

Upper Kings Basin Integrated Regional Water Management Plan (IRWMP)



Prepared for:

Upper Kings Basin Water Forum
and Kings River Conservation District

In Coordination with:

California Department of Water Resources



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1.1 BACKGROUND

The Kings Groundwater Basin (Kings Basin) is located in the southern part of the San Joaquin Valley groundwater basin in the Central Valley of California. It is primarily an agricultural area, which uses both surface water and groundwater for irrigation purposes. The two primary sources of surface water for Kings Basin are:

- Kings River; and
- San Joaquin River via Friant-Kern Canal, a component of the Central Valley Project (CVP).

These two surface water sources are not sufficient to meet the water demand in the Kings Basin. Therefore, the water districts in the area have been managing the available supplies through *conjunctive use*, which is the combined use of surface water and groundwater supplies and storage.

Due to insufficiency of surface water supplies, the Kings Basin has been operating under overdraft conditions for many years, with an average annual overdraft of approximately 100,000 to 150,000 acre-feet (WRIME, 2003). *Overdraft* means that on an average basis, more water is removed from the groundwater basin than is replaced, resulting in significant declines in groundwater levels throughout the basin. According to Bulletin 118 (DWR, 2003a), the groundwater in storage in Kings Basin was about 93 million acre-feet in 1961; this estimate of storage was to a depth of 1,000 feet or less. It is also estimated that about 10 million acre-feet of groundwater was mined from the Kings groundwater basin during the past 50 years of operation.

Upper Kings Water Forum

- Kings River Conservation District
- Alta Irrigation District
- Consolidated Irrigation District
- Fresno Irrigation District
- Raisin City Water District
- County of Fresno
- County of Kings
- County of Tulare
- City of Clovis
- City of Dinuba
- City of Fresno
- City of Fowler
- City of Kerman
- City of Kingsburg
- City of Parlier
- City of Reedley
- City of Sanger
- City of Selma
- Fresno Audubon Society
- California Native Plant Society, Sequoia Chapter
- Kings River Fisheries Management Program Public Advisory Group
- El Rio Reyes Conservation Trust
- California Water Institute
- California Department of Water Resources
- California Department of Fish & Game
- Regional Water Quality Control Board
- Kings River Water Association
- Sierra Club

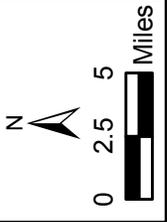
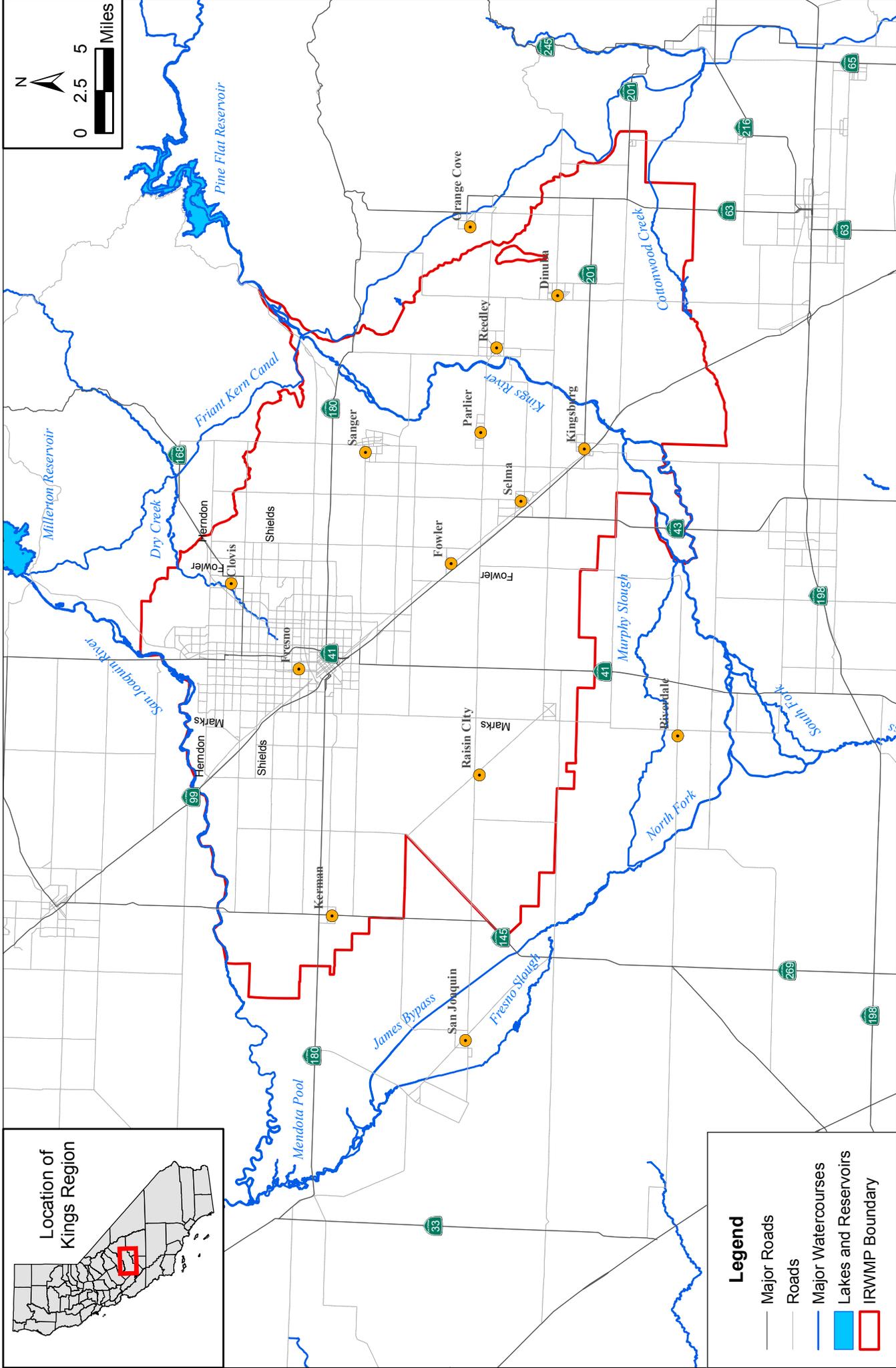
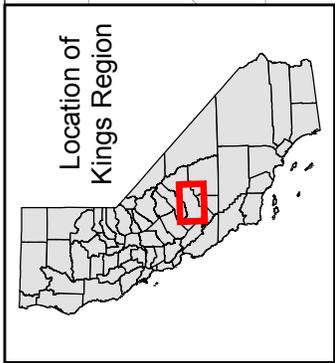
The continued groundwater overdraft and the urban growth pressure in the region call for improved water resources management in the Kings Basin. Historically, the management of the

water resources has been limited to independent operations by overlying local water agencies and individual water users. It is recognized that piecemeal planning constrains the potential for solution of the region's most pressing issues and increases the potential for competition and conflict over the available water supplies. As a result, the local agencies have initiated a process of regional cooperation in 2001 to address the overdraft problem and develop implementable solutions. Kings River Conservation District (KRCD), Alta Irrigation District (AID), Consolidated Irrigation District (CID), and Fresno Irrigation District (FID) formed a Basin Advisory Panel (BAP), sought technical, facilitation, and financial support from the California Department of Water Resources (DWR), and signed a Memorandum of Understanding (MOU) that defined how they would work together to manage existing supplies and develop new supplies for the Kings Region. This water management group is formed pursuant to the IRWMP standards and guidelines (DWR, 2004a).

The BAP made significant progress by working together to define the water resources problems but realized that the involvement of other stakeholders in the basin would be necessary if regional solutions were to be developed. As a result of these early efforts, the water districts solicited wider stakeholder participation and the Upper Kings Water Forum (Water Forum) was formed in 2004 to coordinate water resources planning in the Upper Kings Basin Region (Kings Region). The Water Forum embarked on developing an Integrated Regional Water Management Plan (IRWMP) for the Kings Region to improve water management, reduce conflicts, protect water quality, and ensure sustainable resources management through regional cooperation. The objective of the IRWMP is to identify and define different water management scenarios for the Kings Basin and evaluate alternatives to determine the most economical and best use of the water resources of the region as a whole.

The Kings Region is shown on Figure 1-1 and spans over parts of three counties: Fresno, Kings, and Tulare. The Water Forum planning process includes city and county governments, non-governmental organizations and other stakeholders. This diverse range of perspectives has been valuable in developing a consensus and selecting water management strategies for inclusion in the Upper Kings Basin Integrated Regional Water Management Plan (Upper Kings Basin IRWMP).

The Upper Kings Basin IRWMP is the outcome of a two-year collaborative planning and facilitated process that included completion of a wide range of technical studies, preparation of briefings and technical memorandums, development of the Kings Basin Integrated Groundwater and Surface water Model (Kings IGSM), extensive stakeholder involvement and community affairs process, and numerous meetings among various work groups and Water Forum participants. The local funding for these efforts was supplemented by a Proposition 50 Planning Grant and other technical assistance grants from the California Department of Water Resources (DWR).



Legend

- Major Roads
- Roads
- Major Watercourses
- Lakes and Reservoirs
- IRWMP Boundary

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Upper Kings Basin Region (Kings Region)

Figure 1-1

Upper Kings Basin IRWMP



1.2 VISION FOR THE IRWMP

The Water Forum adopted a vision statement to ensure a common view of the future among all members. This vision set the direction of the Upper Kings Basin IRWMP and guided the collaborative planning and decision-making process. The IRWMP defines issues, guiding principles, regional goals, objectives, strategies, actions, and projects to enhance the beneficial uses of water for the Kings Region and ensure the sustainability of the water supply.

“The vision of the Upper Kings Basin Water Forum is a sustainable supply of the Kings River Basin’s finite surface water and groundwater resources through regional planning that is balanced and beneficial for environmental stewardship, overall quality of life, a sustainable economy, and adequate resources for future generations.”

Adopted by the Upper Kings Basin Water Forum

The Water Forum has taken the initiative to bring together the different interests in the Kings Region to better communicate, collaborate, and cooperate in solving regional issues that are beyond the capacity of any one entity to address. The Water Forum has recognized that all of the stakeholders in the region, whether public agencies or non-governmental organizations, have unique perspectives and that all of the individual interests need to be recognized if the Upper Kings Basin IRWMP is to be successful.

Participating entities must continue to recognize and support the concept that regional integration will enhance their ability to manage their operations and collective resources, will increase their water supply reliability, and will provide a framework to improve water management across the region. More importantly, all participating entities should be assured that by participating in a regional integrated water management program, they will not lose opportunities to control their own future nor will they lose their autonomy. Regional integration does not seek to diminish the individual purveyor’s decision-making power or a local government’s power to exercise its rights. Instead, it seeks to enhance the collective power of the local entities and the ability to manage their resources. Participating entities would also be able to address water management issues on a much larger scale through an integrated planning framework.

The Water Forum sought to bring together the plans of the public agencies and provide oversight and management structure for institutional involvement and multi-stakeholder participation. Many of the plans are based on the statutory authorities of the various agencies involved. The success of the Upper Kings Basin IRWMP also depends on the participation of those agencies that have jurisdictional authority to implement the plan.

By working with varied interests and agendas, the IRWMP planning process has opened the doors for partnerships, funding opportunities, operational connectivity, and increased awareness of planning efforts, projects and opportunities. In developing regional plans and prioritizing multi-benefit projects, it is important not only to coordinate efforts with other planning agencies within the region, but also to coordinate across regional boundaries, and the Water Forum is working towards building bridges with surrounding regional efforts.

The Water Forum has brought together an enormous amount of information and has facilitated communication concerning complex and controversial issues. Not all of these issues are going to be addressed in this first attempt at developing an IRWMP, but the Water Forum and the integrated planning framework are expected to provide an ongoing mechanism for resolving conflicts within which water agencies, regulators, and environmental groups can talk, identify common problems and concerns, and work together to find solutions. The Water Forum is prepared to address the continuing challenges related to coordinating groups with widely differing missions, agendas, and interests. The IRWMP implementation cannot succeed without continuous review and modification to meet new and unanticipated challenges.

1.3 PURPOSE, NEED, AND COMMON UNDERSTANDING FOR THE IRWMP

Historically, the management of water resources has been limited to independent operations by overlying local water agencies and individual water users. The Water Forum was formed by the local land and water agencies and stakeholders to improve communication, collaboration, and cooperation; to develop a consensus on the regional problems and solutions; and to resolve or avoid conflicts. A general consensus has been achieved concerning the purpose of the Upper Kings Basin IRWMP. The IRWMP is to:

- Document how the Water Forum worked together through a collaborative process to identify issues, goals, and objectives for water resources management in the Upper Kings Region;
- Improve water management, reduce conflicts, protect water quality, and ensure sustainable resources management through regional cooperation;
- Identify and define different water management scenarios for the Kings Basin, evaluate alternatives to determine the most economical projects and programs to manage, and develop the surface and groundwater supplies in a sustainable manner;
- Prioritize immediate, near-term, mid-term, and long-term investments and define engineering solutions, program priorities, and institutional approaches to implement the IRWMP; and

- Provide a roadmap to work together within the Kings Region and surrounding regions to further develop and manage the available water supplies.

The need for the IRWMP is clear. The continued groundwater overdraft is not sustainable and the urban growth pressure in the region, coupled with the need to sustain the agricultural economy, call for improved water resources management in the Kings Basin. The water budget and overdraft problem is presented in more detail in Chapter 4.

The Water Forum drafted Agreements in Principle, which were then reviewed and adopted by the elected bodies represented on the Water Forum throughout the winter of 2006–07. The Agreements in Principle contained a statement of common understanding that expresses the need for the Upper Kings Basin IRWMP.

- The Water Forum participants represent public agencies and community organizations that overlie the Upper Kings Basin and share a common groundwater resource. Any action affecting groundwater within any of the overlying land-use or water-district jurisdictions could impact that area and also have effects (positive or negative) throughout the basin.
- Overdraft of the Kings Groundwater Basin is a common problem for the cities, counties, and water districts in the region. If allowed to continue, it could threaten the region's economic prosperity and could reduce agricultural productivity as well as urban growth and development. This problem cannot be solved by any individual entity or jurisdiction; it is a regional problem that requires a regional solution.
- Solutions conceived in a vacuum to serve a limited area of interest or impact cannot adequately address regional water resource problems related to overdraft, water supply reliability, water quality, flood control, or ecosystems management.
- Groundwater overdraft has the potential to result in conflicts between geographic areas and different water use sectors in the basin. Local control and management must be demonstrated, and if the area does not take the initiative to develop an IRWMP, it is possible that solutions could be imposed by the Courts or the State.
- Conjunctive use and groundwater management projects are needed to halt and reduce overdraft, avoid conflicts over the available groundwater supplies, and meet the IRWMP goals and objectives.
- Conjunctive use and groundwater management is the integrating theme for the IRWMP. The planning framework has been designed to integrate water quality, ecosystem, flood control, and land use/recreation management strategies within this prevailing theme.
- The IRWMP will recognize, preserve and protect Kings River water rights. The Kings Basin is hydrologically and hydraulically interconnected and is a resource shared by all individuals and organizations that overly this common pool of

resource. The activities of one organization have an effect on the activities of the other organizations.

1.4 PLAN DEVELOPMENT

The Upper Kings Basin IRWMP was initiated in January 2005. The work was broken down into two Phases. Each Phase was broken down into work elements and tasks. Work Elements consisted of a group of tasks that shares a common purpose. Tasks consisted of specific activities with a defined purpose and deliverable. All of the technical studies and deliverables are posted on the project web site or are available from KRCD.

The Phase 1 - Project Planning and Model Development, consisted of the following Work Elements:

- Technical Studies;
- Development of the Public Outreach and Community Affairs;
- Identification of IRWMP Components;
- Document of Baseline Conditions; and
- Water Forum Support.

The Phase 2 - IRWMP Development, was initiated in January 2006 and consisted of Work Elements that are shown in Figure 1-2.

1.5 RELATIONSHIP WITH LOCAL PLANS

This IRWMP builds upon the previous planning efforts and documents, and complements the other local water management and land use planning efforts in the Kings Region. The Forum documented existing Groundwater Management Plans (GWMP), Agricultural Water Management Plans (AWMP), Urban Water Management Plans (UWMP), city and county general plans, land use policies, water supply and wastewater treatment master plans, master plans for drainage, and other key documents related to local land use and water supply agency programs. Chapter 3, Baseline Conditions and Settings, describes the existing plans. The purpose for reviewing and evaluating these plans was to leverage the existing information; to define foundational actions and existing programs from which to build the IRWMP; and to define opportunities to integrate and meet the goals and objectives of these multiple plans.

The DWR is recommending that land use planning be one of the water management strategies included in an IRWMP. The Water Forum is seeking to integrate water supply and land use plans to better coordinate the related planning process. By state law, the responsibility for land

use planning is clearly assigned to the cities and counties. The Water Forum's Land Use and Water Supply Work Group conducted a review of the existing City and County General Plans. The Water Forum discussed the issues and opportunities at multiple meetings and conducted a special workshop with representatives from the city and county planning agencies.

A briefing was prepared to inform the Water Forum's discussions (WRIME, 2007a). The review of the prevailing land use plans specifically evaluated how each general plan recognizes regional water resources issues, incorporates water management strategies, and could be supported by the Upper Kings Basin IRWMP. The important policy "drivers" that provide a basis for integrating land use and water supply plans and the planning process were identified; in addition, the general plans were evaluated and specific observations and findings of the review were presented to Water Forum. These findings are discussed in more detail in Chapter 7, Water Management Strategies.

The Upper Kings Basin IRWMP seeks to be consistent with the existing city and county land use plans. State statutes also require that land and water supply plans be consistent and require that cities and counties assess the available supplies and report findings during the adoption of the plans or specific development proposals regarding the adequacy of the available supply.

The adopted city and county general plans were also used to evaluate historical land use, water demand and water supply conditions. The general plans provided information on the planned growth within the city sphere of influence and general plan areas. To be consistent with the prevailing land use plans, the future water demand scenarios for Upper Kings Basin IRWMP alternatives analysis were created using city and county growth projections and land use changes. The Upper Kings Basin IRWMP also used this local data along with other information to evaluate water supply alternatives and to take a region-wide look at the water budget and long-term, cumulative effects of proposed land use plans and water supply projects. The results were then reviewed from the perspective of Upper Kings Basin IRWMP water management strategies and regional goals and objectives.

