 (AB 3030). A copy of Root Creek Water District Resolution No. 97-1 is included as Appendix A.

## B. Purpose and Goal

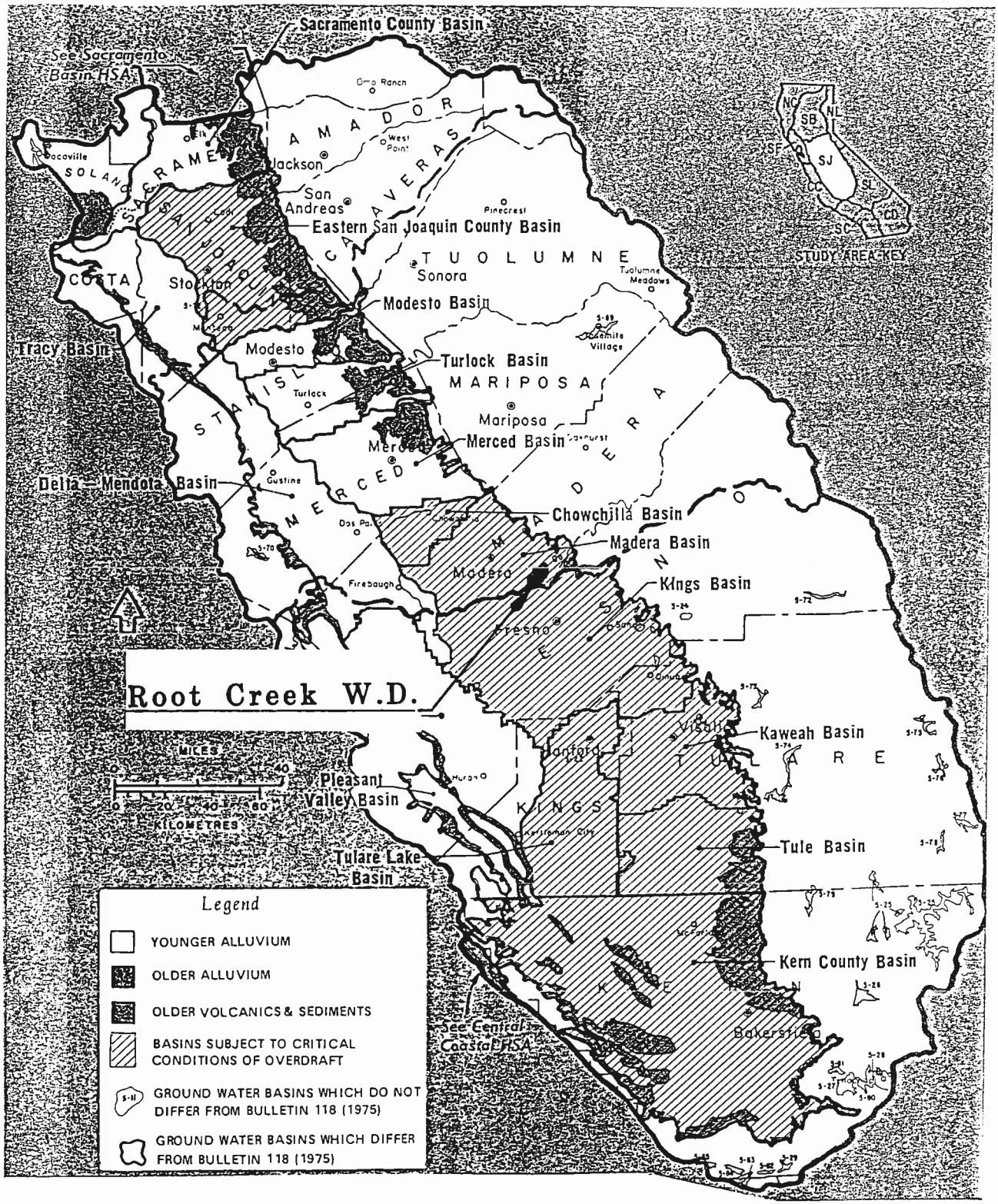
The purpose of this Ground Water Management Plan is to develop a coordinated and comprehensive approach to the evaluation and management of ground water resources within the Root Creek W.D.

The goal of this Plan is to implement effective ground water management which moves to restore, where possible, and maintain a high quality and dependable ground water resource.

Upon adoption of this Plan, action on specific elements will be initiated within the Management Program to achieve the stated goal. As specific elements take effect, and/or other concerns arise, the Management Program may be revised to assure continued progress toward the management goal.

## C. Authority

California Assembly Bill No. 3030, which became law on January 1, 1993, authorized local agencies that are within ground water basins as defined in California Department of Water Resources (DWR) Bulletin 118-80, and that meet certain other criteria, to prepare and adopt ground water management plans. Root Creek Water District qualifies under the law. The District encompasses a portion of the Madera Ground Water Basin as defined in Bulletin 118-80, which lies within the San Joaquin Basin Hydrologic Study Area (Figure 1).




San Joaquin Basin Hydrologic Study Area

Ref: D.W.R. Bulletin 118-80, 1980

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GRAPHIC SCALE

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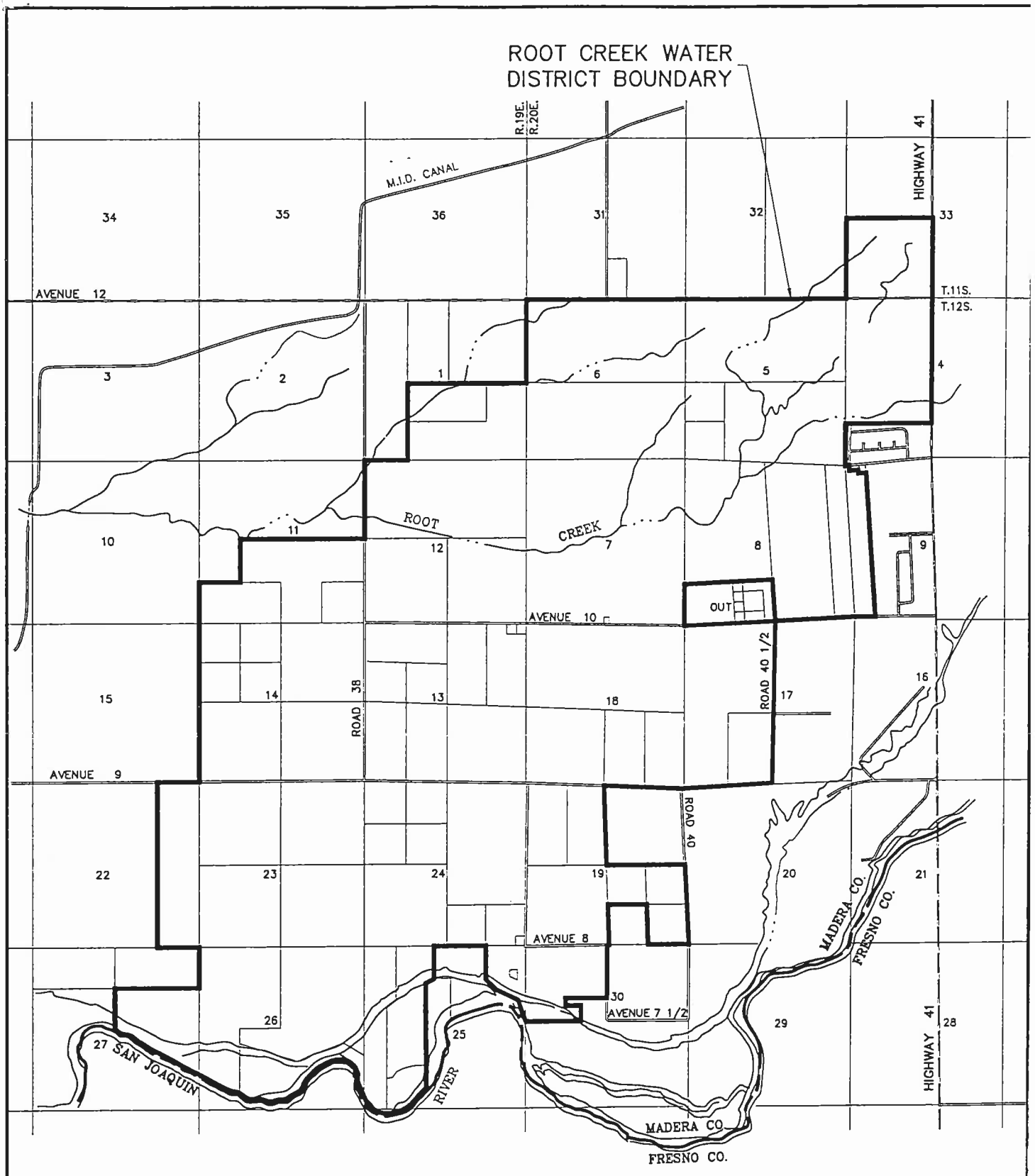
ROOT CREEK WATER DISTIRCT
GROUNDWATER MANAGEMENT PLAN

