MADERA REGION REGIONAL WATER MANAGEMENT GROUP

IRWMP PLANNING GRANT APPLICATION

ATTACHMENT 3.2

TABLE OF CONTENTS FOR 2008 IRWMP

Integrated Regional Water Management Plan

Volume 1

April 2008

MADERA COUNTY
Established 1893
State Of California

BOYLE
ENGINEERING CORPORATION

In association with
Kenneth D. Schmidt and Associates

Table of Contents

Executive Summary ES-1
Description of Study Area ES-1
Existing Water Resource Systems ES-4
Water Demand ES-4
Water Supply ES-7
Water Quality ES-9
Flood Control Planning ES-11
Water Resources Management Opportunities ES-11
Recommendations ES-14
Chapter 1 Introduction 1-1
1.1 Purpose of Plan 1-1
1.2 Regional Goals 1-1
1.3 Plan Scope 1-3
1.3.1 Water Resource Management Optimization 1-3
1.3.2 Evaluating and Increasing Water Supplies 1-4
1.3.3 Water Quality Protection and Improvement 1-4
1.3.4 Flood Control Planning 1-4
1.3.5 Planning Process, Public Education and Administration 1-4
1.4 Regional Planning Process 1-5
1.4.1 AB 303 and Proposition 50 Study Grants 1-5
1.4.2 IRWMP's Relationship to Existing Water Management Plans 1-5
1.4.3 Consulting Team 1-5
1.4.4 Stakeholder Participation 1-6
1.5 Abbreviations 1-8
1.6 Report Organization 1-9
Chapter 2 Description of Study Area 2-1
2.1 General Description 2-1
2.2 County Regions and Study Areas 2-1
2.2.1 Valley Floor 2-2
2.2.2 Foothills and Mountains 2-3

2.3 Population 2-3
2.4 Topography 2-6
2.5 Land Use 2-6
2.5.1 Valley Floor Land Uses 2-6
2.5.2 Foothills and Mountains Land Uses 2-11
2.6 Watersheds 2-12
Chapter 3 Existing Water Resources Systems 3-1
3.1 Water Supply, Treatment, and Distribution Systems 3-1
3.1.1 Irrigation and Water Districts 3-1
3.1.2 Valley Floor Urban and Rural Water Providers 3-7
3.1.3 Foothills and Mountains Urban and Rural Water Providers 3-10
3.2 Wastewater Collection, Treatment and Disposal/Reuse Systems 3-14
3.2.1 City of Madera Wastewater System 3-15
3.2.2 City of Chowchilla Wastewater System 3-16
3.2.3 County-Operated Wastewater Systems 3-16
3.3 Flood Control and Associated Groundwater Recharge Systems 3-18
3.3.1 City of Madera Groundwater Management and Storm Water System 3-18
3.3.2 City of Chowchilla Flood Control Systems 3-19
3.3.3 County-Operated Flood Control Systems 3-19
3.3.4 Irrigation and Water Districts Recharge Programs 3-19
Chapter 4 Water Demand 4-1
4.1 Historical Water Production 4-1
4.1.1 Agricultural Water Use 4-1
4.1.2 Urban and Rural Nonagricultural Water Use 4-1
4.1.3 Summary of Historical Water Use 4-6
4.2 Water Demand Projections 4-6
Chapter 5 Water Supply 5-1
5.1 Existing Groundwater Supply 5-1
5.1.1 Valley Floor Groundwater Supply 5-1
5.1.2 Foothills and Mountains Groundwater Supply 5-12
5.2 Existing Surface Water Supply 5-17
5.2.1 Water Entitlements 5-17
5.2.2 Summary of Surface Water Supply 5-20