It should be noted that the Upper Kings Basin IRWMP process will provide benefits to the cities in that their growth projections and long-term water needs were included in the technical information and analysis, and the results can be used to expedite and support future updates to the land use and general plans and project reviews (Figure 1-3). Since the region is facing significant growth and development pressure, it is also expected that the increase in urban water demands will increase water quality concerns. Water quality protection has been a large factor in the development of the IRWMP. Current and potential water quality protection programs were evaluated in light of the regional water management strategies.

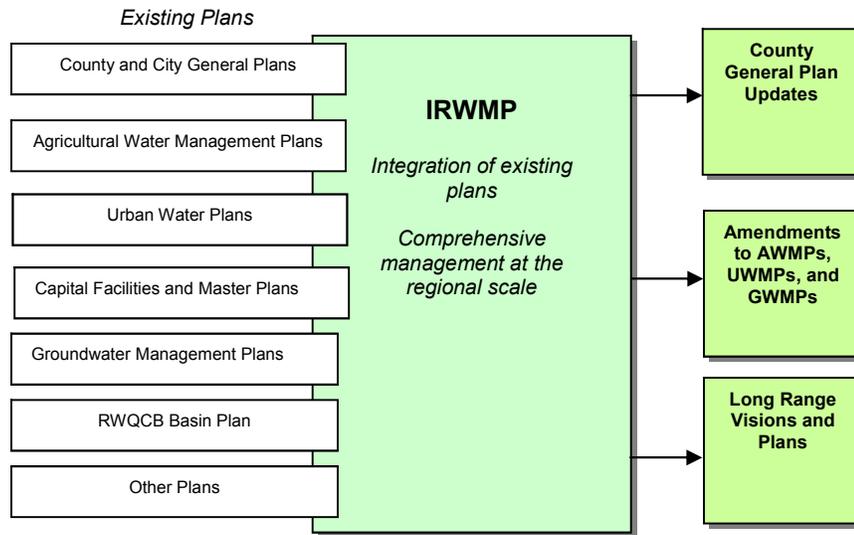


Figure 1-3. IRWMP Plan Integration Schematic

1.6 PLANNING HORIZON

The IRWMP planning horizon extends 25 years into the future, until 2030. This is consistent with the 25-year planning horizon of the UWMPs and many of the local general plans. In cases where the Upper Kings Basin IRWMP planning horizon extended beyond that of a general plan, the city's existing sphere of influence was used to forecast urban growth and population.

1.7 ANTICIPATED REGIONAL VS. LOCAL BENEFITS

Historically, local management of the groundwater basin was limited to independent operations by each overlying water agency and individual water users. If individual agencies and overlying groundwater users continue to act individually and seek to resolve groundwater overdraft from a strictly local perspective, it is likely that competition and conflict will increase, overdraft will continue, and there will be increased risk for water quality impairment, land subsidence, litigation, and higher pumping costs. In addition, a combination of small local projects may not be as cost effective as regional programs or larger projects with multiple participants. On the other hand, the anticipated key benefits of a regional approach are:

- Establishment of goals and policies for the most economical and best use of available water resources in the region;
- Effective management of overdraft in the Kings groundwater basin as a whole;
- Reduced potential for conflicting goals/projects among those who share the same river and the same groundwater basin;

- Improvement in local and regional water supply reliability;
- Improved protection from drought;
- Cost effectiveness of large regional projects as compared to multiple small local projects;
- Reduced costs of developing one regional plan versus individual agency plans;
- Reduced dependence on imported water;
- Increased operational flexibility of the water infrastructures in the region for common benefit;
- Reduction of potential for conflicts and litigation;
- Protection and improvement of groundwater quality;
- Shared development and use of same hydrologic model and analytical tools for project evaluation;
- Reduced cost of data collection, data sharing, and data management; and
- Increased chances for obtaining state/federal grant funds as a region rather than as a local agency.

It is anticipated that the proposed IRWMP will help preserve the agricultural economy while accommodating the planned urban growth. It can also be assumed that by working together, the region will achieve increased political influence and will be better able to leverage local funding with state and federal grants.

It should be noted that some projects may only provide local benefits and/or improvements may be needed to meet regulatory requirements within one jurisdiction only. The analysis conducted for the IRWMP will help local agencies and the Water Forum evaluate those projects with local benefits and those that provide regional benefits so that appropriate cost-sharing arrangements can be developed. The technical analysis associated with the Upper Kings Basin IRWMP development will provide valuable data and information to support local decision making by both the land use and water agencies.

1.8 ORGANIZATION OF THE REPORT

Chapter 1, *Introduction*, explains the Water Forum's vision for the Upper Kings Basin IRWMP, its purpose and need, and the anticipated regional benefits.

Chapter 2, *Description of the Kings Region and Water Forum*, provides information on the basis for selection of the Region and the appropriateness of the Region, as well as the Water Forum participants and organizations and how the Water Forum operated during preparation of the plan. This chapter further describes coordination and cooperation with local, state, and federal

agencies, the public outreach and community affairs efforts used to coordinate and engage the stakeholders, and the funding mechanism for the IRWMP.

Chapter 3, *Baseline Conditions and Planning Environment Setting*, describes the existing conditions in the Kings Region. The baseline conditions are defined by both the policy and the engineering environment. Together, these factors define the foundation from which to build the IRWMP. The institutional conditions are shaped by the existing organizations and management plans. The engineering environment is shaped by the physical setting (topography, hydrology, biological, etc.), the 'as-built' conditions, and existing physical facilities used to manage water resources. The social and cultural setting and disadvantaged communities are also described in this Chapter.

Chapter 4, *Water Resources Setting and Water Budget*, explains the historical water resources conditions; likely future conditions if no additional water management projects are implemented; and the results of the water budget analysis using the Kings IGSM. The nature and extent of the overdraft and description of how the groundwater basin operates are also provided in this Chapter.

Chapter 5, *Goals and Objectives*, describes the Water Forum process for identifying and prioritizing issues to be addressed in the IRWMP and the goals and objectives that were established to resolve the identified issues.

Chapter 6, *IRWMP Planning Framework*, describes the Water Forum Planning Framework and approach to aggregating and integrating the individual water management strategies recommended and required by the DWR. Once the Water Forum adopted the goals and objectives, the group then reviewed the specific water management strategies and established the planning framework to integrate strategies and projects. This chapter also contains discussion of the approach to resolving conflicts, the synergy among water management strategies, and the project ranking criteria use to prioritize projects.

Chapter 7, *Review of Water Management Strategies*, presents each of the water management strategies that the Water Forum considered, specifically discussing how they could be integrated and applied to the Kings Region, the constraints, and the findings of the Water Forum. Examples of where the water management strategies are currently being used in the Kings Region are also provided.

Chapter 8, *Projects*, provides a summary of the projects submitted by stakeholders, and includes the results of the projects screening and ranking process.

Chapter 9, *Integrated Strategies, Regional Priorities, and Implementation Plan*, describes how the projects were integrated to create the Regional Conjunctive Use Program (RCUP). RCUP

integrates the individual projects and actions into a coherent strategy that can be implemented by the Water Forum and stakeholders to meet the IRWMP goals and objectives. The Water Forum revisited the water management objectives established at the beginning of the project and defined Regional Basin Management Objectives that made the objectives established at the beginning of the process measurable. The Regional Basin Management Objectives will serve as performance measures to allow for monitoring of the IRWMP plan implementation and to ensure that the anticipated benefits are actually being delivered. Program Impacts and Benefits are also discussed and an integrated schedule and budget are presented. The chapter describes the CEQA compliance and permitting strategy and the relationship of the Upper Kings Basin IRWMP to other planning efforts and the IRWMPs in the San Joaquin and Tulare Basins.

Chapter 10, *Implementation Plan—Management Actions*, presents the technical and institutional elements of the IRWMP that are to be undertaken to implement the plan and ensure success. This includes defining the technical elements for measuring and monitoring progress, data management, reporting, and ongoing use and management of the Kings IGSM. Institutional elements include the approach for governance, finance, and community affairs.

Chapter 11, *References*, lists the documents cited in the Upper Kings Basin IRWMP. The reference chapter also lists the individual technical studies, which supported Water Forum decisions. Many of these studies help document the scientific and technical merit of the analysis approaches used in defining the projects as well as in developing the IRWMP.

1.9 GUIDE TO HOW THE IRWMP MEETS STATE STANDARDS

The State of California Water Code (CWC) 79562.5(b) specified standards for the Integrated Regional Water Management (IRWM) Plans. The compliance of the Upper Kings Basin IRWMP with those standards is presented in Table 1-1.

Table 1-1. Upper Kings Basin IRWMP and State IRWM Standards

Item from Minimum IRWM Plan Standards	Reference (Chapter, Section, Figure, Table #s of the IRWMP)
<i>Shown in Attachments 1 and 2.</i>	
<i>This evaluation will focus on whether the applicant has demonstrated that the IRWM Plan meets the minimum standards:</i>	
Will the IRWM Plan be adopted by all participating agencies or organizations by June 1, 2008?	
Does the Regional Agency or Regional Water Management Group include at least three local public agencies, two of which have statutory authority over water management?	1.1, 2.2.2
Was a map of the region showing the member agencies involved in the IRWM Plan and the location of the proposed implementation projects included?	Figs. 2-2, 8-1
Does the IRWM Plan include one or more regional objectives?	5.3.2
Does the IRWM Plan document that the following minimum water management strategies were considered: water supply reliability, groundwater management, water quality protection and improvement, water recycling, water conservation, storm water capture and management, flood management, recreation and public access, wetlands enhancement and creation, ecosystem restoration, and environmental and habitat protection and improvement?	6.1.1, Table 6-1
Does the IRWM Plan include the integration of at least two or more water management strategies or elements?	6.1.1, Table 6-1
Does the IRWM Plan include a project prioritization and a schedule for project implementation to meet regional needs?	Table 8-2 Fig. 9-6
Consistency with IRWM Plan Standards	
<i>Shown in Attachment 3.</i>	
<i>In addition to the pass/fail evaluation above, the IRWM Plan will be evaluated against the entire set of IRWM standards.</i>	
Adopted IRWM Plan and Proof of Formal Adoption	
<i>Scoring will be based on whether the IRWM Plan has been/will be adopted.</i>	
Did the applicant submit documentation of formal adoption of the IRWM Plan by August 1, 2007?	
Regional Description	
<i>Scoring will be based on whether the applicant has adequately described the IRWM Plan region, and whether the defined region is appropriate to the planning and implementation.</i>	
Was a map or maps, with accompanying descriptive narrative, showing the region encompassed by the IRWM Plan provided?	Figs. 1-1 to 3-3, 4-5
Did the map/maps include appropriate internal boundaries to the region,	Figs. 2-2 to 2-4;

Item from Minimum IRWM Plan Standards	Reference (Chapter, Section, Figure, Table #s of the IRWMP)
major water related infrastructure, and major land-use divisions within the region?	3-2; 4-5 Secs. 2.1, 2.2, 3.3
Did the IRWM Plan describe the current and future water resources of the region?	Ch. 4
Did the applicant explain why the region is an appropriate area for regional water management?	2.1.3
Did the applicant describe the quality and quantity of water resources within the region?	Quality 3.4, Quantity Ch. 4
Did the applicant describe water supplies and demand for a minimum 20-year planning horizon?	4.6
Were important ecological processes and environmental resources within the regional boundaries discussed?	3.5
Did the IRWM Plan discuss the social and cultural makeup of the regional community; identify important cultural or social values; and describe economic conditions and important trends within the region?	3.6, 3.7
Objectives	
<i>In addition to meeting the minimum standard for this criterion, scoring will be based on whether the applicant has adequately described appropriate IRWM Plan objectives.</i>	
Did the IRWM Plan identify regional planning objectives and the manner in which they were determined?	5.1, 5.3.3
Does the IRWM Plan address major water related objectives and conflicts in the region covered by the Plan?	5.2, 5.3.2
Water Management Strategies & Integration	
<i>In addition to meeting the minimum standard for this criterion, scoring will be based on how well the IRWM Plan integrates a wide range of water management strategies.</i>	
Did the IRWM Plan describe the range of water management strategies that were considered to meet the objectives of the plan?	6.1.1 Ch. 7
Was a brief discussion of why a water management strategy was not applicable provided?	6.1.1, 7.6
Did the applicant discuss how these strategies work together to provide reliable water supply, protect or improve water quality, and achieve other objectives?	6.1.1 Ch. 7
Was a discussion of the added benefits of integration of multiple water management strategies provided, as compared to stand alone alternatives?	6.1, 8.1
Regional Priorities	
<i>Scoring will be based on whether the IRWM Plan has adequately described the</i>	

Item from Minimum IRWM Plan Standards	Reference (Chapter, Section, Figure, Table #s of the IRWMP)
<i>priorities of the region.</i>	
Was a presentation of regional priorities for implementation provided?	7.7
Did the applicant identify short-term and long-term implementation priorities?	9.3.2
Does the IRWM Plan discuss how: 1) decision-making will be responsive to regional changes; 2) responses to implementation of projects will be assessed; and 3) project sequencing may be altered based on implementation responses?	9.3.3
Implementation	
<i>Scoring will be based on whether the IRWM Plan is implementable and implementation steps are well documented.</i>	
Does the IRWM Plan identify specific actions, projects, and studies, ongoing or planned, by which the Plan will be implemented?	Ch. 8, 9, 10
Did the IRWM Plan include timelines for active or planned projects?	Fig. 9-6
Did the applicant identify the entities responsible for project implementation?	8.2
Were the linkages or interdependence between projects clearly identified?	6.1, 8.6, Table 7-1
Was the economic and technical feasibility of projects demonstrated on a programmatic level?	8.7
Was the current status of each element of the IRWM Plan presented?	Tables 10-1 and 10-2
Was the institutional structure that will ensure plan implementation discussed?	Ch. 10
Impacts & Benefits	
<i>Scoring will be based on whether the IRWM Plan clearly and fully describes the impacts and regional benefits of the Plan.</i>	
Does the IRWM Plan include an evaluation of potential negative impacts within the region and in adjacent areas from its implementation?	9.8.3
Does the IRWM Plan include the advantages of the regional plan as opposed to individual local efforts?	1.7, 2.1.2
If applicable, does the IRWM Plan identify interregional benefits and impacts?	9.8.2
If applicable, did the applicant describe the benefits to disadvantaged communities?	6.4.1, 6.4.2
Was an evaluation of impacts/benefits to other resources provided?	9.8.3
Technical Analysis and Plan Performance	
<i>Scoring will be based on whether the IRWM Plan is based on sound scientific and technical analysis and includes measures to assess performance.</i>	
Did the IRWM Plan include a discussion of data, technical methods, and	Ch. 7

Item from Minimum IRWM Plan Standards	Reference (Chapter, Section, Figure, Table #s of the IRWMP)
analyses used in selection of water management strategies?	
Were data gaps identified?	See Kings IGSM Calibration Report, 10.1
Did the IRWM Plan discuss measures that will be used to evaluate project/plan performance, monitoring systems that will be used to gather performance data, and mechanisms to adapt project operation and plan implementation based on performance data collected?	10.1.1
Data Management	
<i>Scoring will be based on whether the IRWM Plan provides for management of data generated during plan development and implementation</i>	
Does the IRWM Plan include mechanisms by which data will be managed and disseminated to stakeholders and the public?	10.1.2
Was a discussion of how data collection will support statewide data needs provided?	10.1.2
Did the IRWM Plan assess the state of existing monitoring efforts, both for water supply and water quality?	Quality 3.4 Supply 3.2.10
If applicable, did the IRWM Plan discuss the integration of data into the State Water Board's Surface Water Ambient Monitoring and Groundwater Ambient Monitoring Assessment Programs?	10.1.2
Financing	
<i>Scoring will be based on whether the IRWM Plan describes a feasible program of financing for implementation of projects.</i>	
Did the IRWM Plan identify beneficiaries and identify potential funding/financing for plan implementation?	10.2.1
Does the IRWM Plan discuss ongoing support and financing for operation and maintenance of implemented projects?	10.2.1
Relation to Local Planning	
<i>Scoring will be based on whether the IRWM Plan is well coordinated with local planning and management efforts.</i>	
Did the IRWM Plan discuss how the identified actions, projects, or studies relate to planning documents established by local agencies?	1.5, 3.2, 7.4, 9.3.5
Does the IRWM Plan demonstrate coordination with local land-use planning decision-makers?	2.2.3, 7.4, 9.3.5
Did the IRWM Plan discuss how local agency planning documents relate to the IRWM water management strategies and the dynamics between the two levels of planning documents?	1.5, 2.2.3, 3.2.11, 7.4, 9.3.5
Stakeholder Involvement & Coordination	
<i>Scoring will be based on whether development and implementation of the IRWM Plan includes stakeholder involvement through a collaborative regional process</i>	

Item from Minimum IRWM Plan Standards	Reference (Chapter, Section, Figure, Table #s of the IRWMP)
Does the IRWM Plan identify stakeholders and the process used for inclusion of stakeholders in development of the plan?	2.2.6
Does the process include a discussion of how:	
■ Stakeholders are identified,	2.2.6
■ They participate in planning and implementation efforts, and	2.2.6
■ They can influence decisions made regarding water management?	2.2.6
Did the IRWM Plan document public outreach activities specific to individual stakeholder groups?	2.2
Does the IRWM Plan include a discussion of mechanisms and processes that have been or will be used to facilitate stakeholder involvement and communication during plan implementation?	10.2.3
Are partnerships developed during the planning process discussed?	2.1.2
Did the application discuss environmental justice concerns?	5.2.9
Did the application discuss disadvantaged communities within the region and their involvement in the planning process?	3.7
Were any possible obstacles to IRWM Plan implementation identified?	10.2.2, Ch. 7
Was coordination with State or federal agencies discussed?	2.2.5, 3.1.5
Did the IRWM Plan identify areas where a State agency or agencies may be able to assist in communication or cooperation, or implementation of plan components or processes, or identify any state or federal regulatory actions required for implementation?	3.1.5, 3.2.8, 7.5.3
Disadvantaged Communities – Environmental Justice	
<i>Shown in Attachment 4.</i>	
<i>Scoring will be based on the degree that disadvantaged communities will benefit from the proposed project(s).</i>	
Did the Plan identify the disadvantaged communities in the Region?	Fig. 3-9
Did the Plan discuss the specific critical water-related needs of disadvantaged communities?	8.3, 9.5
Did the Plan discuss the mechanisms used in development of the Plan to ensure participation of disadvantaged communities?	8.3
Did the Plan identify the water-related Environmental Justice concerns for the Region?	5.2.9, 9.5, 9.9
Did the Plan discuss the mechanisms used in development of the Plan to ensure that implementation of the Plan addresses Environmental Justice concerns?	9.9

This chapter briefly reviews the approach used to define the Kings Region. It also describes the Water Forum participants, organization and operations, and public outreach and community affairs effort.