FIGURE 1

LOCATION MAP




Prepared by
PROVOST & PRITCHARD
ENGINEERING GROUP
298 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6162
209/449-2700 FAX 209/449-2715
DATE 6-11-97
JOB NO. 972506-C
DRAWING NO. 97-0205

GRAPHIC SCALE
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ROOT CREEK WATER DISTIRCT
GROUNDWATER MANAGEMENT PLAN

FIGURE 2

DISTRICT MAP

## II. DESCRIPTION OF DISTRICT

### A. Description of District Area

#### 1) Location

The Root Creek Water District is situated on the eastern edge of the San Joaquin Valley of California approximately ten miles north of downtown Fresno, in Madera County (Figure 1). The District lies just west of Highway 41 on the north side of the San Joaquin River.

#### 2) Topography

Land in the District generally slopes downward to the southwest at 8 to 10 feet per mile. However, slopes are much steeper in the northern portion of the District where the land is cut by several branches of Root Creek, a localized watershed, and in the southwest portion where the District extends below the San Joaquin River bluffs. Elevations range from about 385 feet above mean sea-level in the northeast corner of the District to around 230 feet in the southwest, below the river bluffs.

#### 3) Climate

The climate of Root Creek W.D. is characterized by cool, mild winters and hot, dry summers. Temperatures in the summer often exceed 100 degrees Fahrenheit. Fog is experienced for long periods in the winter, with temperatures typically in the mid-30's. Winter temperatures occasionally drop into the 20's. Average annual precipitation is about 10 inches, with 80 percent of the rainfall occurring in the winter months. The frost-free growing season averages around 250 days per year.

### B. Water Supply

#### 1) Surface Water Quantity

Root Creek W.D. does not have a surface water supply. Some lands in the southern portion of the District do have the right, by virtue of being riparian or by holding contracts, to divert San Joaquin River water. 1,077 acres can be served with this river water.

2) **Surface Water Quality**

The San Joaquin River water that may be diverted on to some lands in the southern portion of the District is of excellent quality for irrigation purposes.

3) **Ground Water Quantity**

The District lies on the eastern fringe of the enormous San Joaquin Valley-wide aquifer. Growers own and operate private wells to meet their water demands. Ground water supplies have been adequate to meet crop requirements, even after extended drought.

4) **Ground Water Quality**

Ground water quality in the District is generally adequate for agricultural use. Quality tends to worsen in the deeper portions of the aquifer, but within the zones usually tapped by wells within the District the water remains useable. Sufficient data is not available to characterize ground water quality in Root Creek W.D. in any greater detail.

## C. Land Use

Root Creek Water District was formed in 1996, at which time agricultural development of the District was essentially complete. Nearly the entire District is planted in orchard, with almonds, citrus, pistachios and olives being the major crops.

## D. Water Demand

Water demand in the District area has slowly increased over the years as land was brought into production. Since nearly full agricultural development has now occurred, and the District is planted largely to permanent crops, demands are fairly stable from year to year.

Root Creek W.D. does not keep records on water use, crop acreage or ground water pumping. Therefor, no good information exists to develop a precise estimate of crop water demand. Based upon the District area of 9,234 acres and an assumed average annual demand of about 2.5 acre-feet per acre, water demand in the District is on the order of 20,000 to 25,000 acre-feet per year.

## E. Water Related Facilities

### 1) District System Inventory

Root Creek Water District does not own or operate any water distribution facilities.

### 2) Other Facilities

Water needs in the District are served solely by private wells and irrigation systems.

## F. Institutional Programs

### 1) Ground Water Monitoring Programs

#### Well Water Levels

The United States Bureau of Reclamation (USBR) and the California Department of Water Resources (DWR) act as clearing houses to gather and process well water-level data from agencies and organizations throughout the San Joaquin Basin Hydrological Study Area. Root Creek W.D. does not currently participate in this program, however, DWR does monitor water levels in some wells in the vicinity of the District.

#### Well Water Quality

No program currently exists to systematically collect and evaluate ground water quality data within Root Creek W.D.

# III. HYDROGEOLOGIC CHARACTERISTICS

## A. Ground Water Basin Description

### 1) Madera Basin

The Madera Basin has been identified by the DWR as a basin with boundaries appropriate for ground water management purposes (DWR Bulletin 118-80). These boundaries were identified on the basis of geological and hydrological conditions, as well as political boundary lines.

The Madera Basin lies within the San Joaquin Basin Hydrologic Study Area (HSA). Root Creek W.D. lies in the southeastern portion of the Madera Basin (Figure 1). The individual basins within the San Joaquin Basin HSA were defined primarily upon political boundaries due to the continuous aquifer system within the HSA.

The Madera Basin was determined in Bulletin 118-80 to be a "critically overdrafted" basin, according to the following definition:

> "A basin is subject to critical conditions of overdraft when continuation of present water management practices would probably result in significant adverse overdraft-related environmental, social or economic impacts."

This definition implies a more dire circumstance than mere "ground water overdraft", which is generally defined as that condition where extractions exceed ground water replenishment over some specified time period.

The Madera Basin extends from the Sierra Nevada foothills on the east to the eastern boundary of the Columbia Canal Company Service Area on the west, and from the San Joaquin River on the south to the southern boundary of the Chowchilla Groundwater Basin on the north.

## B. Root Creek Water District - Aquifer Characteristics

### 1) Geology

#### Overview

The Root Creek Water District overlies a portion of a continuous aquifer system that occupies the central valley of California. The District lies within a sub-basin designated by the California Department of Water Resources (DWR) as the Madera Groundwater Basin, within the San Joaquin Basin Hydrologic Study Area. The aquifer below the Root Creek Water District extends to depths ranging from 1,000 feet to greater than 2,000 feet before basement rock is encountered, but the practical limit of the aquifer is typically considered to be at the base of the fresh water (defined as water containing less than 2,000 parts per million dissolved solids). This zone of fresh water may extend to the basement rock in the northeast corner of the District, (at a depth of around 1,000 feet) and ranges to a depth of about 1,200 feet in the southwest corner. Data is

sparse on the periphery of the valley, and the hydrogeologic boundaries in the vicinity of the District are imprecise.

The Root Creek Water District does not overlie any of the major confining clay layers that have been identified in the valley. However, the deposits underlying the District are composed of older alluvium and continental deposits that are liable to include interfingered layers of relatively impermeable materials.

**Soils**

Surface soils in the District are predominantly loams, ranging from sandy loams to clays. In much of the District hardpan occurs at or close to the surface. Soils within the region were deposited on the San Joaquin River alluvial fan during flood periods and are derived from mixed granitic and sedimentary rocks from the Sierra Nevada mountains. The soils are considered part of the "older alluvium", not having received fresh deposits recently, and often have large amounts of clay in the subsurface. Soils throughout the region are stratified, with interspersed sandy and clayey layers. The sandy layers are not typically continuous across large areas.