5.3 Comparison of Water Demand and Supply 5-21
5.4 Water Resource Impacts of Continued Groundwater Use 5-21
5.4.1 Valley Floor Impacts 5-21
5.4.2 Foothills and Mountains Impacts 5-22
Chapter 6 Water Quality 6-1
6.1 Groundwater Quality 6-1
6.1.1 Valley Floor Groundwater Quality 6-1
6.1.2 Foothills and Mountains Groundwater Quality 6-7
6.2 Surface Water Quality 6-13
6.2.1 Surface Water Supply Systems 6-14
6.2.2 Surface Water Contaminants of Concern 6-16
6.3 Impacts of Failing Septic Systems 6-24
6.4 Existing County Ordinances 6-25
6.4.1 Water Related Ordinances 6-25
6.4.2 Wastewater Related Ordinances 6-28
Chapter 7 Flood Control Planning 7-1
7.1 Current Flood Control Programs 7-1
7.1.1 Federal Flood Control Program 7-1
7.1.2 State Flood Control Program 7-1
7.1.3 Madera County Flood Control Program 7-2
7.2 Flooding Problems 7-5
7.2.1 Madera County Flood Zones 7-5
7.2.2 Flooding Situation 7-8
7.2.3 Historical Floods 7-9
7.2.4 Future Floods 7-10
7.3 Potential Programs and Projects 7-11
7.3.1 *Arundo donax* Mapping and Eradication 7-11
7.3.2 Channel Restoration 7-11
7.3.3 Levee Restoration and Maintenance 7-12
7.3.4 Storm Water Retention Basins 7-13
7.3.5 Flood Warning and Forecasting 7-13
7.3.6 Flood Fighting and Emergency Evacuation Plans 7-13

Chapter 8 Water Resources Management Opportunities 8-1
8.1 Valley Floor Water Management Opportunities 8-1
8.1.1 Water Supply Augmentation Measures 8-1
8.1.2 Water Demand Reduction Measures 8-19
8.1.3 Flood Control Projects and Programs 8-21
8.2 Foothills and Mountains Water Management Opportunities 8-24
8.2.1 Surface Water Supply Requirements 8-24
8.2.2 Water Supply Augmentation Opportunities 8-25
8.2.3 Watershed Management 8-27
8.3 Water Quality Improvement Opportunities 8-37
8.4 Other Water Management Measures 8-39
8.4.1 Land Use Policies 8-39
8.4.2 Water Supply for New Development 8-39
8.4.3 Mitigation Water Credit Program 8-40
8.4.4 Agricultural Water Management Measures 8-41
8.4.5 County Systems Infrastructure Improvements 8-41
Chapter 9 Conclusions and Recommendations 9-1
9.1 Conclusions 9-1
9.1.1 Water Demand 9-1
9.1.2 Water Supply 9-2
9.1.3 Water Quality 9-4
9.1.4 Flood Control 9-5
9.1.5 Water Resources Management Opportunities 9-6
9.1.6 Watershed Management 9-7
9.2 Recommendations 9-7
9.2.1 Foothills and Mountains 9-8
9.2.2 Valley Floor 9-12
9.2.3 Groundwater Monitoring Program 9-18
References

Appendices – Volume 2

A Groundwater Conditions in the Oakhurst Area

B Groundwater Conditions in the North Fork Area

C Groundwater Conditions in the Coarsegold Area

D Groundwater Conditions in the Raymond and Daulton Ranch-Hensley Lake Areas

E Hillview Water Company – Sierra Lakes Wells Centralized Treatment for Arsenic and Uranium - Task Memorandum Report

F Proposed Groundwater Monitoring Program for Madera County

G Responses to Comments and Questions on Draft Integrated Regional Water Management Plan

List of Figures

ES-1 County Location Map....ES-2
ES-2 Locations of Study Subareas....ES-3
ES-3 Valley Floor Water System Providers....ES-5
ES-4 Foothill/Mountain Water Providers....ES-6
ES-5 Valley Floor Groundwater Level Decline....ES-8
ES-6 Subareas and Overdraft in Valley Floor Area....ES-10
1-1 County Location Map....1-2
2-1 Madera County Study Region....2-2
2-2 Location of Study Subareas....2-4
2-3 County of Madera Estimated Population....2-5
2-4 2015 Land Use Plan....2-8
2-5 2015 Land Use Breakdown....2-9
2-6 Proposed Residential Developments....2-10
3-1 Water and Irrigation Districts....3-2
3-2 Valley Floor Water System Providers....3-3
3-3 Foothill/Mountain Water Providers....3-4
4-1 County of Madera Historic Agricultural Water Use....4-3
4-2 County of Madera Historic Urban and Rural Water Use....4-5
4-3 Madera County Historic Per-Capita Water Consumption....4-7
5-1 Valley Floor Groundwater Basins....5-2
5-2 Valley Floor Lines of Equal Water Elevation in Wells, Spring 2004....5-5
5-3 Valley Floor Hydrographs....5-6
5-4 Chowchilla Water District Historic Average Depth to Groundwater....5-7
5-5 Valley Floor Groundwater Level Decline....5-9
5-6 Annual Precipitation at Madera From 1931 to 1999....5-10
5-7 Subareas and Overdraft in Valley Floor Area....5-11
5-8 Major Rock Types in the Foothills and Mountains....5-14
5-9 Annual Mean Precipitation....5-15
5-10 Annual Precipitation in the Foothills and Mountains....5-16