2.1 DESCRIPTION OF THE REGION

The following topics are discussed in this section:

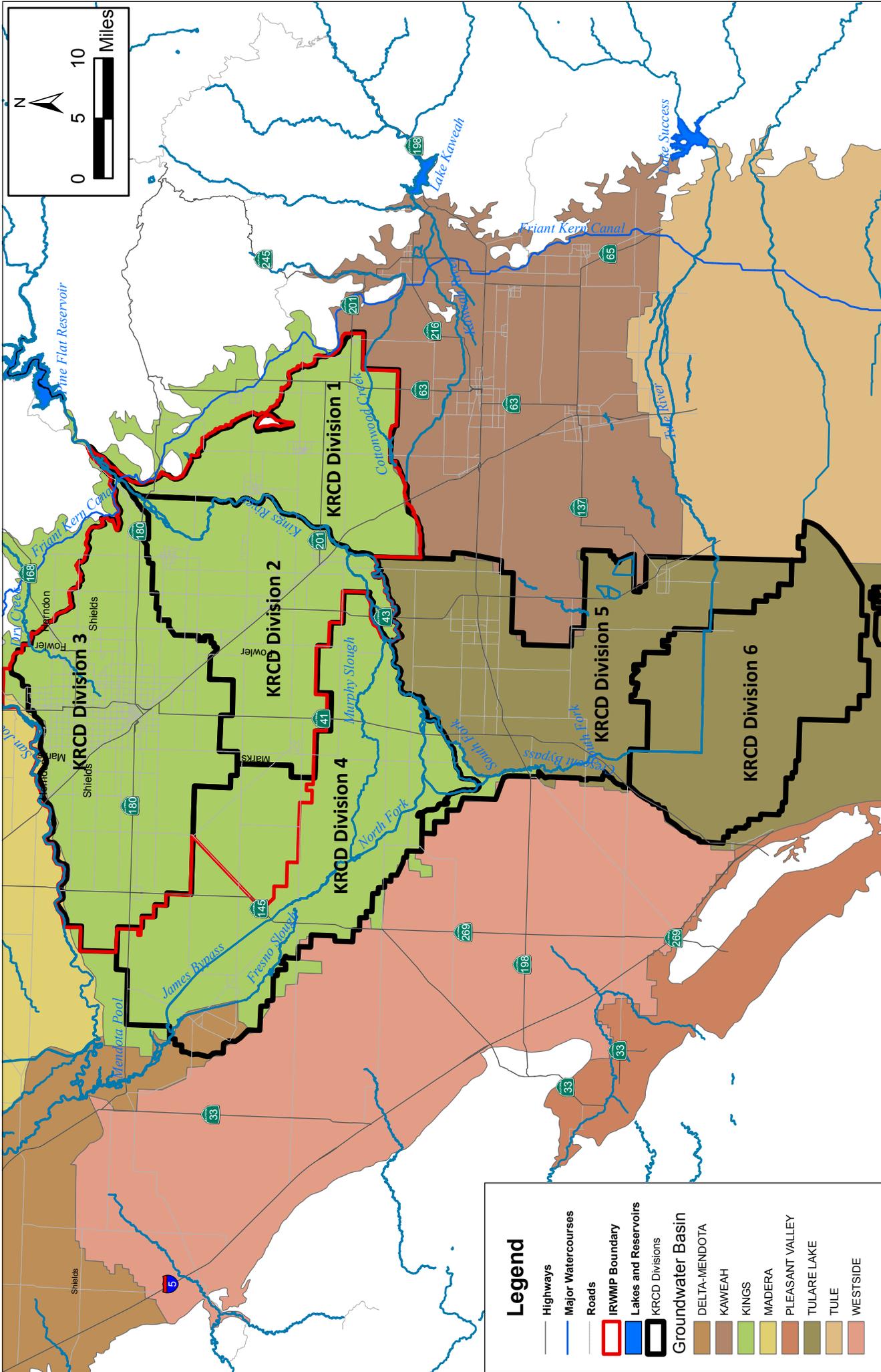
- Definition of the region and internal boundaries;
- Basis for the region's boundaries;
- Appropriateness of the region for water management; and
- Map of the region showing agencies involved in the plan, including the location of implementation projects.

2.1.1 DEFINITION OF THE REGION AND INTERNAL BOUNDARIES

The IRWMP Region is well defined, as shown in Figure 2-1, which also shows the Kings Groundwater Basin and KRCD Divisions. KRCD is the largest regional agency in the area and consists of six divisions. Divisions 1, 2, 3, and 4 overlie the Kings Basin. Divisions 1, 2, and 3, referred to as the Upper Kings Basin, contain all of AID, CID, and FID, respectively. KRCD Division 4 includes the majority of the area referred to as the Lower Kings Basin and contains several water agencies and private canal companies and stakeholders. The Raisin City Water District (RCWD) is in Division 4 and is a member of the Water Forum. The KRCD Divisions 5 and 6 are outside of the IRWMP region and, therefore, are not described here.

The IRWMP Region consists of the geographic areas under the jurisdiction of the Water Forum members and includes the majority of the Kings Groundwater Basin as defined by DWR Bulletin 118 Update 2003 (DWR, 2003a). The total land area of the IRWMP Region is 610,000 acres with an irrigated land area of about 480,000 acres.

The Upper Kings Basin IRWMP Region also includes regional and smaller local water agencies. The boundaries of the water and irrigation districts are shown in Figure 2-2. The IRWMP Region spans over parts of three counties: Fresno, Kings, and Tulare. The county boundaries and the cities within the IRWMP Region are shown in Figure 2-3. The urban spheres of influence and current city boundaries are important because the water districts and urban



Legend

- Highways
- Major Watercourses
- Roads
- IRWMP Boundary
- Lakes and Reservoirs
- KRCD Divisions
- Groundwater Basin
- DELTA-MENDOTA
- KAWEAH
- KINGS
- MADERA
- PLEASANT VALLEY
- TULARE LAKE
- TULE
- WESTSIDE

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IRWMP Region Including KRCD Divisions and Groundwater Basin Boundaries

Figure 2-1

Upper Kings Basin IRWMP



entities need to work together to ensure compatibility and consistency between the prevailing land use and water supply plans for the area.

The Kings River Water Association (KRWA) includes 28 member districts and ditch companies with water rights to the Kings River. The KRWA boundaries are shown in Figure 2-4 in relation to the Upper Kings Basin IRWMP Region. The boundaries of KRWA are important because they define the water rights permitted place-of-use for Kings River water.

2.1.2 BASIS FOR REGION'S BOUNDARIES

The Upper Kings Basin IRWMP Region is developed on the basis of following considerations:

1. Physical and hydrological conditions;
2. Groundwater basin boundaries;
3. Jurisdictional authorities;
4. Ongoing regional partnerships; and
5. Potential for achieving more benefits by operating as a region.

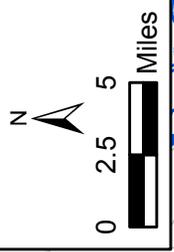
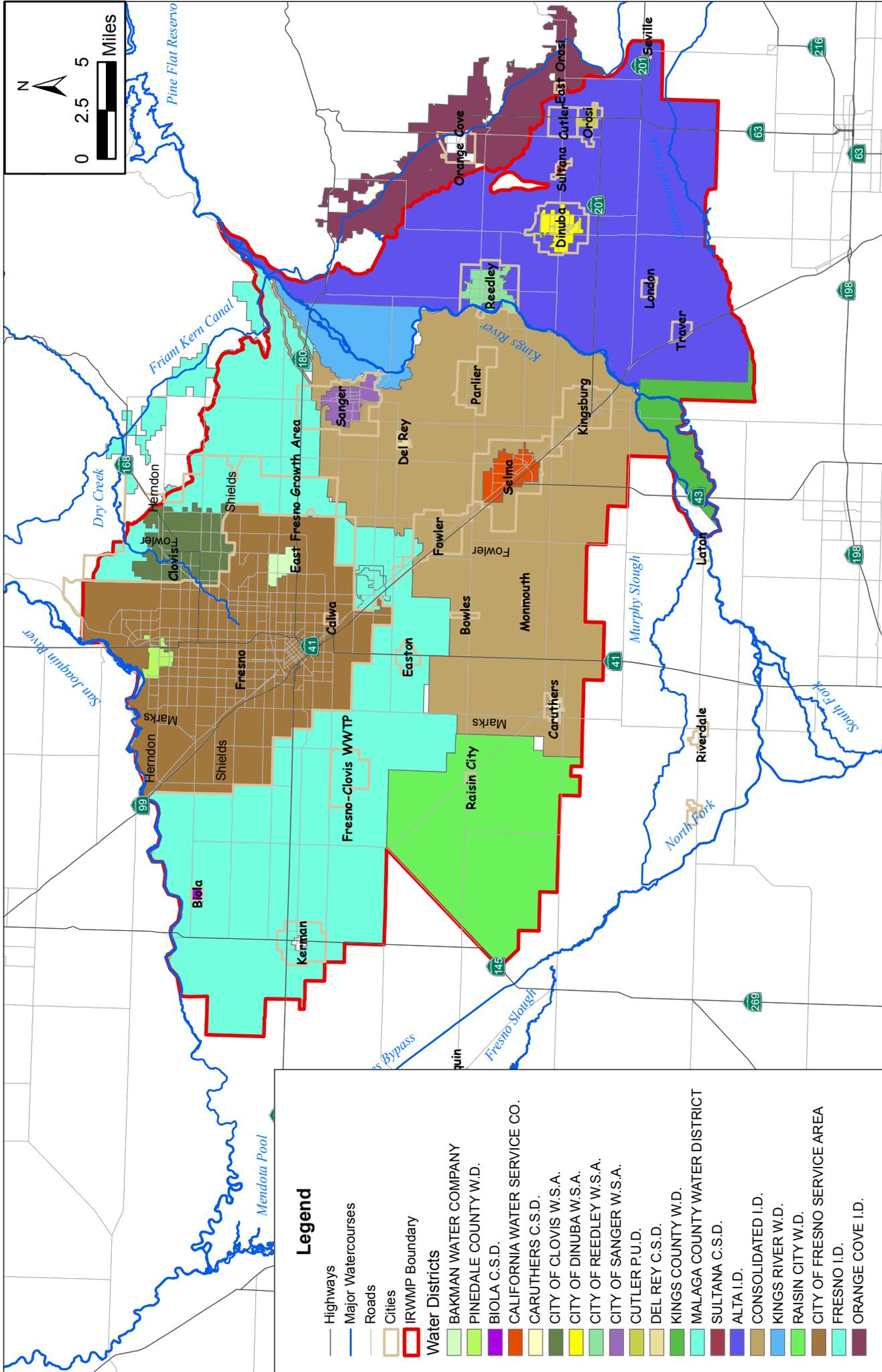
These factors are briefly described below.

Physical and Hydrological Conditions

The physical hydrography of the area is a natural basis for defining the IRWMP Region. The Kings River is the major source of surface water in Kings Basin. The region is reliant on surface water supplies derived primarily from the Kings River. Pine Flat Reservoir regulates the flow on the Kings River and provides storage, flood control, and recreational benefits. The Kings River is a natural river along much of its upper reaches, while its lower reaches have been extensively re-channeled and include many weirs, diversion structures, and levees.

The San Joaquin River defines the northern boundary of the IRWMP Region. It is a source of both surface water supply and groundwater recharge in the Kings Basin. The City of Fresno has water entitlements from the Central Valley Project (CVP) Friant Unit and diverts San Joaquin River water into the area via the Friant-Kern Canal. Some CVP flood water is also utilized intermittently by the City of Fresno and other irrigation districts.

An extensive network of canals is used to deliver water to agricultural lands and to existing groundwater recharge facilities. Although the weirs, diversion structures, canals, and recharge facilities are managed by different local and regional water agencies, they are all part of a single interconnected physical and hydrologic system. As a result, the defined IRWMP Region has a sound physical and hydrologic basis.



Legend	
—	Highways
—	Major Watercourses
—	Roads
□	Cities
□	IRWMP Boundary
Water Districts	
□	BAKMAN WATER COMPANY
□	PINEDALE COUNTY W.D.
□	BIOLA C.S.D.
□	CALIFORNIA WATER SERVICE CO.
□	CARUTHERS C.S.D.
□	CITY OF CLOVIS W.S.A.
□	CITY OF DINUBA W.S.A.
□	CITY OF REEDLEY W.S.A.
□	CITY OF SANGER W.S.A.
□	CUTLER P.U.D.
□	DEL REY C.S.D.
□	KINGS COUNTY W.D.
□	MALAGA COUNTY WATER DISTRICT
□	SULTANA C.S.D.
□	ALTA I.D.
□	CONSOLIDATED I.D.
□	KINGS RIVER W.D.
□	RAISIN CITY W.D.
□	CITY OF FRESNO SERVICE AREA
□	FRESNO I.D.
□	ORANGE COVE I.D.

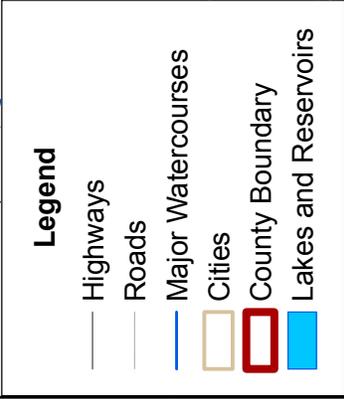
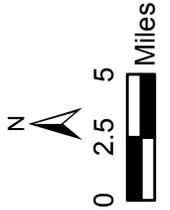
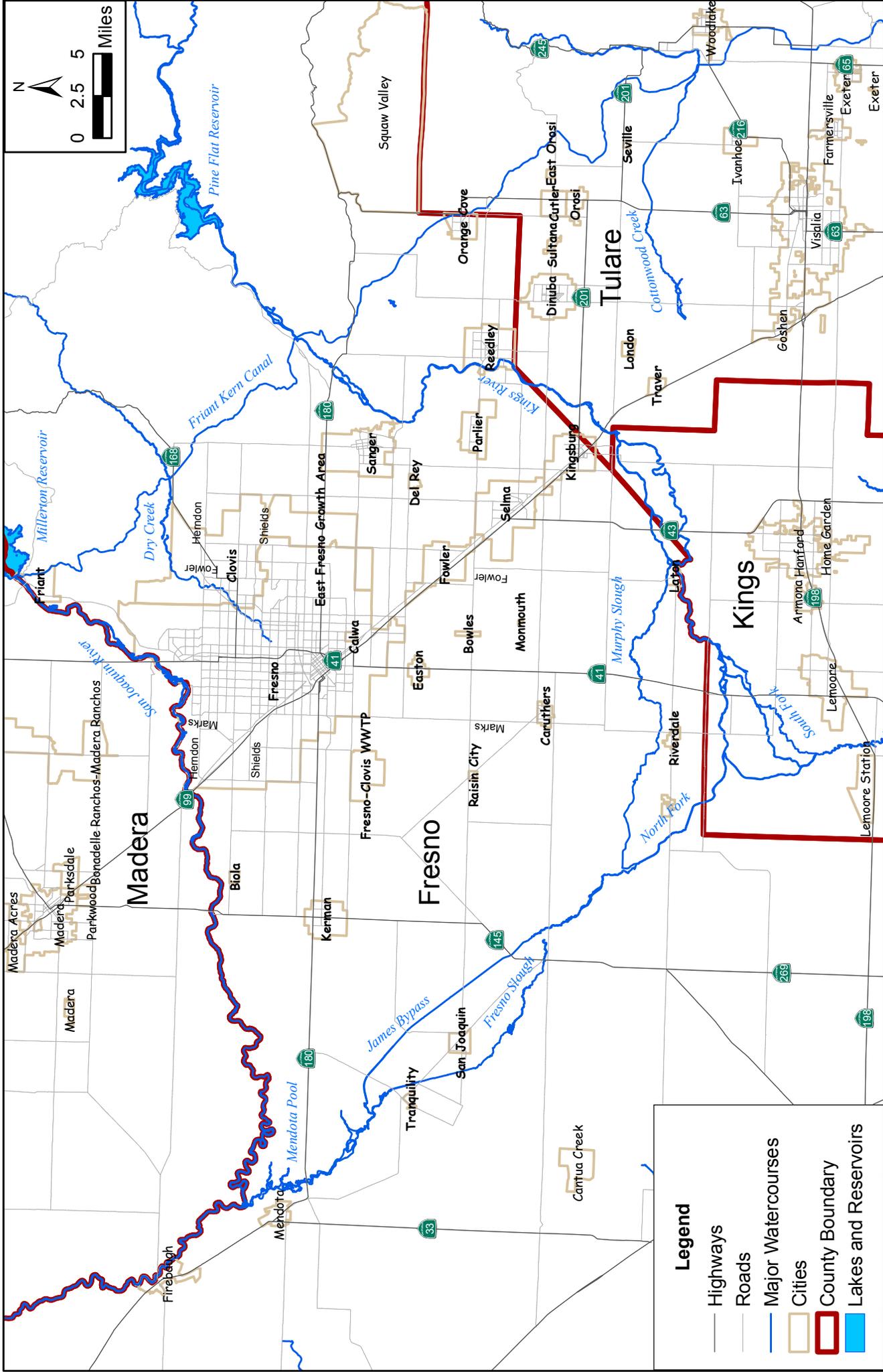
Water Agencies