2) **Well Yields**

Well yields within Root Creek W.D. typically range from 500 to 1,000 gallons per minute, though there are exceptions to both ends of this range. The best producing wells in the District yield in excess of 2,000 gpm.

3) **Storage Capacity**

The aquifer currently being used by agricultural wells within the District is approximately 600 feet deep. Some wells tap strata to depths in excess of 1,000 feet, but these are exceptions. Very few water bearing sands exist below about 600 feet. Assuming it is desirable for the water table to come no closer than ten feet from the ground surface, and applying an average specific yield of 0.075 to the aquifer, total storage capacity of the aquifer in use can be estimated to be 410,000 af. Specific yield is the ratio of the volume of water which will drain freely from a material to the total volume of the formation.

# IV. GROUND WATER CONDITIONS

## A. Historical Conditions

### 1) Ground Water Levels

Prior to development of ground water resources in the Root Creek area, ground water was typically around 100 feet below the ground surface. The direction of ground water flow was to the southwest. In the fall of 1936, the first period for which a ground water map is available, well water-levels ranged in elevation from around 270 feet above mean sea-level in the northwest corner of the District to 240 feet in the southwest (Figure 3).

As development began in the region ground water levels started to decline. By the spring of 1960 ground water elevations ranged from around 230 to 255 feet above m.s.l. in the area of the District, and the direction of flow had swung around to the southwest (Figure 4).

Since 1960 the direction of flow has remained largely to the northwest, and levels have continued to decline. In the spring of 1993 ground water elevations ranged from 150 to 210 feet above m.s.l., and a large pumping depression had developed, centered just northwest of the District's area (Figure 5).

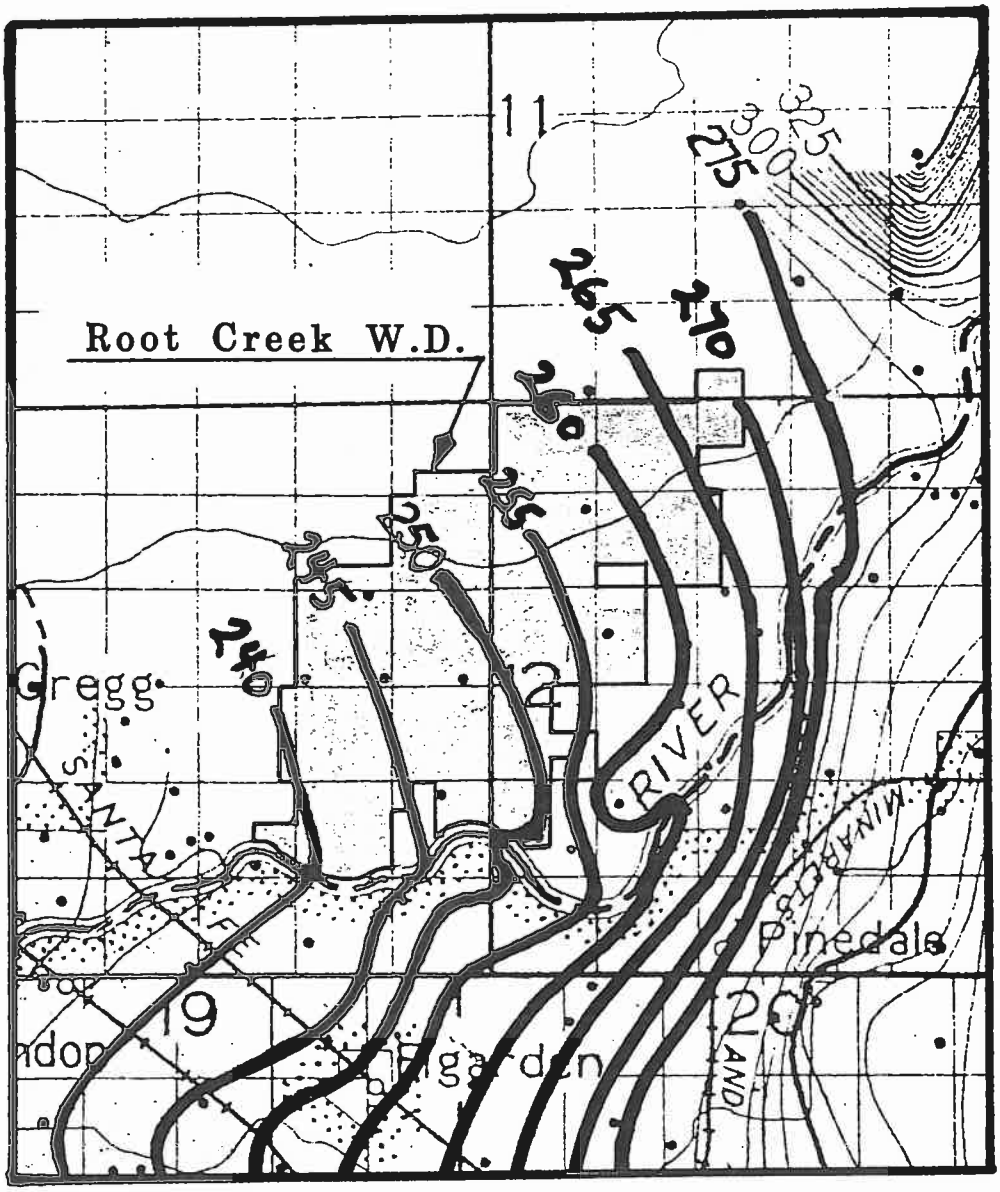
### 2) Ground Water Quality

Ground water quality data for the District area is not readily available. As stated previously in Chapter 2, the ground water has been of adequate quality for agricultural use.

## B. Current Conditions

### 1) Ground Water Levels

The most recent period for which water-level contour maps are available for the Root Creek W.D. area is Spring 1993 (Figure 5). At that time, ground water elevation ranged from 150 to 210 feet above m.s.l. across the District. By inspection of pumping records from private wells it appears that water levels in the District have continued to decline in the intervening years since the 1993 map was prepared.




Ref: California Department of Water resources

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| ROOT CREEK WATER DISTIRCT<br>GROUNDWATER MANAGEMENT PLAN |
| FIGURE 3 |
| LINES OF EQUAL ELEVATION OF<br>GROUND WATER TABLE<br>FALL OF 1936 |