6-1 Valley Floor Areas of Water Quality Concern....6-2
6-2 Foothills and Mountains Areas of Water Quality Concern....6-8
7-1 Federal Project Levees and Channels....7-3
7-2 Flood Zones....7-6
8-1 Allocation of Project Shares....8-7
8-2 Location Map....8-8
8-3 Existing Conveyances....8-10
8-4 Phase 1 Conveyance Upgrades....8-10
8-5 Phase 1 Recharge Areas....8-11
8-6 Phase 2 Recharge Areas....8-11
8-7 Phase 2 Recovery Facilities....8-12
8-8 Phase 2 Lift Stations....8-12

List of Tables

ES-1 Potential Water Supply Augmentation & Overdraft Reduction Projects on the Valley Floor ES-12

1-1 Summary of Groundwater Management Plans and Reports Used 1-6

2-1 County of Madera Population (2000-2007) 2-3

2-2 County of Madera Projected Population 2-6

2-3 Land Use Map Acreages 2-7

2-4 Major Madera County Reservoirs and Lakes 2-12

3-1 County Maintenance Districts and Service Areas 3-9

3-2 Hillview Water Company Water Systems 3-11

3-3 Wastewater Collected and Treated 3-15

3-4 Madera Irrigation District Recharge Basins 3-20

4-1 Irrigation Water Requirements for Madera County 4-2

4-2 Historical Municipal, Domestic, and Industrial Water Use (1999-2006) 4-4

4-3 Historical Water Use in Madera County (1999-2006) 4-6

4-4 Urban and Rural Projected Water Demand in Madera County 4-8

4-5 Water Demand Summary 4-9

5-1 Average Surface Water Deliveries 5-20

5-2 Comparison of Madera County Water Demand and Supply 5-21

6-1 Groundwater Chemistry Data (2005 CCR), County-Owned Small Water Systems - Valley Floor 6-4

6-2 Groundwater Chemistry Data (2002-2007), Large Water Systems - Valley Floor 6-5

6-3 Groundwater Chemistry Data (2005 CCR), County-Owned Small Water Systems - Foothills/Mountains 6-10

6-4 Groundwater Chemistry Data (2002-2007), Large Water Systems - Foothills/Mountains 6-11

6-5 Domestic Water Systems Using Surface Water 6-14

6-6 Foothills and Mountains Surface Water General Mineral, Physical, & Inorganic Chemical Analyses 6-15

6-7 USBR Raw Water Quality at Friant Dam - General Mineral, Physical & Inorganic Chemical Analyses 6-17

6-8 Foothills/Mountains Surface Water Bacteriological Sampling - Raw Surface Water 6-18

6-9 Pathogen Monitoring Data - USBR at Friant Dam 6-19
6-10 Foothills/Mountains Surface Water Total Organic Carbon & Alkalinity Monitoring...6-21
6-11 Foothills/Mountains Surface Water Disinfection Byproduct Monitoring.....6-22
6-12 Water-Related County Ordinances.....6-25
6-13 Private Well Testing Analyses 6-28
6-14 Wastewater-Related County Ordinances.....6-29
7-1 Fresno River Channel Designated Flows 7-12
8-1 Potential Water Supply Augmentation & Overdraft Reduction Projects on the Valley Floor.....8-2
8-2 Full-Scale Project Summary.....8-9
8-3 Community Average Annual Precipitation 8-24