Upper Kings Basin IRWMP

June 2007

Figure 2-2





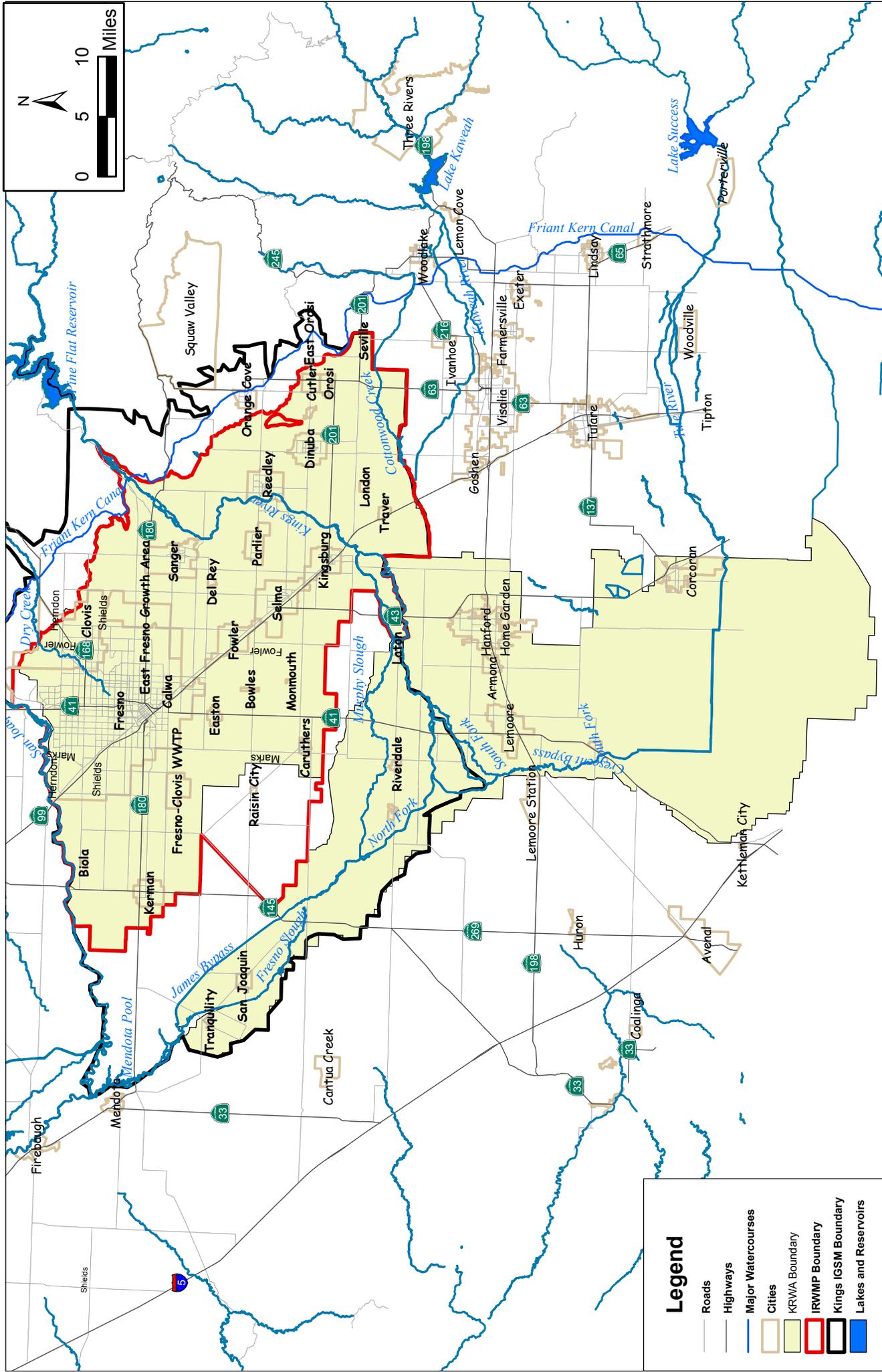
June 2007

County and Urban Areas

Figure 2-3

Upper Kings Basin IRWMP





KRWA Boundary

Upper Kings Basin IRWMP

June 2007

Figure 2-4

Legend

- Roads
- Highways
- Major Watercourses
- Cities
- KRWA Boundary
- IRWMP Boundary
- Kings IGSM Boundary
- Lakes and Reservoirs



Groundwater Basin Boundaries

The Kings Basin is a large groundwater basin located in the southern part of the San Joaquin Valley groundwater basin in the Central Valley of California. The groundwater basin boundary as defined in the DWR Bulletin 118 was shown previously in Figure 2-1. The groundwater basin covers an area of 1,530 square miles. DWR estimated that the groundwater storage for the entire Kings Basin is about 93 million acre-feet (AF) to a depth of more than 1,000 feet (DWR Bulletin 118, 2003). The Upper Kings Basin, consisting of AID, CID, and FID, accounts for a large percentage of the groundwater pumping in the region. The Upper Kings Basin has a total groundwater storage capacity of 35 million AF to an average depth of about 500 feet (KRCD, 1993). The groundwater storage in the Lower Kings Basin is estimated to be about 44 million AF to an average depth of about 1,000 feet (WRIME, 2005b).

There are many land owners and multiple local and regional water agencies and irrigation districts that overlie the Kings Groundwater Basin. This means that the actions of a groundwater user or an overlying land owner may have an effect on all the other water users. The San Joaquin and Kings Rivers are hydraulically connected with the underlying groundwater basin and are major sources of recharge.

The current IRWMP Region, as defined above, includes the majority of the Kings Groundwater Basin. As a result, the integrated hydrologic model for the Upper Kings Basin IRWMP will be developed to encompass the entire groundwater basin. This will facilitate the evaluation of IRWMP projects with potential benefits to the entire groundwater basin. It will also help to resolve issues and to identify and mitigate any potential negative effects from localized pumping, local projects, or regional facilities.

The Kings groundwater basin has an extensive monitoring network. The KRCD obtains water levels from about 1,100 wells in the region based on monitoring records from 19 local agencies. This extensive data will be used in the IRWMP plan development and associate technical analysis, including modeling.

Jurisdictional Authorities

The success of an IRWMP depends on the participation of those agencies that have jurisdictional authority to implement the plan. Therefore, jurisdictional authority is used as an important basis for defining the boundary of the IRWMP Region. Both land use and water supply authorities are needed to effectively develop and implement the plan and, as such, the Water Forum includes representatives from the overlying counties, incorporated cities, and the water districts and agencies. Figure 2-2, presented earlier, showed the water and irrigation

districts in the IRWMP Region. These districts include the majority of agricultural water users (water districts or ditch companies) with rights and entitlements to the Kings River. These water districts also represent most of the groundwater users of the Kings Basin.

The IRWMP Region includes Divisions 1, 2, and 3 of KRCD, as previously shown in Figure 2-1. KRCD is a political subdivision of the state created by the California Legislature with the passage of the Kings River Conservation District Act in 1951. The principal reason for the formation of KRCD was the need for one overall public agency to act on behalf of the entire Kings River service area to:

- Safeguard local water rights;
- Negotiate and contract with the United States for the use of and storage space in Pine Flat Reservoir for irrigation purposes; and
- To plan, finance, construct, and operate hydroelectric power plants on the Kings River.

Raisin City Water District, a member agency within KRCD Division 4, is part of the IRWMP Region; but other local agencies in Division 4 have opted not to join the Water Forum at this time. However, it can reasonably be expected that some of these local water agencies will join the Water Forum at a later date to share the regional benefits of the IRWMP.

KRWA, a member of the Water Forum, is a private association of the major water rights holders on the Kings River and serves as the water master to administer water rights and entitlements. KRWA also manages conservation storage in the Pine Flat Dam, located approximately 10 miles to the east of the Kings groundwater basin in the Sierra Foothills.

Ongoing Regional Partnerships

The Upper Kings Basin IRWMP Region is defined with full recognition to the need for supporting and leveraging ongoing regional partnerships. In 2001, the KRCD, AID, CID, and FID signed a MOU with the DWR to coordinate data collection, field pilot studies, and water resources planning activities. The proposed IRWMP is synergistic with this MOU partnership due to common elements of planning. The IRWMP Region is larger than the region encompassed by this MOU partnership and includes other agencies within the physical and hydrological boundaries of the Kings Basin.

KRWA and KRCD, two key agencies involved with the IRWMP effort, are participating in the Southern San Joaquin Valley Water Quality Coalition (SSJWQC), which was established in 2002. This partnership will facilitate the evaluation and analysis of both data and policy matters on water quality issues for the purposes of IRWMP development.

Stakeholders in the Lower Kings Basin have recently completed the public review draft of the Lower Kings Basin Groundwater Management Plan (WRIME, 2005a). This GWMP integrates six previously prepared GWMPs to better reflect the hydrogeologic and management conditions in the area. A stakeholder-driven process, coordinated through a Lower Kings Basin Advisory Panel and consisting of water district and ditch company representatives, provided oversight to plan development. There are other existing and more localized cooperative efforts within the Lower Kings Basin, such as the McMullin Group and the North Fork Group (NFG). KRCD is supporting these groups and will coordinate the IRWMP effort with these groups as needed. The Lower Kings Basin agencies and interests are also invited to join the Water Forum and the IRWMP effort.

Potential for Achieving More Benefits by Operating as a Region

A key criterion for defining the IRWMP Region is the potential to achieve greater benefits by operating as a region. As mentioned before, the management of the water resources in the Kings Basin has been locally driven by overlying water agencies and individual water users. However, an overdraft problem in an expansive and interconnected groundwater basin cannot be effectively managed by local measures and actions taken individually by overlying users. In addition, a comprehensive exploration of water resources management alternatives requires an integrated look at the entire watershed and groundwater basin beyond the jurisdictional boundaries of any single local agency. Since the defined IRWMP Region is hydrologically and physically interconnected, it is logical to conclude that there are multiple opportunities for achieving greater benefits by operating as a region. The anticipated regional benefits were presented above in the Anticipated Regional vs. Local Benefits section.

2.1.3 APPROPRIATENESS OF THE IRWMP REGION FOR WATER MANAGEMENT

The region defined for the Upper Kings Basin IRWMP is appropriate for integrated water resources management because of the following reasons:

- It is a large area served by multiple local agencies and stakeholders who share the same river and same groundwater resources;
- The key water management drivers are the same or very similar throughout the region; these drivers include, but not limited to, water rights, land use, development pressure, socio-economic and cultural makeup, groundwater overdraft, water quality problems, and regional goals;
- Because of size and diversity of the proposed region, all required components of the integrated water management strategies (CWC §§ 79562.5 and 79564) can be considered in the IRWMP;

- It includes the major water rights holders on the Kings River as willing partners in the process;
- It encompasses a large portion of the productive agricultural area of the Kings Basin groundwater basin, which is under severe overdraft condition;
- It includes the cities which are facing development pressure and growth;
- It includes all the major irrigation districts (AID, CID, and FID) and local agencies, who own and operate water facilities in the entire Kings Basin;
- The cooperative planning in the region will help reduce conflict between water users or resolve water rights disputes, an identified State priority;
- The region will be analyzed as a single hydrologic region with well-defined hydrologic boundaries for development of water budgets and analysis of project impacts; and
- The regions water resources are already being actively managed by two regional entities – the KRCD and KRWA. As a result, integrated regional planning would be appropriate for optimizing the water resources across the region.

2.2 WATER FORUM PARTICIPANTS AND ORGANIZATION

This Section describes the water and land use agencies that were involved in the Water Forum and briefly discusses their statutory authorities. The participation of the groups was authorized by the governing bodies of the corresponding organizations. The roles and responsibilities of the regional agency, regional water management group, and land use agencies are discussed along with how the Water Forum operated and was organized.

2.2.1 REGIONAL WATER MANAGEMENT AGENCY

KRCD was created by the state legislature pursuant to the Kings River Conservation District Act and has regional authority and responsibilities consistent with the IRWMP goals for groundwater management, flood control, water quality preservation, environmental stewardship, and public information. The KRCD Act gives the agency the appropriate legal authority to serve as the regional water management entity, so KRCD prepared and submitted the grant applications and entered into contract with the state on behalf of the Water Forum and Kings Region. KRCD's jurisdiction encompasses an area greater than the jurisdictional boundaries of any one local public agency in the region.

At the January 2005 Upper Kings Water Forum meeting, KRCD was chosen as the regional entity to be responsible for the development of the IRWMP in close coordination with the Forum. KRCD was also chosen to prepare and submit both the Planning Grant and

Implementation Grant Applications under Proposition 50 and coordinate the implementation of the IRWMP.

KRCD has a “Policy Statement Governing Joint Development of Groundwater Recharge Facilities” that was adopted in 1991, updated in 1993, and used to guide how KRCD supports conjunctive use and groundwater recharge. KRCD also initiated the MOU with DWR that produced the initial assessment of the groundwater basin and conjunctive use potential and that resulted in a number of important studies (WRIME, 2002a, 2002b; 2003a, 2003b).

2.2.2 WATER DISTRICTS AND WATER MANAGEMENT AGENCIES

Pursuant to the Proposition 50 Chapter 8 IRWMP Grant Application Guidelines (DWR, 2004), the Water Forum includes KRCD and four legislatively defined special irrigation: AID, CID, FID, and RCWD. Each of the districts has specific powers and authorities, governance, electoral processes, funding mechanisms, and programs for its jurisdiction and is briefly described below. All these agencies have authority for managing and developing water supplies in their respective areas. AID, CID, and FID each have extensive water rights on the Kings River and have been actively operating conjunctive use projects in their respective jurisdictional areas over the past decades. The RCWD does not have water rights on the Kings River or facilities to take delivery or distribute water and is reliant on groundwater to meet all demands.

Water districts and municipal water service providers located in the IRWMP area are shown in Figure 2-3. While there is no single groundwater management authority in the Kings Basin, groundwater management is practiced through conjunctive use programs implemented by individual districts or groups of districts in the basin.

Alta Irrigation District (AID)

AID was formed under the Wright Act, passed in 1887, and is one of the oldest irrigation districts in the state. AID provides surface water from the Kings River to farms in its 129,000-acre service area through a series of unlined canals. AID diverts water at Cobbles Weir into canals that transport water into a system that serves the area from Reedley to west of Orange Cove in eastern Fresno County, as well as serving the Dinuba, Orosi, and Traver areas of northern Tulare County. AID has 100,000 AF of storage in Pine Flat and 19,275 AF of storage in the other upstream reservoirs. In addition to providing surface water to meet irrigation demands, AID uses flood flows from the Kings River to recharge the groundwater basin. No estimate of the amount of water recharged through the basins is available. AID estimates it gets 45,600 AF of incidental recharge annually along its 360 miles of unlined irrigation delivery canals. AID has long recognized the significance of groundwater resources to the area and has been monitoring the water levels for the past 80 years. In August 1994, AID adopted an

AB 3030 Groundwater Management Plan and will be updating the plan to meet revised state requirements.

Consolidated Irrigation District (CID)

CID was organized on September 8, 1921, in accordance with the Irrigation District Law of the State of California Water Code. CID diverts water at the Gould and Fresno Weirs to provide surface water from the Kings River to farms within the service area of approximately 145,000 acres using a series of unlined canals. CID has 119,000 AF of storage in Pine Flat and another 22,937 AF in other upstream storage facilities. CID has been monitoring groundwater levels since the 1920s. The current groundwater monitoring program consists of about 80 wells spaced on a 2-mile grid throughout the district. In July 1995, the CID adopted an AB 3030 Groundwater Management Plan.

Fresno Irrigation District (FID)

FID was organized in 1920 as the successor to the privately owned Fresno Canal and Land Company in accordance with the Irrigation District Law of the State of California Water Code. FID has a service area of approximately 245,000 acres and diverts Kings River water from the Fresno Weir into the 680-mile canal and pipeline distribution system for both agricultural and municipal water uses. FID has rights to store 120,000 AF in Pine Flat reservoir and an additional 23,130 AF of storage in upstream reservoirs. This storage and Kings River water are used by FID to deliver an average annual supply of approximately 500,000 AF. FID obtains most of its surface water supplies from the Kings River but also has a contract with the United States Bureau of Reclamation (Reclamation) for 75,000 AF of Class 2 water from the Friant Division of the CVP. In addition to its own Reclamation contract, FID has contractual agreements with the City of Fresno to take delivery of the City's 60,000 AF of Class 1 water and deliver it to Leaky Acres recharge basins and other basins for groundwater recharge. FID updated its GWMP in 2005.

Raisin City Water District

The RCWD covers an area of approximately 49,400 acres and is primarily an agricultural area; it also includes the community of Raisin City. The RCWD is outside of the KRWA area and does not have surface water entitlement from the Kings River or water from the San Joaquin River. The RCWD is solely dependant on groundwater, pumped by individual growers, as the source of irrigation water.

2.2.3 LAND USE PLANNING AGENCIES — INCORPORATED CITIES AND UNINCORPORATED COMMUNITIES

The IRWMP Region overlaps parts of Fresno, Tulare, and Kings Counties. The incorporated cities, unincorporated communities, and county boundaries in the Kings Region are shown in Figure 2-3. City and County representatives from the planning or public works agencies actively participated in the Water Forum. These representatives provide a conduit to the elected bodies during the planning process. They also supported collection of important data and information and provided critical guidance during the planning process.

Integration of the prevailing land use with water supply plans and of the land use with the water planning process is an important strategy for the Upper Kings Basin IRWMP. Under California law, the management of land use is the responsibility of local government. City and county general plans and the associated goals, policies, objectives and programs define land use planning requirements for each jurisdiction. By law, general plans guide land use decisions at the city and county level and, by their very nature, are comprehensive and integrated across the full spectrum of land, water, and natural resources management elements. The breadth of the general plans may result in less detailed or comprehensive review of regional water issues. The city and county general plans and the land use planning process are mechanisms for local governments to integrate land use and water supply decisions and meet the goals of the cities, counties, and the Upper Kings Basin IRWMP.

For the development of the IRWMP, the city and county information was critical for characterizing the historical and existing conditions in the Kings Region (WRIME, 2006c); documenting demand and supply conditions (WRIME, 2006b); formulating the assumptions for the future without project land use and water supply conditions (WRIME, 2006c); and developing and evaluating the project elements. The IRWMP planning process included necessary care to use data from the city and county land use agencies to help ensure consistency between the IRWMP and land use plans, and thus minimize the potential for conflicts between the plans.