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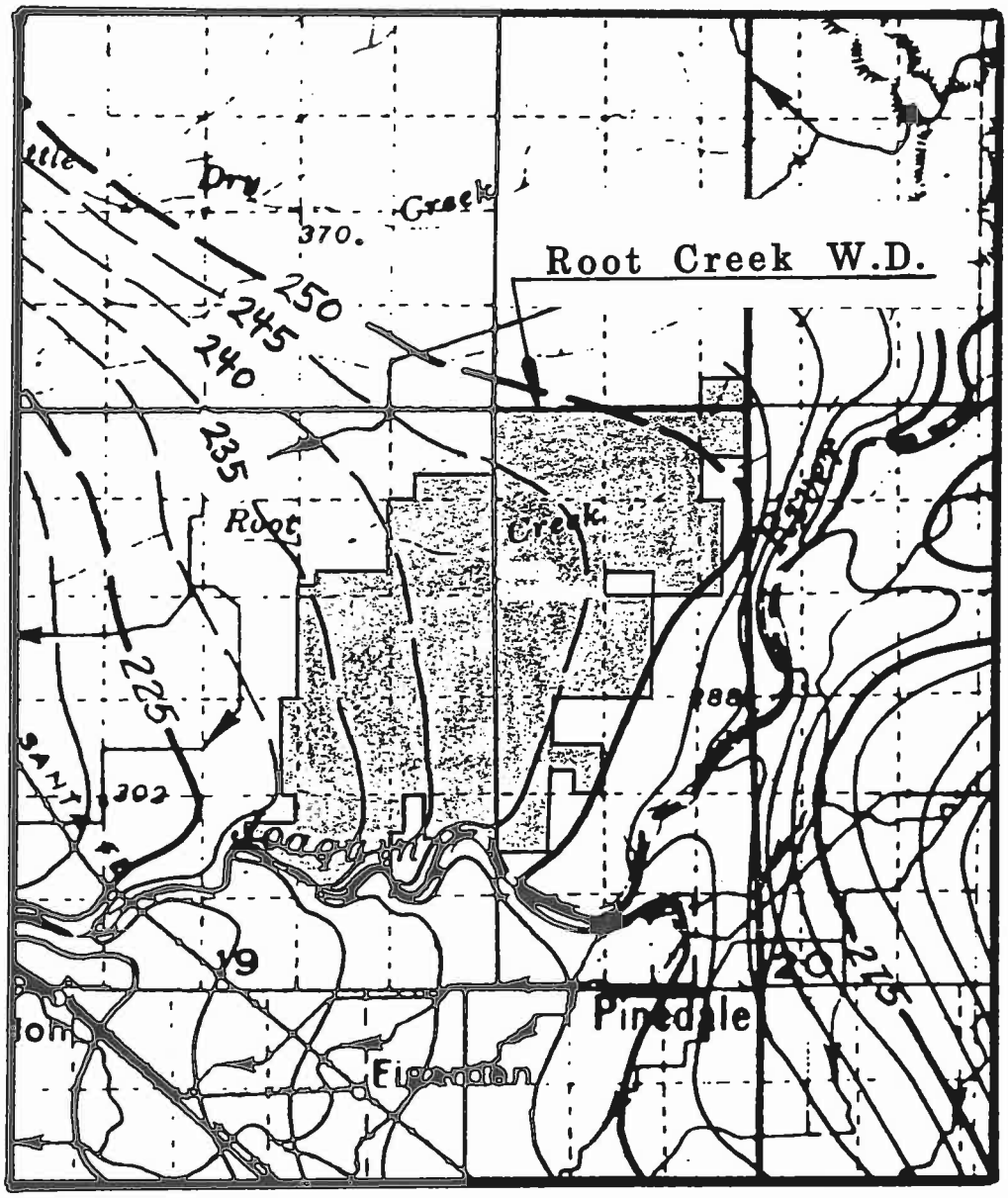


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| ROOT CREEK WATER DISTIRCT<br>GROUNDWATER MANAGEMENT PLAN |
| FIGURE 4 |
| LINES OF EQUAL ELEVATION OF<br>WATER IN WELLS<br>UNCONFINED AQUIFER, SPRING OF 1960 |

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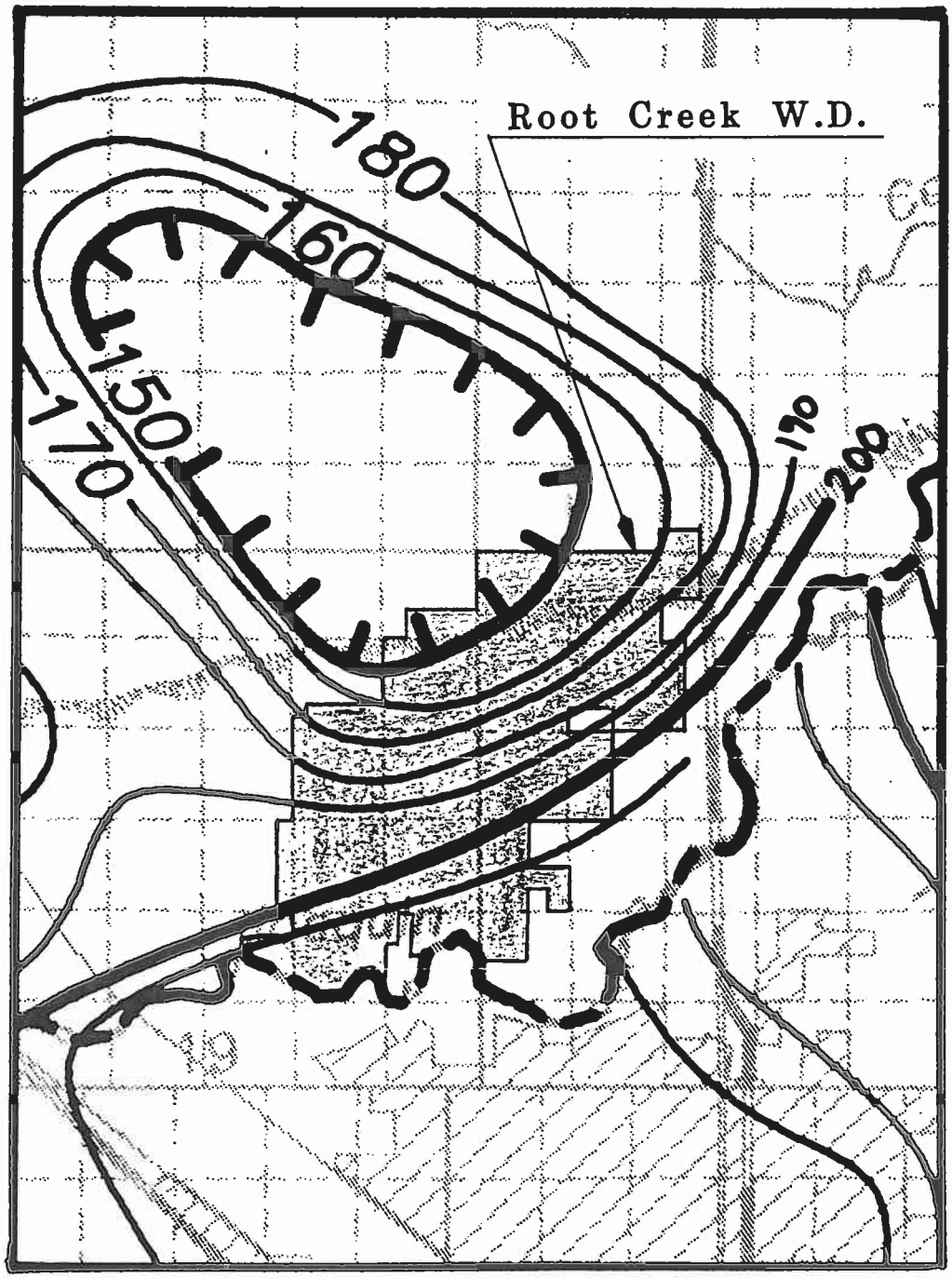


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| ROOT CREEK WATER DISTIRCT<br>GROUNDWATER MANAGEMENT PLAN |
| FIGURE 5 |
| LINES OF EQUAL ELEVATION OF<br>WATER IN WELLS<br>UNCONFINED AQUIFER, SPRING 1993 |

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### Estimated Pump Lift

Pumping lifts within the Root Creek W.D. for production irrigation wells range from around 130 to nearly 400 feet. Typical lifts are 200 to 300 feet.

2) **Ground Water Quality**

Ground water pumped from the unconfined aquifer remains adequate for agricultural use. As stated previously, the ground water quality in the District is generally better in the upper 600 feet of the aquifer.

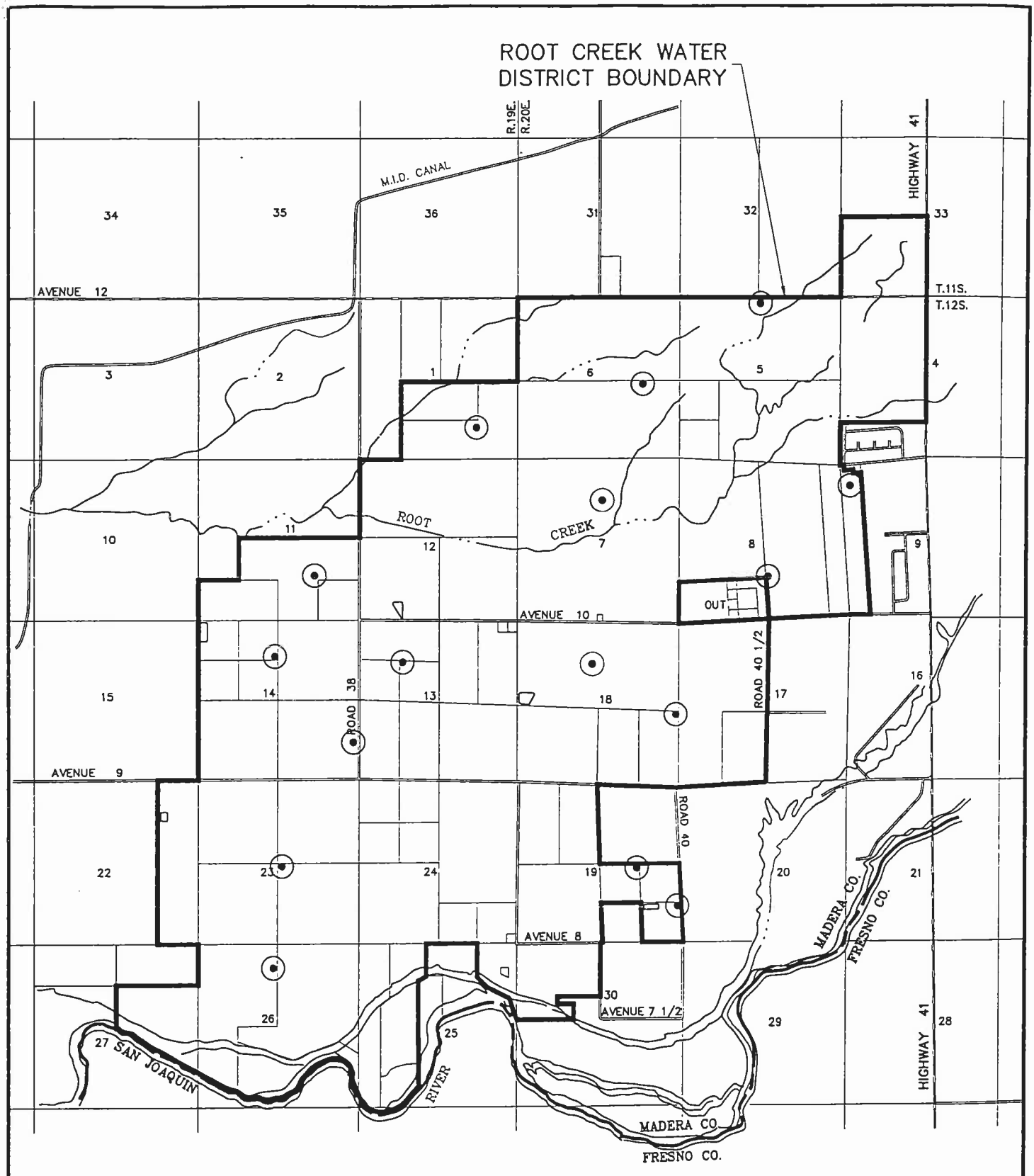
## C. Ground Water Overdraft

The approach used here to estimate overdraft uses historical well water-level measurements taken within a hydrological base period. This base period must extend for sufficient time that both wet periods and drought are included, and the water supply conditions approximate the long-term average. The term overdraft is defined here as a long-term water-level decline during an average hydrologic base period. It is not used to describe short-term water-level declines during times of drought.

In the Root Creek Water District water levels in a number of wells have been monitored since the mid-1970's. The complete water-level data record can be used to prepare well water-level hydrographs and to determine long-term water level changes. A well water-level hydrograph is a plot of depth to water versus time for a particular well.

For this evaluation, well water level hydrographs were prepared for 15 wells in Root Creek W.D. (Figure 6). The period of record for many of these wells extends back to 1974 and long-term trends for the wells are generally consistent. The base period chosen for this analysis is 1974 to 1993. The 15 wells show a consistent trend through this period, and on the San Joaquin River, the major hydrological factor in the area with respect to ground water replenishment, this was exactly an average period (100% of long-term average runoff), with both flood and drought periods.

Linear regressions were performed on the data from each of the 15 wells over the base period. The slopes of these "best-fit" lines were then used as the long-term average annual changes in ground water levels. The hydrographs indicate a long-term water level decline in Root Creek W.D. for the chosen hydrologic base period. A representative well water-level hydrograph is included as Figure 7.




LEGEND:

⊙ INDICATES LOCATION OF A WELL USED IN ESTIMATING OVERDRAFT

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GRAPHIC SCALE

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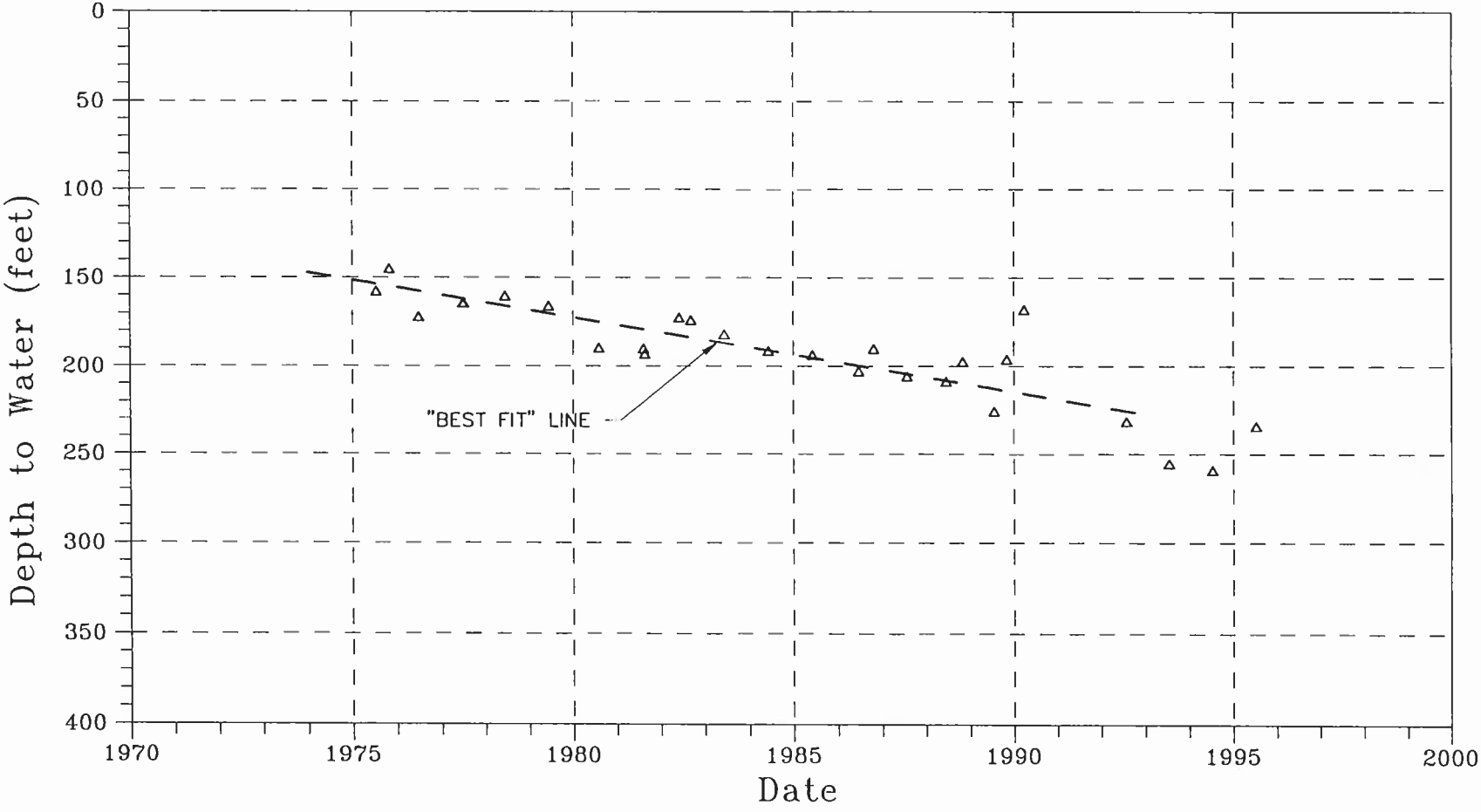
ROOT CREEK WATER DISTIRCT
GROUNDWATER MANAGEMENT PLAN