The cities and county agencies were consulted to obtain critical planning information, including general plans, sphere of influence maps, population forecasts, and urban water management plans, capital facility plans, and related documents. Available information was obtained and used. In addition, the Fresno and Tulare County Local Agency Formation Commissions were contacted for key data and to coordinate with the Municipal Service Review process when possible in order to avoid placing redundant burdens on the cities and special districts in the Kings Region.

In October 2006, Upper Kings Basin Water Forum Briefing Booklet was prepared and circulated to the land use and water agency boards and elected bodies. This booklet also included Agreements in Principle that were adopted by each of the participating land use jurisdictions and water agencies in the fall and early winter of 2006. The Agreements in Principle helped guide program and project development effort.

DWR is recommending that land use planning be one of the water management strategies that should be included in an IRWMP. A review of the existing city and county general plans was conducted and a briefing was prepared (WRIME, 2007a) to support discussion by the Land Use and Water Supply Work Group and the full Water Forum. The purpose of this memorandum was to document the review of City and County General Plan goals, objectives, policies, and programs. The review specifically evaluated how each general plan recognizes regional water resources issues; incorporates water management strategies; and how achievement of these goals could be supported by the IRWMP being developed by the Water Forum. The technical memorandum identifies the policy “drivers” that provide a basis for integrating land use and water supply plans and planning process.

2.2.4 FORUM OPERATIONS AND ORGANIZATION

A Planning and Steering Committee (PSC) was formed with representatives from the KRCD, AID, CID, FID, Fresno County, and designated city and county representatives. The City of Dinuba represented disadvantaged communities. The role of the PSC was to coordinate the Water Forum and provide direct oversight to IRWMP development. The PSC ensured that the input from the Water Forum was used appropriately to guide and direct the Upper Kings Basin IRWMP development process. Four work groups were also formed to focus on specific work tasks or issues. These work groups and roles included the:

- Technical Analysis and Data Work Group: coordinate development of the data and technical analysis approach, evaluate modeling program strategy, assist in capture of interagency and interdisciplinary data, and provide input to the model development and analysis.
- Outreach and Community Affairs Work Group: develop and implement the Outreach and Community Affairs plan and coordinate the public outreach efforts.
- Financing and Economics Work Group: review project costs, financing strategy, cost sharing, and impact and benefits analysis.
- Plan and Project Inventory Work Group: coordinate identification, discussion, and analysis of water management strategies, develop program ranking criteria, identify potential or proposed projects, support inventory of plans, policies and other programs that will influence the IRWMP development and implementation.

During the process a number of ad hoc work groups were formed to focus on specific tasks or activities. The work groups and responsibilities included:

- Land Use and Water Supply Work Group: evaluate existing general plans and policy language and coordinate development of a strategy in this area. This group also sponsored a specific workshop on this subject that involved planners from all of the cities in the area.
- Public Infrastructure Work Group: solicit participation from city public works staff, and county service areas or districts to review the water quality baseline report (WRIME, 2007a), develop a water quality infrastructure position and strategy for the IRWMP, and identify drinking water and wastewater treatment facility needs.
- Environmental Stakeholders Work Group: identify environmental enhancement projects and develop design requirements for recharge facilities that would provide environmental benefits.

DWR provided funding for facilitation services of the Center for Collaborative Policy (CCP), which has been instrumental in organizing and coordinating the Water Forum during its formation and development of the initial IRWMP strategy and throughout the planning process.

2.2.5 COORDINATION AND COOPERATION WITH LOCAL, STATE, AND FEDERAL AGENCIES

The IRWMP development process provides for coordination and cooperation with the relevant local, state, and federal agencies in relevant plan components through the Water Forum. As mentioned before, the participation in the Water Forum is open to all. In addition to the representatives from local entities, the representatives from other state and regional agencies attended the Water Forum meetings.. The California Department of Fish and Game (CDFG) and Regional Water Quality Control Board (RWQCB) provided input and guidance to Water Forum.

KRCD is the lead for coordinating interagency technical input through the Technical Analysis and Data Work Group. Specific groups or committees of the various work groups have been and will continue to be engaged during the IRWMP implementation. For example, local and regional experts with knowledge of hydrogeology and geology participated in the development of the conceptual hydrogeology and calibration of the Kings IGSM. In addition, CDFG and local environmental organizations have worked to develop the fishery management plan for the lower Kings River and guidelines, which influenced the design of recharge basins. It is expected that this group will continue to provide input and identify areas of special biological significance, coordinate resources agency input, and identify opportunities for coordinating input during environmental review and development of additional water management strategies that incorporate environmental benefits and habitat considerations.

2.2.6 PUBLIC OUTREACH AND COMMUNITY AFFAIRS

The Water Forum was open to all stakeholders of the Kings Basin during the development of the Upper Kings Basin IRWMP and stakeholder involvement has been an important component of the success of the IRWMP. The Water Forum process started in 2004 and included sending open invitation to local water and land use agencies, regional agencies, cities, counties, and environmental groups to join the Water Forum. Through out the planning process, the local, state, and federal resource and regulatory agencies, landowners, and the public were invited to Water Forum meetings in order to be inclusive and obtain a wide range of perspectives. The agencies and public have been provided the opportunity to review, address, comment upon, and to provide input to the process.

In 2005, with the support of the Education and Community Affairs Work Group, the Public Outreach and Community Affairs Strategy (KRCD, 2005b) was prepared to outline the stakeholder coordination process (Appendix A). The Upper Kings Basin IRWMP, along with the Public Outreach and Community Affairs Strategy, are living documents to be coordinated by the Water Forum with support to be provided by KRCD.

The following goals were developed for the communications strategy:

1. Brand the Water Forum as a regional entity addressing water reliability and quality and agricultural, urban and natural resource needs.
2. Educate the public about the region's water resources issues.
3. Promote an IRWMP to gain support for water management strategies being considered by the Water Forum.
4. Mobilize the electorate to vote on projects that improve regional water reliability and quality.

It was necessary to transform the strategic objectives for public outreach into message that could be conveyed through appropriate tools and media. The messages were crafted in terms laypersons would understand and conveyed the nature and extent of the overdraft, defined the role for the Water Forum, and communicated the purpose of the IRWMP. It was planned that the Water Forum's public outreach effort would utilize a combined approach of community relations and mixed media to reach the target audiences. The tools identified included:

- Stakeholder Meetings;
- Speakers' Bureau;
- Community Relations;
- Editorial and Media Relations;
- Long Format Video;
- Website; and

- Printed Materials.

During the first two and a half years of implementing the outreach effort several of the tools identified were used. Most of the efforts made were geared toward decision-making audiences to assist the Water Forum with the adoption of resolutions and to provide support for funding requests.

In total, the Water Forum met 14 times with attendance ranging from 16 to 25 persons. Forum members informed the respective elected bodies at regularly noticed public meetings as incremental progress was made during development of the IRWMP. Special efforts were made in working to adopt the Principles-of-Agreement in support of the IRWMP. The general managers of each of the water districts attended meetings of the other stakeholder decision making bodies to explain the need and purpose for the IRWMP and Principles-of-Agreement.

In accordance with the Outreach and Community Affairs Plan, numerous special meetings or workshops were conducted, and a host of work group or subcommittee meetings were used to address specific topics. The following is a summary of other stakeholder and community affairs activities conducted.

Stakeholder Meetings

Numerous stakeholder meetings were conducted with elected and governmental officials along with group meetings with representatives from agricultural, urban and environmental representatives as summarized:

- Sub-Committees (total of 46 meetings, average number of attendees ranged from 4-30):
 - Planning and Steering Committee (15 meetings);
 - Technical Analysis and Data Work Group (9 meetings);
 - Water District General Managers Committee (10 meetings);
 - Environmental Stakeholders Work Group (3 meetings);
 - Land Use and Water Supply Committee (5 meetings); and
 - Education Committee (4 meetings).
- Workshops: total of 5 workshops with approximately 100 attendees:
 - Public Works Workshop on Water Quality and Infrastructure;
 - Planners Workshop to Review General Plans and Integrate Land Use and Water Supply Planning; and
 - Public Meetings (1 each in AID, CID, and FID service areas to orient the public and local decision makers).

Speaker's Bureaus

Presentations were made to governing boards, environmental groups and rotaries as a total of 25 presentations were made.

Community Relations

Local newsletters were utilized to inform and educate residents, businesses, and elected officials about Water Forum activities. The following is a summary of those articles:

- KRCD News, Winter 2006/2007 Issue – “Water Forum Looking For Grant Funding”; and
- KRCD News, Fall 2006 Issue – “Upper Kings Basin Water Forum Progresses With Regional Planning For Projects”.

KRCD's newsletter is mailed to over 8,500 residents within KRCD's service area.

Editorial and Media Relations

Key reporters for local papers were periodically updated about Water Forum activities resulting in several stories in the Fresno Bee.

- The Fresno Bee, Local & State section, *Group touts 4 water projects*;
- The Fresno Bee, Local & State section, *Fresno Co. may catalog water supply* (Benjamin, 2005b);
- The Fresno Bee, Local & State section, *Agencies to tap sources for water* (Benjamin, 2005a); and
- The Fresno Bee: Local & State section, *Group takes regional course (Upper Kings Water Forum is formed.)* (Pollock, 2004).

Printed Materials

Printed materials were developed to support educational efforts. Approximately 1,000 educational materials were distributed during speaker's bureaus and workshops and other events.

- Nov. 2005 – Hydrologic Modeling of the Kings Groundwater Basin / A White Paper (14-page book);
- Aug. 2006 – Upper Kings Basin Water Forum and the Upper Kings Integrated Water Management Plan (2-page overview);

- Oct. 2006 – Position Statement/Principles: Integrated Water Quality and Sustainable Infrastructure Program for Clean and Safe Water (6-page document); and
- Nov. 2006 – Upper Kings Basin Water Forum – Briefing Booklet (40-page book).

The community relations and public outreach strategy will be updated with the completion and adoption of the Upper Kings Basin IRWMP. Additional message points will be developed to assist in communicating the key issues identified in the IRWMP and role of the Water Forum in regional solutions.

In addition, those tasks identified in the Water Forum's communications strategy for the latter part of 2007 and for 2008 and 2009 will be modified to focus on immediate and long-term goals including the formation of a Joint Powers Authority (JPA) as the governance structure for the Water Forum. An increased focus on educating the general public will be given in summer of 2007 to take advantage of the heightened awareness by residents of local water supplies due to the drought conditions that the region is currently experiencing.

2.2.7 FUNDING FOR DEVELOPMENT OF THE IRWMP

The Water Forum recognizes that all of the stakeholders have valid interests in ensuring that there is sufficient clean, reliable water in the IRWMP Region so it has taken the initiative to keep all of these groups working together to solve the interrelated water and land use and environmental issues, regardless of whether they were able to financially support the planning effort.

Local match funding for the Proposition 50 IRWM Planning Grant Application was authorized by the governing bodies of many of the participants and resolutions of commitment were approved in the SPRING/FALL/SUMMER of 2005. Water Forum *partners* were defined as the stakeholders who have matched state funding with local funding. *Participants* represent stakeholder interests but have not been able to provide funding.

KRCD has provided both direct and in-kind financial support throughout the planning process. This included coordination of the numerous contracts and agreements, conduct of specific technical analysis, Geographic Information System (GIS) services, meeting coordination, and public outreach and communications.

DWR has provided funding through the Propositions 50 Planning Grant program. Additional DWR technical support was provided through the MOU between the DWR Conjunctive Water Management Branch and the original Basin Advisory Panel. In addition, through a separate contract between DWR and KRCD, the development of the Kings IGSM was funded. DWR also provided the facilitation services to the Water Forum.

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The purpose of this chapter is to document baseline conditions. The information in this chapter was used to help the Water Forum understand the existing conditions; and to define and prioritize issues, current projects, and programs; and to lay a solid foundation to begin developing integrated solutions.

The baseline conditions are defined by the unique policy, engineering, and natural environments found in the Kings Region. The institutional conditions are shaped by the existing organizations and management plans. The engineering environment is shaped by the existing the 'as- built' conditions and physical facilities used to manage local resources. The natural environment and physical setting (topography, hydrology, biology, etc.) pose both great opportunities and potential constraints and have a great influence on both the policy and engineering environments.

This chapter summarizes the information from more detailed and comprehensive reports that were prepared to support and inform Water Forum deliberations, including:

- Baseline Conditions Technical Memorandum (WRIME, 2006c);
- Environmental Baseline Conditions (KRCD, 2006b);
- Water Quality Baseline Conditions (WRIME, 2007c);
- Analysis of Water Demands in the Kings Basin (WRIME, 2006a); and
- Analysis of Water Supplies in the Kings Basin (WRIME, 2006b).

This chapter, along with the water budget information in Chapter 4, provides a snapshot of the current water management environment and a benchmark from which to compare future water management conditions. The environmental baseline report was also used to help project planners avoid, minimize, or mitigate any potential impacts during project planning and design.

The institutional baseline is presented in two sections: 1) existing organizations and 2) plans, policies, programs, and agreements. The first section describes the local, regional, state, and federal organizations that are involved with or have an influence on development of the IRWMP. The subsequent section describes the programs, projects, policies, and regulations affecting the IRWMP. These sections are followed by a description of the engineered environment and water management facilities and the environmental setting.

Activities under this task included review of city and water district capital facilities plans and engineering data on current water supply facilities (storage, diversion, and distribution), flood control facilities, recharge and extraction facilities, drinking water treatment plants, wastewater treatment plants, and reclamation and flood control facilities. Data collected under this subtask were organized into a GIS to the degree that available source data were in compatible electronic formats.

3.1 ORGANIZATIONS

This section describes the local, regional, state, and federal organizations participating in the Upper Kings Basin IRWMP or which may have an influence on the development and implementation of the plan. As discussed previously, both the water and land use agencies are participating in the Upper Kings Basin IRWMP in recognition of the critical relationship between the uses of water and land. The Kings Region's groundwater and surface water management is accomplished by public and private water agencies, districts, and utility companies. Land use decisions are made by the various city councils and the county boards of supervisors, while water use decisions are made by the independent water boards.

The success of the Upper Kings Basin IRWMP depends on the participation of those agencies that have jurisdictional authority to implement the plan. Local, regional, state, and federal agencies that have relationships and potential roles in developing the IRWMP are listed in Table 3-1, which also compares the agencies' roles to the water management strategies recommended by DWR.

3.1.1 WATER DISTRICTS/SPECIAL DISTRICTS

General and special districts are the two major types of water districts. General districts like AID, CID, and FID are formed under specific sections of the state code that define the procedures, powers, authorities, and other characteristics of the district. Special districts like KRCD or the Fresno Metropolitan Flood Control District (FMFCD) are formed by special acts of the legislature creating the districts and prescribing their powers. In addition, there are many types of districts formed, such as public utility districts and community services districts, to provide unique or specialized services to local land owners. Each of the districts has specific powers and authorities, governance, electoral processes, funding mechanisms, and programs for its jurisdiction. Water districts, private ditch companies, and municipal water service providers located in and around the IRWMP area are shown in Figure 2-2.

As previously described, AID, CID, and FID all have designated powers and authorities for managing and developing water supplies in their respective areas and have extensive water

Table 3-1. Agencies and Roles in Relation to DWR Water Management Strategies

Organization	Roles Related to DWR Water Management Strategies ¹																											
	Agricultural lands stewardship	Agricultural water use efficiency	Conveyance (canals)	Drinking water treatment and distribution	Economic incentives (Loans, Grants, and Pricing)	Ecosystem restoration	Floodplain management	Groundwater storage. Conjunctive Use	Groundwater remediation	Aquifer remediation	Matching water quality to water use	Pollution prevention	Precipitation enhancement	Recharge areas protection	Recycled municipal water	Surface storage--regional/local	System re-operation	Urban land use management	Urban runoff management	Urban water use efficiency	Water-dependent recreation	Watershed management	Water transfers	Wastewater treatment	Permit Requirements			
Other Regional																												
Selma Kingsburg Fowler Regional Sanitary District																												
State																												
Department of Water Resources																												
Regional Water Quality Control Board																												
State Water Resources Control Board																												
Department of Fish and Game																												
Department of Health Services																												
Department of Food and Agriculture																												
Department of Pesticide Regulation																												
Department of Toxics Substances Control																												
Federal																												
Corps of Engineers																												
Bureau of Reclamation																												
Fish and Wildlife Service, NOAA Fisheries																												
Environmental Protection Agency																												
Department of Agriculture, NRCS																												

¹. DWR Water Management Strategies as defined in the California Water Plan Update 2005 . Strategies not applicable to the IRWMP Region include Desalination and Surface storage-CALFED,

rights on the Kings River, and all have been actively operating conjunctive use projects in their respective jurisdictions. KRCD boundaries overlap with those of AID, CID, and FID, and KRCD has served as the regional agency for purposes of the IRWMP.

Mid-Valley Water Authority

The Mid-Valley Water Authority (MVWA) is a Joint Powers Authority that was created to secure a supplemental water supply and to support the construction of a conveyance facility for the delivery of supplemental water to the MVWA service area; KRCD is the lead agency. The MVWA was formed in 1982 with 30 public agencies, though currently the MVWA has 20 agencies and has become relatively inactive. The service area extends from Merced County in the north to the southern boundary of the Arvin-Edison Water Storage District (AEWSD), and includes approximately 3.4 million acres. The MVWA completed the San Joaquin Valley Conveyance Investigation in cooperation with Reclamation. The Reclamation Reform Act and the Central Valley Project Improvement Act (CVPIA) have precluded the MVWA from obtaining a water supply from the CVP and stalled further development of the proposed conveyance and delivery facilities. Currently, there are no active plans or projects for the MVWA.

Community Services Districts, Public Utility Districts, and County Service Areas

Community Services Districts (CSD) are formed by a county to provide water, sewer, or other public services to unincorporated communities and they are usually managed by county public works departments. Public Utilities Districts (PUD) are formed under specific provisions of state code and have their own boards of directors. There are a number of small County Service Areas (CSA) within the IRWMP region that provide water or sewer service. The county Local Agency Formation Commission (LAFCO) keeps track of the various special districts within the county, maintains maps of the service area, and approves any boundary changes. Table 3-2 lists CSDs and PUDs found in the IRWMP Region, also indicating the counties in which they are located. Figure 2-2, presented previously, showed the current service area boundaries for the CSDs or PUDs. The county LAFCOs also maintain maps of the districts and smaller CSA boundaries. All of the listed districts provide both water and wastewater treatment services. Many of the CSDs and PUDs provide service to small areas with limited tax bases and many of the areas served are rural and can be defined as disadvantaged communities.

Table 3-2. Community Service Districts and Public Utility Districts in the IRWMP Area

County	Service Provider	Population (2000)
Fresno	Biola CSD	1,037
Fresno	Caruthers CSD	2,103
Tulare	Cutler PUD	4,491
Fresno	Del Rey CSD	950
Tulare	East Orosi CSD	426
Fresno	Laton CSD	1,236
Tulare	Orosi PUD	7,318
Tulare	Seville Zone of Benefit	360
Tulare	Sultana CSD	507

In the Fresno County part of the IRWMP Region, water service is also provided by CSAs 5, 10, 14, and 42. These are very small service areas with a limited number of connections. These water purveyors have a wide range of needs that are further discussed in the disadvantaged community sections. Many of the small public water agencies do not have management or technical capacity and are constrained by limited funding.

Fresno Metropolitan Flood Control District

The FMFCD provides flood control and urban storm water services for streams in the Fresno stream group in a 400-square mile watershed located between the Kings and San Joaquin Rivers. It is a special district with jurisdictional authorities defined by the California Water Code. The FMFCD manages the local drainage and regional flood control programs in and surrounding the Fresno-Clovis area and its programs are closely integrated and coordinated with FID and the Cities of Fresno and Clovis to provide efficient, comprehensive services. Capital facilities, such as pipeline and basins, are funded through local development ordinances. The FMFCD is authorized to collect property taxes within its service area.

The FMFCD Services Plan guides district actions and serves as a good example of an integrated program (FMFCD, 2004). The Services Plan provides detailed description of the goals, programs, facilities, regulations, agreements, and implementation plans for each of the major program areas. The FMFCD Services Plan and the pending capital facilities plan are foundational actions for the Upper Kings Basin IRWMP.

The major program areas include flood control, rural streams, local storm water drainage, storm water quality management, water conservation, recreation, and wildlife management. The FMFCD program is unique in that it uses a multipurpose, multi-objective approach and most

retention pond facilities are designed for flood control, groundwater recharge, and recreational purposes.

FMFCD facilities provide water supply and water quality benefits by capturing an average of 90% of all urban runoff. This is accomplished through a cooperative groundwater recharge program in partnership with the Cities of Fresno and Clovis, Fresno County, and FID. The FMFCD participates in the land use and development review process to ensure that design requirements are met; to make recommendations regarding new development; and to help the land use agencies prevent flood loss and damage to rural streams, private property, and district facilities. The Service Plan seeks to be consistent with the general plans of the city and county land use agencies, and incorporates the key general plan elements of the City and County of Fresno and the City of Clovis. The Service Plan documents the various interrelated elements of the three prevailing general plans. GIS coverages of FMFCD facilities were obtained and added to the IRWMP GIS.

Selma-Kingsburg-Fowler County Sanitation District

The Selma-Kingsburg-Fowler County Sanitation District (SKFCSD) provides wastewater treatment services to the Cities of Selma, Kingsburg, and Fowler, as well as to the unincorporated areas along the corridor between the cities. The SKFCSD is a public agency, which was formed in February 1971 by the Fresno County Board of Supervisors through authority granted in the County Sanitation Districts Act and the State of California Health and Safety Code. The purpose of this special district is to provide for the collection, treatment, and disposal of wastewater emanating from the residential, commercial, institutional, and industrial dischargers within the service area. The SKFCSD is in the process of updating its capital facilities plan, which will also be a foundational action of the Upper Kings Basin IRWMP.

3.1.2 RESOURCE CONSERVATION DISTRICTS

Resource Conservation Districts (RCDs) are established locally under the provisions of Division 9 to the Public Resource Code and the rules of the LAFCO of each county. RCDs have close ties to county governments, but have their own locally appointed, independent boards and are not county government entities. RCDs are grass roots organizations that undertake projects for soil and water conservation, wildlife habitat enhancement and restoration, watershed restoration, conservation planning, and education. RCDs are usually supported by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service). RCDs have become more active in the past 10 years with increased emphasis on watershed planning and water quality protection. There are two RCDs that are active in the IRWMP Region: the Navelencia Resource Conservation District and the

Tulare County Resource Conservation District. No specific comprehensive watershed plans, projects, or programs have been identified that would serve as a foundational action for the IRWMP.

3.1.3 WATER ASSOCIATIONS

Water associations are private groups, which work together to represent the interests of their members. KRWA, the Friant Water Authority, and the SSJVWQC are three associations in the IRWMP area.

Kings River Water Association

The history of water management on the Kings River is marked by numerous disputes over water rights. These disputes eventually led to the formation of the KRWA as a way to solve disputes and to coordinate water management along the river. Under a series of complex agreements and water schedules documented in the “Blue Book,” KRWA serves as the water master to manage the Kings River flow and the conserved storage in Pine Flat Reservoir. KRWA is comprised of 28 member agencies that have contracts for the 1,006,000 AF of conserved storage in Pine Flat Reservoir. Figure 2-4 shows the boundaries of KRWA that are within and surrounding the IRWMP Region.

The boundaries of KRWA define the Place-of-Use for the Kings River water rights held by KRWA in trust for the individual members. The Place-of-Use must be defined in the water rights permits issued by the California State Water Resources Control Board (SWRCB). The areas outside of the KRWA boundaries do not have

surface water rights to the Kings River and are reliant solely on groundwater. Under KRWA policies, surface water can be transferred between KRWA members within the adopted KRWA

KRWA Members

- Alta Irrigation District*
- Burrel Ditch Company
- Clark’s Fork Reclamation District #2069
- Consolidated Irrigation District*
- Corcoran Irrigation District
- Crescent Canal Company
- Empire West Side Irrigation District
- Fresno Irrigation District*
- James Irrigation District
- John Heinlen Mutual Water Company
- Kings River Water District
- Laguna Irrigation District
- Last Chance Water Ditch Company
- Lemoore Canal Company
- Liberty Canal Company
- Liberty Mill Race Company
- Lovelace Water Corporation
- Peoples Ditch Company
- Reed Ditch Company
- Riverdale Irrigation District
- Southeast Lake Water Company
- Stinson Canal and Irrigation Company
- Stratford Irrigation District
- Tranquility Irrigation District
- Tulare Lake Basin Water Storage District
- Tulare Lake Canal Company
- Tulare Lake Reclamation District #761
- Upper San Jose Water Company

*Water Forum Members

Place-of-Use. Through KRWA, members pay for irrigation storage benefits on the Pine Flat Dam and for retirement of the bonds and obligations to the federal government.

Friant Water Authority and CVP Contractors in the IRWMP Region

The Friant Water Authority represents the entities from the Friant Unit of the CVP that house federal water contracts with Reclamation. The Friant Unit includes Millerton Lake, the Madera Canal, Friant-Kern Canal, and associated facilities. The Friant-Kern Canal crosses the IRWMP Region and is operated and maintained by the Friant Water Authority. The DMC ends at Mendota Pool, just north and west of the IRWMP Region, and provides water to federal contractors in this area. The CVP Contractors in the IRWMP area are shown in Table 3-3.

Table 3-3. CVP Contractors in IRWMP Area

Contractor	Contract Date	Duration	Type	Entitlement (AF)	Use
Fresno Irrigation District	January 2001	25 years	Class 2	75,000	M&I and Irrigation
Garfield Water District	January 2001	25 years	Class 1	3,500	Irrigation
International Water District	January 2001	25 years	Class 1	1,200	M&I and Irrigation
Orange Cove Irrigation District	January 2001	25 years	Class 1	39,200	M&I and Irrigation
City of Orange Cove	January 2001	25 years	Class 1	1,400	M&I
City of Fresno	August 2005	40 years	Class 1	60,000	M&I
Fresno County Waterworks District #18	January 2001	25 years	Class 1	150	M&I
Tranquility Irrigation District	February 2005	25 years	Project Water	13,800	M&I and Irrigation
Tranquility Public Utility District	February 2005	25 years	Project Water	70	M&I and Irrigation
James Irrigation District	February 2005	25 years	Project Water	35,300	M&I and Irrigation
Coelho Family Trust	February 2005	25 years	Project Water	2,080	M&I and Irrigation

The Friant Unit provides two classes of water service. *Class 1 water* is the most dependable supply and would normally be available in-whole or in-part for delivery each year. Class 1 water is typically contracted to districts that serve areas with limited or no access to groundwater of acceptable quality. *Class 2 water* is that supply in excess of Class 1 that is only periodically available for delivery. Because of uncertainty regarding availability and time of occurrence, Class 2 water is not as dependable as Class 1. Class 2 water is typically under contract to districts with access to good groundwater supplies or other surface water sources.

These districts can accept recurring CVP deficiencies and rely primarily on their other sources of supply.

The Friant Water Authority is a key player in the plan to restore the San Joaquin River. This plan is under development but would be a foundational action of the IRWMP.

FID is the only CVP contractor in Fresno County that has a Class 2 contract entitlement. The City of Fresno has a Class 1 contract, which is unusual for a large urban center. This represents a secure source of supply, which is very important to the Fresno-Clovis Metropolitan Area. Some of the CVP contractors in Fresno County receive their surface water through Friant Unit facilities under the provisions of an exchange contract involving the Cross Valley Canal.

Southern San Joaquin Valley Water Quality Coalition

KRWA and KRCD are participating in the SSJWQC, which was established in 2002 to deal with water quality issues and concerns affecting the Kings River area and the Tulare Lake Basin. Some of the pending water quality issues identified by the SSJWQC are:

- Expiration of the agricultural waiver exemption for water discharge requirements;
- The State and Regional Water Quality Control Boards' 303(d) list of impaired waterways to be used to calculate Total Maximum Daily Load (TMDL) under the Clean Water Act; and
- The Regional Board's triennial review of the San Joaquin and Sacramento River Basin Plan, including examination of TMDL and water quality issues.

The SSJWQC participating agencies believe that they will be better served approaching these and other water quality issues using a regional approach rather than individually. The implementation of the water quality monitoring and protection program is a foundational action for the IRWMP.

Groundwater Planning and Project Development Groups

Two other local groups, the McMullin Group and NFG, are active in the Lower Kings Basin just to the west of the IRWMP Region. Both are local stakeholder groups cooperating on groundwater projects and on obtaining grants and loans. The NFG has an MOU with DWR for conjunctive use projects. KRCD is working to support both groups in identifying capital facilities and programs that would provide regional benefit.

3.1.4 LAND USE PLANNING AGENCIES — INCORPORATED CITIES AND UNINCORPORATED COMMUNITIES

The incorporated cities, unincorporated communities, and county boundaries were shown in Figure 2-3. The IRWMP Region overlaps parts of Fresno, Tulare, and Kings Counties. The legal authority for the various city and county actions and programs is derived from two essential powers of local government: corporate and police powers. Using their corporate power, local governments collect money through bonds, fees, assessments, and taxes and spend it to provide services and facilities, such as police and fire protection, streets, water systems, sewage disposal facilities, drainage facilities, and parks. Using their police power, local governments regulate the use of private property through zoning, subdivision, and building regulations in order “to promote the health, safety, and welfare of the public.” City and county general plans provide the formal framework for the exercise of these powers by local officials, for guiding land use decisions over a specified planning horizon, and for making assumptions about the future for planning purposes. A city defines its planned growth over a specific planning horizon in the city’s general plan. The city’s defined growth area and Sphere of Influence (SOI) are important for forecasting future land use conversions from agricultural to urban uses and are used to determine future water requirements.

Local Agency Formation Commission

Fresno, Kings, and Tulare Counties’ LAFCOs are responsible for overseeing the formation and boundary changes (jurisdictional areas) of cities and special districts. Proposals for reorganization or annexation are subject to review by the appropriate county’s LAFCO under the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000 (CKHA) (CGC §56000). *Annexation* is the inclusion, attachment, or addition of territory to a city or district (CGC §56017) and can involve detachments from other special districts. The process is also referred to as *reorganization*. LAFCOs have numerous powers under the CKHA, but those of primary concern are the powers to act on local agency boundary changes and to adopt SOIs for local agencies and special districts.

For the IRWMP, the city and county general plan land use diagrams and LAFCO-approved SOIs provide the basis for calculation and evaluation of potential future water demands. A consolidated map of the SOIs in the IRWMP Region is presented in Figure 3-1, which shows the proposed and accepted future city boundaries at build-out. For unincorporated areas, the SOI for the water service provider is shown. The SOI is established for the specific planning horizon as defined by the prevailing general plans for cities or as currently recognized for water districts that are the purveyors to the unincorporated community. Prior to updating an SOI, state law

requires a LAFCO to approve a Municipal Service Review (MSR) for public services provided within the SOI.

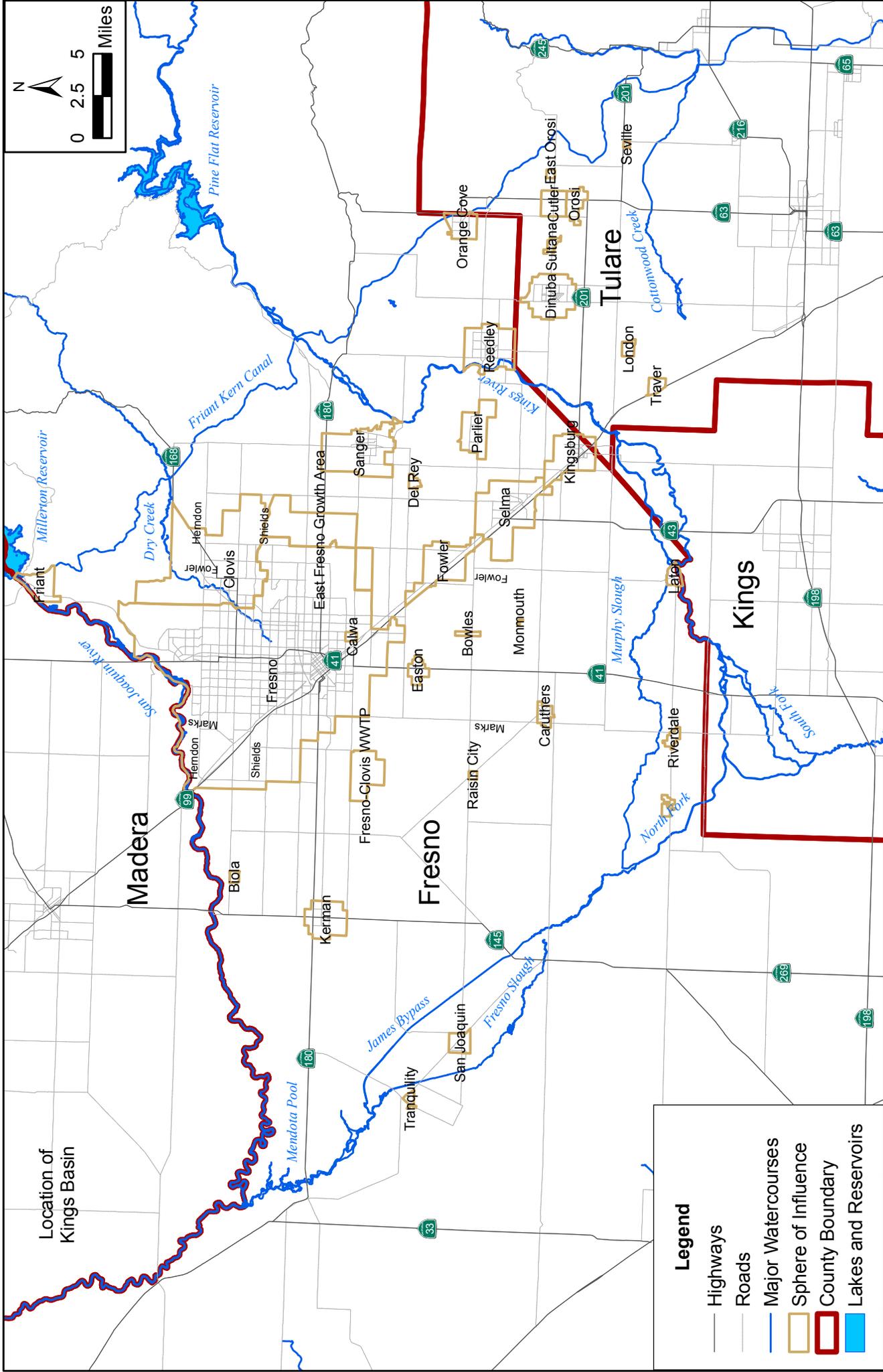
3.1.5 STATE AND FEDERAL AGENCIES

The DWR IRWMP Standards state that an IRWMP needs to identify state or federal agencies involved with strategies, actions, and projects; areas where a state agency or other agencies may be able to assist in funding, communication, cooperation, or implementation of IRWMP components or processes; or where state or federal regulatory decisions and approvals are required for implementation. A number of state and federal agencies are currently involved in various aspects of water management in the IRWMP Region and surrounding areas. This section discussed the state agencies and their potential influence on the IRWMP development and implementation. The state and federal agencies have a wide range of jurisdictional authority and responsibilities assigned by law that can help or influence the IRWMP.

State and federal agency participation was sought early in the process. The complexity of the regulatory compliance and permitting process is one of the ways the Water Forum ranked and evaluated IRWMP projects. The state and agency authority is often exercised only during review of environmental documents prepared pursuant to the California Environmental Quality Act (CEQA) or the National Environmental Policy Act (NEPA) or when considering issuance of a permit. This usually occurs late in the planning process and can result in schedule delays, unanticipated mitigation costs, and conflicts. This early consultation and involvement of the resources agencies during IRWMP project planning was intended to avoid these issues.

Department of Water Resources

DWR has been a partner in the IRWMP planning process from the beginning and has provided technical and financial support to the Water Forum and KRCD. DWR operates and maintains the State Water Project (SWP), including the California Aqueduct; provides dam safety and flood control services; assists local water districts like KRCD in water management and conservation activities; promotes recreational opportunities; and plans for future statewide water needs. DWR, which is not a regulatory agency, has historically provided both grant and loan funding to local agencies to plan and build water supply projects and implement groundwater programs. Proposition 50 is the most recent program with the guidelines, standards, and process used to evaluate projects and distribute funds to local agencies (DWR 2004). DWR also establishes standards and guidelines and provides support for UWMPs and GWMPs. There has been an increased emphasis on groundwater planning and development of conjunctive use programs throughout the state.