FIGURE 6

LOCATIONS OF WELLS USED TO ESTIMATE GROUND WATER OVERDRAFT

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Prepared by

PROVOST & PRITCHARD
ENGINEERING GROUP

DATE: 8-11-97
JOB NO.: 97305
DRAWING NO.: 97-0306

ROOT CREEK WATER DISTIRCT
GROUNDWATER MANAGEMENT PLAN

FIGURE 7

REPRESENTATIVE WELL WATER-LEVEL HYDROGRAPH
WELL NO. 12S/20E 8K

In order to determine the annual change in ground water storage, a parameter known as the "specific yield" is multiplied by the average water-level change during the base period and the area represented by the well. Specific yield is the ratio of the volume of water which will drain freely from a material to the total volume of the formation. The average specific yield for the useable aquifer is assumed to be around 7.5%. Using this specific yield, the ground water overdraft for Root Creek Water District is estimated to be around 2,500 acre-feet per year.

## D. Extraction and Perennial Yield

Ground water extraction within Root Creek W.D. is unknown. The District does not own or operate any wells. Private wells extract an unknown amount for agricultural and domestic uses.

Perennial, or sustained, yield is defined here as the average annual amount of ground water pumping that can be supported over an average hydrologic base period that will not result in a long-term decline in water levels. The base period must be long enough to include both wet and dry hydrologic cycles.

Perennial yield is currently impossible to quantify for Root Creek W.D. due to a lack of sufficient data and the shared nature of the aquifer. Root Creek W.D. is not a "closed" ground water system. That is, ground water in the District is hydraulically connected to ground water in the surrounding area. Substantial changes in ground water levels within or in the vicinity of the District could affect the perennial yield of the District's ground water supply. Under current conditions ground water flow across the District is fairly uniform and it appears subsurface inflow roughly balances subsurface outflow.

The overdraft, estimated to be around 2,500 af per year, implies that pumping within the District has been exceeding the current perennial yield by that amount.

## E. Ground Water Monitoring

Root Creek W.D. does not currently monitor ground water levels or quality. The DWR does measure water levels in some wells in the vicinity of the District. These measurements are taken each spring and fall as a part of the State's San Joaquin Valley-wide ground water monitoring program.

# V. MANAGEMENT PLAN ELEMENTS

## A. Control of Saline Water Intrusion

Saline water intrusion is not currently a concern for Root Creek W.D. While the ground water may tend to be more saline in deeper portions of the regional aquifer, this appears to be a natural condition inherent in the geology, and does not threaten the District's ground water supply.

## B. Identification and Management of Wellhead Protection Areas and Recharge Areas

The Federal Wellhead Protection Program was established by Section 1428 of the Safe Drinking Water Act Amendments of 1986. The purpose of the program is to protect ground water sources of public drinking water supplies from contamination, thereby eliminating the need for costly treatment to meet drinking water standards. The program is based on the concept that the development and application of land use controls, usually applied at the local level in California, and other preventative measures can protect ground water.

A Wellhead Protection Area (WHPA), as defined by the 1986 Amendments, is "the surface and subsurface area surrounding a water well or wellfield supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield." The WHPA may also be the recharge area that provides the water to a well or wellfield. Unlike surface watersheds that can be easily determined from topography, WHPA's can vary in size and shape depending on subsurface geologic conditions, the direction of ground water flow, pumping rates and aquifer characteristics. There are several different methods typically used to delineate the lateral boundaries of a WHPA.

Under the Act, states are required to develop an EPA-approved Wellhead Protection Program. To date, California has no state-mandated program, but instead relies on local agencies to plan and implement programs. This is one of the factors that prompted the State Legislature to enact AB 3030. Wellhead Protection Programs are not regulatory in nature, nor do they address specific sources. They are designed to focus on the management of the resource rather than control a limited set of activities or contaminant sources.

As Root Creek W.D. does not provide public drinking water, Wellhead Protection Areas are not currently applicable to this plan.

## C. Regulation of the Migration of Contaminated Ground Water

Ground water contamination can originate from many sources or activities. Clean-up of contaminated ground water is a complex and expensive task generally involving a number of organizations. Agencies with roles to play in mitigating ground water contamination include the California Regional Water Quality Control Board (RWQCB), the California Department of Toxic Substances Control (DTSC) and the U.S. Environmental Protection Agency (EPA). Each agency has its own set of regulatory authorities and expertise to contribute, and the degree to which they participate depends on the nature and magnitude of the problem. The role of the Root Creek W.D. will be to report any contamination that they may discover to the appropriate agency.

## D. Administration of a Well Abandonment and Well Destruction Program

Existing State and Madera County law requires that owners or lessees properly destroy their abandoned wells. Proper destruction of abandoned wells is necessary to protect ground water resources since abandoned or improperly destroyed wells can result in water of different chemical qualities from different strata mixing, and useable ground water being degraded. The responsibility for administration and enforcement of the County well ordinance will be left with Madera County.

## E. Mitigation of Conditions of Overdraft

Overdraft of the ground water supply can lead to a variety of problems, including land subsidence and increased pumping costs. Additionally, if overdraft continues unchecked, the ground water supply may become unreliable when surface water is scarce, as in a time of extended drought.

Ground water overdraft is due to an imbalance in the rates of extractions and replenishment. There are several methods to correct this imbalance. The first is to decrease the extraction to match the rate of replenishment. The second is to increase ground water replenishment to match the extraction rate. The third method is a combination of the first two, to balance replenishment and extraction. Each of the methods are applied over an extended period, making use of the storage capacity of the aquifer. Extractions can exceed replenishment in drought periods as long as replenishment equally exceeds extractions in wetter periods.

The overdraft in Root Creek W.D. is estimated to average around 2,500 acre-feet per year. Factors that will affect the future rate of overdraft include:

1) Future water demand in the District.

2) Future pumping outside the District. Continued decline of water levels to the north and west of Root Creek W.D. could increase the subsurface outflow of ground water.

Overdraft is a significant concern in the District, and if it continues unchecked at the current pace could ultimately affect the reliability and even availability of the District's water supply. Periodic analyses of the District's ground water levels are needed to monitor the overdraft situation.

Possible mitigative measures include reducing ground water pumping by reducing District water demand and increasing ground water recharge. Local streamflow and San Joaquin River flood waters are potential sources of recharge water.

## F. Replenishment of Ground Water Extracted by Water Producers

Replenishment of ground water is an important technique in management of a ground water supply and mitigate a condition of overdraft. The overdraft for the District may possibly be offset by increased recharge of local stream flows and by recharge of San Joaquin River flood waters.

## G. Monitoring of Ground Water Levels and Storage

The purpose of a ground water level monitoring program is to provide information that will allow computation of the change in ground water storage. Root Creek W.D. will initiate a program of measuring well water levels in the spring and fall, in cooperation with the USBR and DWR. Contour maps depicting level of water in wells in the District and surrounding area will be prepared on an annual basis, along with estimates of changes in ground water storage.