June 2007

Figure 3-1

City Spheres of Influence

Upper Kings Basin IRWMP



Legend

- Highways
- Roads
- Major Watercourses
- Sphere of Influence
- County Boundary
- Lakes and Reservoirs

State Water Resources Control Board/Regional Water Quality Control Boards

The California Water Code (CWC) defines the roles and responsibilities of the SWRCB and the nine RWQCBs. The SWRCB administers surface water rights, water pollution control, and water quality functions throughout the state, while the nine RWQCBs conduct planning related to water quality, permitting, and enforcement activities. The SWRCB sets statewide policy and, together with the RWQCBs, implements state and federal laws and regulations. Federal water quality requirements are managed by the SWRCB under the Porter-Cologne Water Quality Control Act (CWC §13000). The SWRCB does not have the authority for managing groundwater or determining groundwater rights. The SWRCB distributes and manages a range of grant- and loan-funded programs, including the State Revolving Loan fund to build water and wastewater facilities, and grants for watershed management programs.

Both the Kings River and the San Joaquin River have been determined to be fully appropriated by the SWRCB (Decision 1290). This means that there is no water on the Kings River that could be assigned a new water rights permit (CWC §§ 1205–1207). Minor potential sources of surface water may still be subject to appropriation through water impounded by flood control detention facilities built on the Fresno Stream Group, Mill Creek, or the Arroyo Pasajero Stream Group on the west side of the San Joaquin Valley. A water rights application has been filed for potential impounded water on the Fresno Stream Group for purposes of groundwater recharge by FID, the Cities of Fresno and Clovis, and FMFCD.

The IRWMP Region is covered by the Central Valley Water Quality Control Plan — Tulare Lake Basin (Basin Plan), last revised in January 2004 (RWQCB, 2004). The Basin Plan establishes the water quality objectives and standards for the IRWMP Region and the policies and programs of the RWQCB to ensure that water quality is protected and meets all of the designated beneficial uses. The Basin Plan is to be updated in 2006.

Department of Fish and Game

The mission of the California Department of Fish and Game (DFG) is to manage California's diverse fish, wildlife, and plant resources, as well as the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. DFG has both planning and regulatory functions and is responsible for protection and enhancement of public trust resources, like the Kings River. For planning purposes, DFG is a partner with KRCD and KRWA to plan and develop the Kings River fisheries management program. DFG also supports development of habitat conservation plans and strategies for upland, aquatic, and riparian habitats, so it can serve as a resource in these areas. DFG regulatory functions that could influence the implementation of the IRWMP are related to the California Endangered Species

Act and to environmental review and permitting of potential projects. State law requires any person, state or local governmental agency, or public utility to notify DFG before beginning an activity that will substantially modify a river, stream, or lake. DFG will determine if the activity could have a substantial, adverse affect on an existing fish and wildlife resource and whether a Lake or Streambed Alteration Agreement is required.

Department of Health Services

The California Department of Health Services (DHS) permits municipal drinking water systems, regulates contaminant sources, establishes and enforces regulations for the use of reclaimed wastewater, and runs a range of other programs to protect water quality and public health and safety. The DHS also possesses extensive data on water quality for existing systems in the IRWMP Region.

The DHS is the lead agency for developing and implementing the Drinking Water Source Assessment and Protection (DWSAP) Program. The drinking water source assessment is the first step in the development of a complete drinking water source protection program. The assessment includes a delineation of the area around a drinking water source through which contaminants might move and reach the drinking water supply; an inventory of Possible Contaminating Activities (PCA) that might lead to the release of microbiological or chemical contaminants within the delineated area; and a determination of the PCAs to which the drinking water source is most vulnerable. Assessments have been conducted for water systems in the IRWMP Region. The DHS sets Maximum Contaminant Levels (MCL) for trace elements, different types of organic contaminants, microbial (biological) contaminants, trihalomethanes (THM), and many other potential contaminants to ensure that the water is safe for human consumption.

The DHS will be concerned about IRWMP goals for protection of water quality and any IRWMP projects that may negatively impact municipal and domestic beneficial uses. The DHS has produced "The Purple Book," which contains California health laws related to reuse of disinfected tertiary recycled water (DHS, 2001b), and works with the RWQCBs to ensure protection of water quality and to review projects that propose to make use of reclaimed water. Any IRWMP projects that include delivery and treatment of surface water would need to meet Title 22 standards. At a minimum, water designated for municipal uses cannot contain concentrations of chemical constituents that exceed the MCLs specified in Title 22 of the California Code of Regulations, which are incorporated by reference into the water quality objectives for groundwater in the RWQCB Basin Plan.

U.S. Corps of Engineers

The U.S. Corps of Engineers (Corps) operates and maintains Pine Flat Dam and Reservoir, administers recreation facilities around the reservoir, and is in charge of all matters related to flood control, including flood releases. The Corps has important flood control and Floodplain management responsibilities in areas with federal levies. The Corps is also responsible for the Clean Water Act 404 permits in situations where waters of the United States may be impacted by projects such as those that may be developed under the IRWMP.

In 1993 the Corps began a fish and wildlife habitat enhancement study for the Kings River and Pine Flat Reservoir. This resulted in a reconnaissance study that identified possible projects and led to a cost-sharing agreement between KRCD and the Corps in 1996 to further evaluate the feasibility of potential projects and develop the Pine Flat Dam Fish and Wildlife Habitat Restoration Feasibility Study. The earlier reconnaissance work identified the turbine bypass project that was subsequently built in 2002 and was funded in cooperation with KRCD. The turbine bypass project provides for flexible operations and allows for the release of cold water from the Reservoir to support the downstream fishery at times when the power plant is not in operation. Both efforts are part of the coordinated fisheries management program in cooperation with KRCD, KRWA, and DFG.

U.S. Bureau of Reclamation

Reclamation's Mid-Pacific Region has historically had a complex relationship with agencies in the IRWMP Region and a limited role in the development of the local Kings River water resources. The role of Reclamation was established by the 1982 Reclamation Reform Act which specifically exempted the Kings River and other Corps flood control projects from some of the limitations and restrictions placed on other federal water project users sponsored by Reclamation. This resolved prior issues over repayment and operations of the water storage components of Pine Flat Reservoir.

Reclamation is the owner and operator of the CVP. This includes the Friant Division on the San Joaquin River and all of the other facilities north of the project area, including the East Side, San Luis, San Felipe, Delta, American River, Shasta/Trinity, and Sacramento River Divisions. The CVPIA has significantly changed the way the CVP is operated. All of the long-term CVP contracts have been subject to renewal and are in various stages of completion. Those without long-term contracts have been operating with interim contracts.

CVP facilities could be used to transfer or import water from other areas into the IRWMP Region. The IRWMP might evaluate using the CVP facilities to "wheel" or convey water obtained through agreement for transfer or exchange. Water from the CVP Friant Unit is

currently delivered under contract to entities in the IRWMP Region. Water diverted at the Delta is delivered down the DMC to contractors in the lower part of the Kings basin. These operations could be influenced by the CVPIA or other Reclamation programs on the San Joaquin River, including the Upper San Joaquin River Basin Storage Investigation and the San Joaquin River Riparian Habitat Restoration Program.

U.S. Fish and Wildlife Service, NOAA Fisheries

The U.S. Fish and Wildlife Service (FWS) is the federal agency that conducts a wide range of activities for conservation, habitat planning, and protection of endangered species. It is the primary federal agency charged with management and enforcement of the Federal Endangered Species Act (Federal ESA) as it applies to terrestrial and aquatic habitats. The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries Service) manages marine fishery resources, including inland waters that support anadromous species. This includes compliance with the Federal ESA for salmon, steelhead, and other anadromous species issues.

Within the IRWMP Region, the FWS or NOAA Fisheries could become involved if there is a related federal action associated with IRWMP project. This would include any action that involves use of federal facilities, permits, or funding. NOAA Fisheries would become involved if there is a potential impact to salmon or steelhead species. In their conservation role, the FWS manages habitat and refuges, such as the Mendota Wildlife Refuge located in the western part of Fresno County. The FWS has also developed the San Joaquin Upland Species Recovery Plan which seeks to protect listed species in the area and preserve important habitat.

U.S. Department of Agriculture, Natural Resources Conservation Service

The U.S. Department of Agriculture NRCS works with local agencies and land owners and provides technical support for conservation of land and water, prevention of erosion, preservation or restoration of habitat, and other programs to help conserve resources. NRCS provides financial assistance for many conservation activities. Participation in NRCS programs is voluntary. Some NRCS programs, such as the Farm Bill, help farmers and ranchers resolve environmental issues on their land, enhance the long-term quality of the environment, and conserve natural resources. This includes technical support and funding programs, such as the Agricultural Management Assistance and Wetland Reserve programs. NRCS can make incentive payments to agricultural producers to voluntarily address issues and incorporate conservation practices into their farming operations. Producers may construct or improve water management structures or irrigation structures; plant trees for windbreaks or to improve water quality; and mitigate risk through production diversification or resource conservation

practices, including soil erosion control, integrated pest management, or transition to organic farming. NRCS has also been active in helping dairies develop nutrient and conservation management plans.

3.2 PLANS, POLICIES, PROGRAMS, AND AGREEMENTS

This section provides an inventory of existing local, state, and federal plans, policies, programs, and agreements that help to provide the foundation for building the IRWMP. These documents define the current institutional planning environment and how the local communities are managing land, water and other biological resources and habitats. Consistent with the IRWMP Standards, the Upper Kings Basin IRWMP is closely related to planning documents and programs established by local agencies (DWR, 2004).

Key Plans and Programs Related to IRWMP Development

- Urban water management plans
- Groundwater management plans
- Water supply master plans
- Wastewater master plans
- City and County General Plans
- Watershed management plans
- Integrated resource plans
- Habitat conservation plans
- Multi-species conservation plans
- Floodplain management plans
- Regional drinking water quality plans
- Other regional planning efforts

The IRWMP is not the only regional resource management effort in the Kings Basin. There have been other important regional water planning efforts. The IRWMP seeks to integrate existing regional planning documents where appropriate to avoid duplicative efforts. Coordination with these efforts will ultimately support the implementation of the IRWMP.

3.2.1 STATE WATER PLAN

The California Water Plan Update 2005 (CWP) was prepared by DWR to define the statewide approach to water management, to set state priorities, and to provide guidance to water planners throughout the state (DWR, 2005c). The CWP is a master plan that guides the orderly and coordinated control, protection, conservation, development, management, and efficient use of the water resources of the state (CWC § 10005(a)). The CWP promotes regional water planning to integrate multiple water and resource management activities to meet a wide range of local objectives and it is intended to help water agencies, local governments, and the Legislature promote and support integrated regional water management. The CWP makes neither project-specific nor site-specific recommendations, but instead provides a framework to guide local agencies. The CWP has new features that include a strategic plan with vision, goals, recommendations and an implementation plan. It was developed with a different analytical approach than prior state water plans and relies on extended information and tools, including

use of water portfolios, regional reports, a protocol for future scenarios, and defined resource management strategies.

The CWP identifies resources management strategies (Table 3-4), which were used by the Water Forum to develop the IRWMP Planning Framework so that it fits into the state’s priorities. The proposed strategies were used by the Water Forum to complement the operation of the existing water system within the IRWMP Region. The basic intent of the CWP is to help areas to prepare good plans that satisfy regional and state needs, meet multiple objectives, include public input, address environmental justice, mitigate impacts, protect public trust assets, and are affordable.

Table 3-4. CWP Resource Management Strategies

<ul style="list-style-type: none"> ■ Agricultural lands stewardship ■ Agricultural water use efficiency ■ Conjunctive management and groundwater storage ■ Conveyance ■ Desalination ■ Drinking water treatment and distribution ■ Economic incentives (Loans, Grants, and Water Pricing) ■ Ecosystem restoration ■ Floodplain management ■ Groundwater remediation/Aquifer remediation 	<ul style="list-style-type: none"> ■ Matching water quality to water use ■ Pollution prevention ■ Precipitation enhancement ■ Recharge areas protection ■ Recycled municipal water ■ Surface storage—CALFED ■ Surface storage—regional/local ■ System re-operation ■ Urban land use management ■ Urban runoff management ■ Urban water use efficiency ■ Water-dependent recreation ■ Watershed management ■ Water transfers
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3.2.2 URBAN WATER MANAGEMENT PLANS

Since 1983, the Urban Water Management Planning Act (CWC § 10610) has required urban water suppliers that serve more than 3,000 customers or that deliver more than 3,000 AF per year to prepare and adopt a UWMP. The Act provides that urban water suppliers must prepare, adopt, and submit UWMPs to DWR to be eligible to receive funding for certain programs, including Proposition 50. The UWMPs must contain several specified elements, including estimates of water use, identification of existing conservation measures (Best Management Practices [BMPs]), identification of alternative conservation measures, a schedule of implementation of actions proposed by the plan, and identification of the frequency and magnitude of water shortages. In 1991, the Act was amended in response to the drought and

now requires water suppliers to estimate water supplies available at the end of one, two, and three dry years, and to develop contingency plans for severe shortages. The Act requires water suppliers to review and update their plans at least once every five years; new requirements for UWMPs are periodically passed by the State Legislature (see SB 610, SB 672, and SB 1518). Current plans were due in December 2005. Table 3-5 lists the status of local UWMPs in the IRWMP Region. The UWMPs and related programs to implement the BMPs are foundational actions for the IRWMP.

Table 3-5. Entities Required to Submit Urban Water Management Plans and Status

Urban Water Suppliers Required to Submit UWMP	UWMP 2000 Complete	UWMP 2005
Clovis	Yes	Complete
Dinuba	Yes	Submitted
Fresno	No	In Progress
Reedley	Yes	Submitted
Sanger	Yes	Submitted
Selma: California Water Service	Yes	In Progress

3.2.3 AGRICULTURAL WATER MANAGEMENT PLANS

There are state and federal incentives and requirements for agricultural water providers to develop AWMPs. These plans are intended to document that agricultural water is being used efficiently.

The Agricultural Efficient Water Management Act of 1990 (AB 3616) defines state requirements for AWMPs and requires DWR to support and assist in implementation of practices that increase statewide water use efficiencies. DWR supports the Agricultural Water Management Council (Council), which consists of members of the agricultural and environmental communities and other interested parties. The Council’s goal is to help agricultural water suppliers to voluntarily develop AWMPs and implement Efficient Water Management Practices (EWMPs). Members sign the Memorandum of Understanding Regarding EWMPs by Agricultural Water Suppliers in California. The MOU includes a comprehensive methodology by which each and every EWMP is analyzed and allows for a consistent analysis by all participating water suppliers. DWR is responsible to provide technical review and evaluation of AWMPs that are submitted to the Council. The Council reviews and approves the submitted plans.

Under the CVPIA, CVP contractors using water for agriculture are required to prepare AWMPs pursuant to the Federal Reclamation Reform Act (RRA) of 1982 and the Central Valley Improvement Act of 1992. Section 210 of the RRA requires contractors to prepare and submit plans with definitive goals, appropriate water conservation measures, and timetables.

Contractors are to submit plans every five years. Section 3405(e) of the CVPIA requires that the Secretary of the Interior establish criteria to evaluate AWMPs prepared by CVP contractors. Reclamation has developed standards for reviewing plans (USBR, 2005). Typically, a plan prepared to meet AB 3616 requirements will also meet Reclamation requirements.

AID was one of the original members of the Agricultural Water Conservation Council and both AID and FID have adopted AWMPs. CID does not have a current plan and since it is not a federal water contractor, it is not required to prepare a plan to meet federal requirements. The AWMPs and related programs to implement the BMPs are foundational action for the IRWMP.

3.2.4 GROUNDWATER MANAGEMENT PLANS

All of the adopted GWMPs in the Kings Region and the related projects and programs are foundational actions for the IRWMP. Groundwater management is the planned and coordinated local effort of sustaining the groundwater basin to meet future water supply needs. With the passage of AB 3030 in 1992, local water agencies were provided a systematic way of formulating GWMPs (CWC §10750). Assembly Bill 3030 also encourages coordination between local entities through joint-power authorities or MOUs. Senate Bill 1938, passed in 2002, further emphasized the need for groundwater management in California. SB 1938 requires AB 3030 GWMPs to contain specific plan components to receive state funding for water projects. The GWMP also addresses the 12 specific technical issues identified in the California Water Code along with the seven recommended components identified in DWR Bulletin 118 (DWR, 2003a). CID, AID, and FID all have adopted GWMPs. The requirements are listed in Table 3-6. Table 3-7 lists the GWMPs and status of each in and surrounding the IRWMP Region. There are a number of plans that are in the process of being updated for areas that overlie the Kings Basin.