## H. Facilitating Conjunctive Use Operations

Conjunctive operation of a ground water basin is defined in DWR Bulletin 118-80 as:

> "Operation of a ground water basin in coordination with a surface water reservoir system. The basin is intentionally recharged in years of above average precipitation so ground water can be extracted in years of below average precipitation when surface water supplies are below normal."

Such management results in the ground water storage being reduced in dry periods and increased in wetter periods. To avoid a condition of overdraft, replenishment and subsurface inflow must balance extraction and groundwater outflow over the long-term.

A conjunctive use program generally requires:

- A source of surface water in years of plentiful surface water supply.
- Recharge facilities.
- Conveyance facilities to import and export water to and from the ground water storage area.
- Available storage capacity in the aquifer.
- Extraction facilities.
- Distribution facilities for surface and ground water.

Root Creek Water District will need to develop many of the facilities to implement a conjunctive use program.

## I. Identification of Well Construction Policies

Improperly constructed wells may result in contaminated ground water by establishing a pathway for pollutants entering a well through drainage from the surface, allowing mixing between aquifers of varying water quality, or the unauthorized disposal of waste into the well. Madera County has enacted and is responsible for enforcing an County Well Ordinance that regulates well construction.

## J. Construction and Operation of Ground Water Management Facilities

Effectively managing a ground water supply requires facilities that protect the quality and assure that the quantity of ground water in storage is sufficient to meet long-term operational goals. Root Creek W.D. needs to work towards developing the ability to recharge enough ground water to ensure the continued viability of the District supply.

There are two potential water sources for increasing ground water recharge in the District; San Joaquin River flood waters, and local streamflows. The main local stream in the District is Root Creek. Root Creek is an ephemeral stream with a small watershed. The creek flows for brief periods of time, mainly in the winter rainy season. There may be some potential for increasing recharge from these temporary flows within Root Creek W.D. Anecdotal evidence and geologic reports that are general in nature suggest surface soil conditions in some areas adjacent to the stream channel are amenable to percolation of water. Silt load in local streamflows is a potential problem with this type of project due to it tendency to quickly reduce the permeability of recharge ponds. Before proceeding with a project intending to increase recharge of Root Creek flows hydrological and hydrogeological studies would be necessary to determine project feasibility.

San Joaquin River flood waters present a more substantial opportunity to increase recharge. The District would need to execute a contract with the U.S. Bureau of Reclamation for "Section 215" water, the cost of which would be around $25 per acre-foot. Areas favorable and available to recharge facilities may exist in the river bottom as well as above the bluffs within the District.

Regardless of the source, the District will attempt to develop the means to increase recharge within the District by an average annual amount of 2,500 acre-feet per year. Geological conditions will be very challenging as the projects are developed. Favorable surface soil conditions may not truly indicate a site's worth for a recharge pond. Sand strata are rarely continuous over large area in the District and much of the geological profile consists of fairly impermeable materials that may impede the percolation of water to the useable aquifer. Any recharge project will require careful and potentially expensive studies, and financial considerations will drive the pace of project development.

## K. Development of Relationships with Federal, State and Local Regulatory Agencies

The development of relationships between the ground water management district and the various regulatory agencies is an important part of an effective ground water management plan. This plan will be submitted to DWR, and Root Creek W.D. will work with DWR and USBR to monitor and report ground water conditions within the District. Ground water management activities will be coordinated with surrounding Madera Basin ground water management agencies including the Madera Irrigation District and various small County service areas such as the Madera Ranchos and Rolling Hills subdivisions. As ground water management intensifies in the region, Root Creek W.D. may pursue development

and execution of "Memorandums of Understanding" (MOU's) with the County of Madera regarding these service areas, as well as with the Madera I.D.

### L. Review of Land Use Plans and Coordination with Land Use Planning Agencies

An important component of developing a ground water management plan is the review of land use plans for the surrounding area or basin, and coordinating efforts with regional and local land use planning agencies. Land use planning activities in unincorporated areas of Madera County are performed by the County of Madera's Planning Department, and overseen by the Madera County Planning Commission. Root Creek W.D. does not have land use planning authority, therefore regional and local land use planning activities will remain with the appropriate agencies.

## VI. GROUND WATER MANAGEMENT PROGRAM

### A. Program Components

This Program requires the implementation of the following Plan Elements, as defined in the previous section:

1) Monitoring and analysis of ground water levels.

2) Ground water recharge project feasibility studies.

3) Development of relationships with regulatory agencies, neighboring agencies with ground water management authority, and the County of Madera.

### B. Program Costs, Funding and Potential Fees

Initial costs to implement the program will be borne by Root Creek W.D. If additional funds are necessary to implement the Program and are outside the current authority of the Root Creek W.D. to raise, but within the powers granted by AB 3030, a public vote will be required. A simple majority is necessary to approve a measure to levee a fee for ground water management.

## C. Implementation Schedule

Upon adoption of the Ground Water Management Plan, the Program will be implemented on the following schedule:

1) Initiate a ground water monitoring program within six months.

2) Pursue ground water recharge project feasibility studies within one year.

3) Begin developing relationships with other agencies immediately.

# APPENDIX A

Root Creek W.D. Resolution No. 97-3

Resolution of Root Creek Water District
to Adopt a Ground Water Management Plan

RESOLUTION NO. 97-3

RESOLUTION OF
ROOT CREEK WATER DISTRICT
TO ADOPT A GROUND WATER MANAGEMENT PLAN

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

WHEREAS, the Root Creek Water District (the "District") is an authorized local agency and may therefor adopt and implement such a ground water management plan; and

WHEREAS, a first public hearing was held on April 14, 1997 to discuss the adoption and implementation of a ground water management plan; and

WHEREAS, the District passed, and subsequently published, a Resolution of Intention to Draft a Ground Water Management Plan (RCWD Resolution 97-1); and

WHEREAS, the District's consultant prepared a Ground Water Management Plan at the direction of the District Board of Directors; and

WHEREAS, a second public hearing was held on October 13, 1997 in accordance with the California Water Code Section 10753.5, et seq. to consider adoption of the proposed Ground Water Management Plan; and

WHEREAS, no protests to the proposed Ground Water Management Plan were filed at the second public hearing; and

WHEREAS, the Board believes that the adoption of the proposed Ground Water Management Plan is in the best interests of the District's landowners and water users and can help meet the projected long-term water needs of the District;

BE IT RESOLVED, that it is the intention of the District adopts the Ground Water Management Plan in accordance with Part 2.75 of Division 6 of the California Water Code, as prepared by the District's consultant and dated June12, 1997;

RESOLVED, that the Board hereby authorizes each of the officers of the District to execute all documents and take any other action necessary or advisable to carry out the purpose of this resolution.

The foregoing Resolution was passed and adopted this 13th day of October, 1997.

ROOT CREEK WATER DISTRICT

By: _____
Rodger Jensen, President

CERTIFICATE OF SECRETARY

The undersigned certifies that he is the Secretary of the Root Creek Water District and that the foregoing resolution was adopted by the Board of Directors in said District at a meeting thereof, duly and regularly held on October 13, 1997 following a public hearing at which meeting a quorum of the Board of Directors was at all times present and acting.

IN WITNESS WHEREOF, I have set my hand this 13th day of October, 1997.

_____
Deborah Messer, Assistant Secretary
Root Creek Water District

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# Attachment 1.1, Approved Madera RWMG Minutes

November 2010 Meeting Minutes

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# *Regional Water Management Group*
## Monday, November 8, 2010 1:30 to 3:30 pm
## Location: Chowchilla Library Community Room
## Meeting Agenda

**In Attendance:**
Frank Abley – US Forest Service
Cindy Black – City of Chowchilla
Elissa Brown – Grant Writer
Chris Campbell – Root Creek Water District
Jack Fry – Chowchilla Red Top Resource Conservation District
Jeannie Habben – Central Sierra Watershed Committee
Glenn Eastes – Madera County
Carl Janzen – Madera Irrigation District
Norman Kuhr – Chowchilla Red top RCD
Michael Neveu – YSPUC
Phil Pierre – Root Creek Water District
Don Roberts – Gravelly Ford Water District
Igal Treibatch – S.E.M.C.U.
Dick Tzou – Madera Irrigation District
Dough Welch – Chowchilla Water District

Quorum was met; meeting was called to order by Michael N. at 1:34 PM.

1. **Review Agenda**
   No agenda change

2. **Public Comment (hold to three minutes each speaker)**
   Comment by Central Sierra Watershed, this Saturday 11/13 from 2pm to 5pm, a party in honor of Larry Ballew in Oakhurst.

**Old Business/Housekeeping:**

3. **Approve minutes from 8-30-10 and 9-21-2010 meeting**

Approve meeting minutes from 8/30/2010 with changes as submitted, unanimous.
Board voted to pass the August meeting minutes; this was passed unanimously, approved 8/30/2010 meeting minutes as submitted.

Review of meeting minutes from 9-21-2010 meeting: discussion. DWR Fresno Rep felt her comments were not to be labeled as a criticism but rather as suggestions. Others agreed. Jeannie H will re-write the section in regards to this discussion and submit as a change. Economic development projects need governance. Group agreed to include September 21 edited document for final approval at December meeting.

4. **Review Department Forestry document inclusion to existing IRWMP, Fuel Reduction Recommendation (tabled from October's meeting)**
   See attached documentation for the recommended amendments to the Madera Integrated Regional Water Management Plan

   Doug W made the motion to approve the proposed amendment to the IRWMP Forest Service section and Don R second the motion and the Dept of Forestry document for the amendments of the IRWMP are approved unanimously by the board.

### 5. For grant preparation: collect monies from members

Monies collection tabled for December meeting.

### 6. Review of IRWMP Implementation grant project submissions

Elissa B facilitated this issue. Notes from her presentation follow:
Each region is required to submit multiple projects on one application. This process will include submittal of Project Description for the RWMG to review and vote. The list will be published with a 30 day comment period. Grant Application is due January 7, 2011. The first vote is preliminary; member can vote "against" inclusion at December meeting. However, no additions to the November group of projects will be entertained. There could be as many as 3 rounds of funds and this submittal is for the first round.

5 projects were submitted at the meeting. Project prioritization will be up to the Grant Applicant. The projects include: (1) Ash Slough Arundo Eradication and Sediment Removal project; (2) Cottonwood Creek/Berenda Creek Arundo Eradication Project; (3) Root Creek In-Lieu Groundwater Recharge Project; (4) Sierra National Forest Fuel Reduction Project; (5) Madera Ranchos Flood Control and Water Recharge Ponding Basin. Please refer to the submitted project documents for details.

Voting for inclusion of all five projects was unanimous.
A vote was held in approval of all five projects as presented in review, per project documentation: (1) Ash Slough Arundo Eradication and Sediment Removal project; (2) Cottonwood Creek/Berenda Creek Arundo Eradication Project; (3) Root Creek In-Lieu Groundwater Recharge Project; (4) Sierra National Forest Fuel Reduction Project; (5) Madera Ranchos Flood Control and Water Recharge Ponding Basin.
Motions were made stating the above, and after the board voted it was unanimous that all five projects be included in the in the Implementation Grant Application.

### 7. Selection of Grant Applicant

Group members agreed to form subcommittee to recommend the choice of Grant Applicant for the Grant Implementation phase, and come to the December meeting with at least one applicant.

## New Business:

### 8. Choose next location and time for meeting

The next meeting is to be held on December 13 at the Madera Irrigation District office.
Adjourn Meeting adjourned at 3:45pm.

Recommended amendments to the Madera Integrated Regional Water Management Plan

**Add to Section 7.2.2.2** :

High severity wildfire can increase the probability and magnitude of flooding, and potentially result in debris flows. Wildfire can leave areas of a watershed completely devoid of vegetation and ground cover. High temperatures can cause physical and chemical changes to forest soils that reduce infiltration and make them more susceptible to erosion. The combined affect results in rapid concentration of runoff (flash flooding) that carries elevated amounts of sediment and debris, potentially plugging culverts, damaging bridges, and filling reservoirs.

Degraded mountain meadow and riparian areas also contribute to elevated flooding. Mountain meadows and floodplains provide natural storage of stormwater and aquifer recharge. Properly functioning meadows store runoff and maintain dry season flows by the slow release of water. Loss of this storage through channel incision reduces the time of concentration for flood flows, increasing both flood volume and height.

**Add :**

Section 7.3.7 Watershed Protection and Restoration Projects

The US Forest Service is responsible for managing over 300,000 acres of land in the foothill and mountain regions of Madera County. Both commercial and non-commercial fuel reduction projects are completed annually to reduce the intensity and spread of wildfires and to increase forest resiliency to disturbances such as drought, insect and disease attack, and wildfire; thereby reducing the probability of deforestation and increased flooding.

There are an estimated 1,300 meadow and fen systems (approximately 3,180 acres) in the headwaters of Madera County. Past land management activities have compromised the hydrologic function of many of these through incision and conifer encroachment. The Sierra National Forest has identified 30 meadows in need of restoration within the Upper Chaquito Creek 6$^{th}$-field Hydrologic Unit Code (HUC). These projects are currently being evaluated as part of the Bass Lake Ranger District Five Year Meadow Restoration Plan. There are potentially an additional 130 meadow restoration projects in other 6$^{th}$ -field HUCs.

**Revise 8.2.3 from**:

"Madera County has a very active and historical program for fire protection, resource management, and environmental enhancement. Typical practices of fuel management include thinning of conifers; mastication of small trees, brush, and shrubs; prescribed burning and vegetation replacement. Although the main objective of the past and current programs has been fire protection, it has been observed that in areas where vegetation management has been conducted, storm runoff increases and increased groundwater recharge enhances springs, which tend to run for greater durations. A literature review supports the potential to increase water supply through vegetation management."

**To:** "Madera County has a very active and historical program for fire protection, resource management, and environmental enhancement. Typical practices of fuel management include thinning of conifers; mastication of small trees, brush, and shrubs; prescribed burning and vegetation replacement. The main objective of these programs are fire protection, but they also provide ecological restoration and promote long-term hydrologic function. Properly functioning mountain ecosystems provide long-term resiliency to disturbances, thereby maintaining the quantity and quality of water during a time of changing climate and increased wildfire disturbance. Under certain conditions, vegetation management has resulted in short term increases in water yield. A literature review supports the potential to increase water supply through vegetation management. In evaluating projects for potential increases in water *quantity*, the possibility of decreased water *quality* from erosion and sedimentation should be considered"

**Section 8.2.3.1**

Change

"There are several other projects within Madera County; however, water yield increases resulting from management were not identified. Some of these projects are as follows:"

TO:

"There are several other projects within Madera County that have not identified increased water yields from management. These projects are designed to reduce the intensity and spread of wildfire, protect lives and property, and increase forest health and resiliency. Some of these projects are as follows:"

ADD TO 9.2.1.4

There are potentially 160 meadow restoration projects on Forest Service land within the headwaters of Madera County. Of these, 30 are currently in the planning phase. It is recommended that the Madera RWMG work with the USFS to identify and restore mountain meadows for the protection of water quality, flood attenuation, and increased dry season flows.

ADD TO 9.2.1.6 (but not under projects designed to increase water supply)

Pursue opportunities with the USFS for vegetation management projects designed for ecological restoration, wildfire protection, and forest resiliency. Future projects would include fuel treatments, thinning, and noxious weed eradication.

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