Table 3-6. Groundwater Management Plan Components

<i>SB 1938 Mandatory Components</i>
1. Documentation of public involvement
2. Basin Management Objectives (BMOs)
3. Monitoring and management of groundwater elevations, groundwater quality, inelastic land subsidence, and changes in surface water flows and quality that directly affect groundwater levels or quality
4. Plan to involve other agencies located in the groundwater basin
5. Adoption of monitoring protocols
6. Map of groundwater basin boundary, as delineated by DWR Bulletin 118, with agencies boundaries that are subject to GWMP
7. For agencies not overlying groundwater basins, prepare the GWMP using appropriate geologic and hydrogeologic principles
<i>AB 3030 and SB 1938 Voluntary Components</i>
1. Control of saline water intrusion
2. Identify and manage well protection and recharge areas
3. Regulate the migration of contaminated groundwater
4. Administer well abandonment and destruction program
5. Control and mitigate groundwater overdraft
6. Replenish groundwater
7. Monitor groundwater levels
8. Develop and operate conjunctive use projects
9. Identify well-construction policies
10. Develop and operate groundwater contamination cleanup, recharge, storage, conservation, water-recycling, and extraction projects
11. Develop relationships with state and federal regulatory agencies
12. Review land use plans and coordinate with land use planning agencies to assess activities that create reasonable risk of groundwater contamination
<i>DWR Bulletin 118 Suggested Components</i>
1. Manage with guidance of advisory committee
2. Describe area to be managed under GWMP
3. Create links between BMOs and goals and actions of GWMP
4. Describe GWMP monitoring programs
5. Describe integrated water-management planning efforts
6. Report of implementation of GWMP
7. Evaluate GWMP periodically

**Table 3-7. Groundwater Management Plans
in the IRWMP Region and Surrounding Areas**

Agency	Plan Name	Date Adopted	Status
IRWMP Area			
FID	Groundwater Management Plan (Draft)	December 23, 2005	Adopted by FID and MOU partners
AID	Groundwater Management Plan	August 14, 1994	Developing plan.
CID	Groundwater Management Plan	July 26, 1995	Not current with SB 1938.
Lower King Basin	Lower Kings Basin Groundwater Management Plan	April 2005	Adopted by KRCD Board
Mid-Valley Water District	Lower Kings Basin Groundwater Management Plan	April 2005	Adopted by KRCD Board
Laguna ID	Water Management Plan	May 1992	Can be covered by Lower Kings GWMP if adopted by Board.
Liberty WD	Groundwater Management Plan	May 14, 1996	Can be covered by Lower Kings GWMP if adopted by Board.
James ID	Amended Ground Water Management Plan	February 14, 2001	Can be covered by Lower Kings GWMP if adopted by Board.
Raisin City WD		May 2007	Adopted by Board.
Tranquility ID	Groundwater Management Plan		Covered by Lower Kings GWMP if adopted
Riverdale ID	Groundwater Management Plan		Covered by Lower Kings GWMP if adopted
Areas Surrounding IRWMP Region			
Empire Westside ID	Groundwater Management Plan AB 3030	September 21, 2005	
Westlands WD	Groundwater Management Plan AB 3030	September 16, 1996	
Tulare Lake Basin Water Storage District	Coordinated Groundwater Management Plan	N/A	
Kings County WD	Groundwater Management Plan	2001	1993 GWMP updated in 2001

3.2.5 CITY AND COUNTY GENERAL PLANS

The counties and cities that overly the groundwater basins are actively engaged in the Water Forum. The list of local General Plans, plan statuses, and planning horizons is provided in Table 3-8.

Table 3-8. Status of City and County General Plans

County	City/County	Most Recent Update	Elements Updated						
			Land Use	Circulation	Housing	Open Space	Conservation	Safety	Noise
	Fresno County	2003	2003	2003	2003	2003	2003	2003	2003
	Tulare County	pending	1974	1974	1992	1974	1974	1974	1974
Fresno	Clovis	1993	1993	1993	2000	1993	1993	1993	1993
Fresno	Fresno	2002	2002	2002	2004	2002	2002	2002	2002
Fresno	Fowler	1976	1976	1976	1992	1976	1976	1976	1976
Fresno	Kerman	1993	1993	1993	1991	1993	1993	1993	1993
Fresno	Kingsburg	2003	1997	1992	2002	1992	1992	1992	1992
Fresno	Orange Cove	2002	2002	2002	2003	2002	2002	2002	2002
Fresno	Parlier	1998	1998	1998	1998	1998	1998	1998	1998
Fresno	Reedley	1994	1994	2003	1994	1994	1994	1994	1994
Fresno	Sanger	1995	1988	1988	1991	1995	1988	1988	1988
Fresno	Selma	1998	1998	1998	1993	1983	1983	1991	1991
Fresno	San Joaquin	1996	1996	1996	2003	1996	1996	1996	1996
Tulare	Dinuba	1997	1997	1997	2004	1997	1997	1975	1997

Source: 2005 Planners Book of Lists, Office of Planning and Research

California state law requires each city and county to adopt a general plan “for the physical development of the county or city and any land outside its boundaries which bears relation to its planning”(CGC § 65300). The California Supreme Court has called the general plan the “constitution for future development.” The goals, policies, and objectives contained in each of the city or county general plans are intended to underlie most land use- and resource-related decisions, including those that affect water supplies and quality. Each of the general plans in the IRWMP Region address water issues in different ways. Most plans acknowledge overdraft and document the reliance on groundwater, but many do not identify programs to resolve this regional issue.

General plans have both informational and procedural requirements. There are seven mandatory elements: land use, circulation, housing, conservation, open-space, noise, and safety. These elements must be internally consistent with one another, creating an integrated, usable

document. Pursuant to state law, subdivisions, capital improvements, and development agreements, land use actions must be consistent with the adopted general plan.

Of the seven mandatory elements that cities and counties must cover in their general plans, some degree of water management information is required in five of them: land use, circulation, conservation, open-space, and safety. However, there are no specific guidelines or requirements for how or where these are to be addressed (OPR, 2003). These elements are used in various ways to address water supply, water quality, wastewater treatment and disposal, flood management, watershed management, and stormwater management. This allows local water and land use agencies the ability to respond based on unique local conditions.

There is no specific requirement for how far into the future the general plan must project or for how frequently it must be updated, although it should be reviewed regularly and revised as new information becomes available (OPR, 2003). Inconsistent horizons between the prevailing general plan and water management or supply plan may be a source of conflict or subject the plans of related actions to legal challenge.

3.2.6 WATER SUPPLY AND WASTEWATER MASTER PLANS

Many water districts and municipal entities have prepared water supply and/or wastewater master plans to anticipate future conditions and guide future investments in infrastructure. Efforts were made to identify and collect published water supply master plans and capital facilities plans. These plans represent local agencies' evaluation of their water supply and wastewater facilities needs and, where such plans are available, may be used by the Water Forum to identify water management strategies and planned facilities. Recent changes in state legislation and case law require that water supply and wastewater master plans be consistent with the prevailing land use plan. Plan consistency will help avoid legal challenge. Review of all the available water and wastewater plans for consistency with the related general plan was not part of this task. Adopted master plans, where they were discovered or made available, provide foundational actions and projects for the IRWMP.

3.2.7 RWQCB AND CENTRAL VALLEY WATER QUALITY CONTROL PLAN — TULARE LAKE BASIN

This section discusses current water quality protection requirements, plans, and programs of the SWRCB and RWQCB. The quality of the available surface water and groundwater supplies within the IRWMP Region influences the ability to put the water to use. If the quality of the water is degraded beyond the ability to put the water to the intended use, overall supply may become limited or the costs for treatment may increase. One of the IRWMP objectives is to improve groundwater management through conjunctive use. For conjunctive use to be

effective, surface water of appropriate quality must be available either for direct use in lieu of a groundwater supply or for storage in the groundwater basin. State policy prevents water of poor quality to be put into the groundwater basin if the quality of the underlying groundwater would be degraded. Conversely, if clean sources of surface water are to be stored in a groundwater basin for subsequent withdrawal, the underlying groundwater quality must be such that the quality of the stored surface water would not be impaired.

Beneficial Use and Water Quality Standards

The Basin Plan defines the following beneficial uses of water and the narrative or numerical water quality standards and objectives to protect the identified beneficial uses. The Basin Plan for the IRWMP Region designates beneficial uses for the Kings River (Table 3-9).

Table 3-9. Tulare Lake Basin Plan Kings River Beneficial Uses

River Section	MUN	AGR	IND	PRO	POW	REC-1	REC-2	WARM	COLD	WILD	RARE	SPWN	GWR	FRSH
Pine Flat Reservoir					X	X	X	X	X	X			X	X
Pine Flat Dam to Friant-Kern	X	X			X	X	X	X	X	X		X	X	X
Friant-Kern to Peoples Weir	X	X		X		X	X	X		X			X	
Peoples Weir to Stinson Weir on North Fork and to Empire Weir No. 2 on South Fork		X				X	X	X		X			X	

MUN: municipal, AGR: agricultural, IND: industrial service supply, PRO: industrial process supply, REC-1: water contact recreation, REC-2: non-water contact recreation, WARM: warm water fishery, COLD: cold water fishery, WILD: wildlife habitat, RARE: rare, threatened, or endangered species habitat, SPWN: spawning, reproduction, or early development, GWR: groundwater recharge, FRSH: freshwater replenishment.

Groundwater Water Recharge (GWR) is a designated beneficial use for Kings River surface water. GWR is defined as the “uses of water for natural or artificial recharge of groundwater for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers.” In addition to the primary beneficial use for agricultural purposes, surface water rights on the Kings River may also recognize groundwater recharge beneficial uses. Those water rights filings that do not already include groundwater recharge in the permit or license may need to file an underground storage supplement with the SWRCB. The Basin Plan identifies the water quality objectives for specific constituents. Recommended numerical limits to translate water quality objectives have also been developed by the RWQCB. The standards and objectives are to protect the designated beneficial uses and prevent third-party effects and impacts to the environment. The potential for a project to exceed these limits is the basis for evaluating threats to water quality and likelihood of impairment to groundwater or surface water.

Kings River groundwater beneficial uses are identified as municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply. At a minimum, water designated for municipal uses cannot contain concentrations of chemical constituents that exceed the MCLs specified in Title 22 of the California Code of Regulations, which are incorporated by reference into the water quality objectives for groundwater in the Basin Plan. Agriculture is dependent on an adequate supply of water of satisfactory quality. Agricultural uses of groundwater and surface water for irrigation are the primary beneficial uses in the IRWMP Region. The RWQCB lists requirements intended to protect agricultural use and sustain the agricultural economy in the IRWMP area. Water quality requirements vary by crop types and agronomic conditions. Water quality objectives to protect agricultural uses are reflected in the numerical water quality standards of the RWQCB and Basin Plan.

The Basin Plan and SWRCB policy do not require water quality improvements over baseline conditions or naturally occurring background concentrations. The water quality objectives are developed to ensure that there is no degradation from historical conditions. Because of this, it is important to document the current baseline water quality conditions so that the proposed action does not have to mitigate or resolve an existing problem. A separate technical memorandum on water quality conditions is to be prepared as part of the IRWMP.

Protected Areas and Impaired Water Bodies within the IRWMP Region

Water quality is defined as limited or impaired if current water quality conditions do not meet the specific water quality standards and objectives for the defined beneficial use. Known water quality problems are identified by the RWQCB by comparing monitoring data to the standards and objectives for each of the beneficial uses. Waters that do not meet standards are placed on the 303(d) List of Water Quality Limited Segments, which identifies water bodies of impaired quality. This list indicates whether the water body is meeting the needs of the designated beneficial use. If a stream segment is defined as impaired, specific management programs and specific management actions are defined in context of the Basin Plan. Any IRWMP project that would have the potential to further impair a designated water body would receive increased scrutiny from the RWQCB. IRWMP projects might also be constrained by impaired waters.

The latest available 303(d) list was prepared by the SWRCB and RWQCB in 2002. It includes the segments of the north and south forks of the Kings River from Island Weir to the Stinson and Empire Weirs. The Kings River in this reach has elevated levels of electrical conductivity, molybdenum, and toxaphene. The 303(d) list gives the reach a low priority for the development of a TMDL.

Mendota Pool, on the western edge of the Kings Groundwater basin is also listed in the 303(d) list and has been defined as impaired by elevated selenium levels—potentially because of

agriculture—groundwater withdrawal, or other sources. The 303(d) list also gives Mendota Pool a low priority for the development of a TMDL. The Lower Kings Basin is not likely a significant contributor to the issues at Mendota Pool, but could be affected by water quality issues should Mendota Pool water be considered as a source of water for recharge.

Waste Discharge Requirements and National Point Discharge Elimination System Permits in the IRWMP Region

The RWQCB requires that any person discharging waste or proposing to discharge waste to file a Report of Waste Discharge if such actions could affect water quality (CWC 13260(a)). The RWQCB has a statutory obligation to prescribe Waste Discharge Requirements (WDR) except where the Regional Board finds that a waiver of waste discharge requirements for a specific type of discharge is not against the public interest. Any such waiver must be conditional and may be terminated at any time (CWC 13629). If there is no waiver of WDRs, the RWQCB would issue either a general permit or an individual permit to the discharger. The RWQCB may establish WDRs or require a discharger to operate under an individual and general National Point Discharge Elimination System (NPDES) permit.

Cities and industrial facilities are required to have WDRs for any discharge to land for disposal of wastewater. Individual NPDES permits are required for direct discharge to surface water bodies. The larger facilities treating municipal waste in the IRWMP Region are operating either under WDRs or an NPDES permit.

The RWQCB was contacted to identify other industrial facilities or small dischargers operating under WDRs in the IRWMP Region. There are roughly 200 permitted facilities with WDRs. They are all relatively small dischargers and are not believed to be a threat to water quality so long as they remain in compliance with the conditions of the WDRs. The RWQCB data is not in a format that allowed for mapping the location of these facilities.

Based on the report of waste discharge, the RWQCB may require any discharger to apply for and obtain an individual permit under the NPDES. Requirements for individual NPDES permits are a determination of the RWQCB (40 CFR 122.28(b)(3)). NPDES general permits may also be issued for stormwater and construction sites. Each of the cities within the IRWMP with population of more than 100,000 is required to operate its municipal stormwater system under a general stormwater NPDES permit. Typically, cities also require developers to demonstrate proof of clearance from the RWQCB under the general NPDES permits for management of stormwater from construction sites.

IRWMP projects could be subject to WDRs or NPDES permit requirements. The permitting and regulatory compliance constraints will be evaluated as part of the alternatives evaluation and development of the IRWMP implementation plan.

RWQCB Requirements for Discharges from Irrigated Lands

Discharges from irrigated lands can contain wastes that could affect the quality of the waters of the state. The discharge of tail water, wastewater, or storm water from irrigated lands occurs to both surface water and groundwater. In the IRWMP Region, the SSJWQC is addressing the agricultural waste discharge requirements of the RWQCB imposed since the waiver of agricultural WDRs expired in 2003 (RWQCB, 2003). The SSJWQC is identifying and correcting water quality impairments without the need for issuance of WDRs.

The goal of the agricultural waivers program is to improve and protect water quality by providing a program to manage discharges from irrigated lands that cause or contribute to conditions of pollution or nuisance as defined in Section 13050 of the California Water Code or that cause or contribute to exceedance of any RWQCB or SWRCB numeric or narrative water quality standard by reducing discharges of waste. The SSJWQC has developed a monitoring program to assess the sources and impacts of discharges from irrigated lands and, where necessary, it is tracking progress in reducing the amount of waste discharged that affects the water quality of the IRWMP Region and its beneficial uses.

Nonpoint Source Management Plan and Watershed Management Initiatives

Nonpoint sources of contamination are the result of broadly accepted societal practices where the source of contamination is widely dispersed and individual liability is not easy to establish. The SWRCB has adopted the “Plan for California’s Nonpoint Pollution Control Program” (SWRCB, 2000). The purpose of the Nonpoint Source Program Plan is to improve the state’s ability to effectively manage nonpoint source pollution and conform to the requirements of the federal Clean Water Act. The Nonpoint Source Management Plan establishes the framework for statewide nonpoint source activities, statewide objectives, and implementation strategies to manage nonpoint source problems. Both cities and agricultural land uses are facing increased pressure to prevent nonpoint source contamination of surface water and groundwater.

The RWQCB is adopting individual Watershed Management Initiatives (WMI) to implement the statewide strategy for nonpoint source control (RWQCB, 2002). The RWQCB is attempting to assess water quality problems in each watershed, develop and implement strategies to correct problems, and evaluate success. Inherent in the process is the need to prioritize work to maximize the use of resources.

State of the Watershed reports have been prepared for the three watersheds and several sub-watersheds, including the Tulare Lake Region. The Tulare Lake Watershed comprises the drainage area of the San Joaquin Valley south of the San Joaquin River. The Tulare Lake Watershed is essentially a closed basin. The Watershed is divided into six Watershed Management Areas. The IRWMP Region is in the Kings Basin Management Area, which includes the Kings River drainage area (as well as the drainage area for the tributaries and distribution systems of the Kings River) and the designated groundwater basin.

The reports present the current known water quality concerns in the watersheds and describe: (1) priorities within the watershed based on the known water quality problems; (2) current efforts to address the problems; (3) recommendations for future actions (including monitoring to track progress); (4) time schedules for high priority activities; and (5) preliminary budget allocations. The reports provide the framework for discussions with stakeholders. Discharges from nonpoint sources, such as agriculture, silviculture, urban runoff, past mining activities, dairies, and individual wastewater disposal systems, have been identified as the most significant and widespread surface water and ground water quality problems in the region.

Policy with Respect to Maintaining High Quality Water

The regulations implementing the Clean Water Act (40 CFR 131.6; 131.12(a)) require that each state develop and adopt a statewide antidegradation policy. In California this requirement is satisfied by SWRCB Resolution No. 68-16, the Statement of Policy with Respect to Maintaining High Quality Waters of California. The SWRCB policy requires the continued maintenance of existing high quality waters unless there is a demonstration: (1) that allowing some degradation is consistent with the maximum benefit to the people of the state, and (2) that such degradation would not unreasonably affect existing or potential beneficial uses. Actions which may adversely affect surface water quality must satisfy both Resolution No. 68-16 and the federal antidegradation policy (40 CFR 131.12). A reduction in water quality can be allowed only if there is a demonstration that such a reduction is necessary to accommodate important economic or social development. This RWQCB has recently begun to consider how this policy is to be applied to groundwater recharge operations such as may be proposed in the IRWMP.

Sources of Drinking Water Policy

The Sources of Drinking Water Policy (Resolution No. 88-63) declares that, with specified exceptions, all waters of the state are to be considered suitable or potentially suitable for municipal or domestic supply and water should be protected to meet drinking water standards and beneficial uses. There are exceptions for surface water and groundwater with total dissolved solids (TDS) levels in excess of 3,000 mg/L; surface water and groundwater that are

contaminated, either by natural process or by human activity, to the extent that they cannot reasonably be treated for domestic use; and surface waters in systems designated or modified to carry municipal, industrial, or agricultural wastewaters or stormwater runoff. Under this policy, the entire Kings Basin groundwater is a potential source of drinking water and should be protected accordingly.

3.2.8 KINGS RIVER FISHERY MANAGEMENT PROGRAM

The Kings River Fishery Management Program is a very important regional effort and is considered a foundational action for the IRWMP. Water dedicated to environmental uses cannot be put to use for other purposes in the location where the water is reserved; however, it may be put to other uses farther downstream. The main stem of the Kings River and the South and Middle forks above 1,590-foot elevation have been designated as Wild and Scenic Rivers and have water reserved for this purpose. However, after flowing through these sections of river the same water is then used to meet urban and agricultural demand once it reaches the valley. The Kings River Fishery Management Program seeks to maintain the fishery below Pine Flat Dam.

There are ongoing fisheries studies in the Kings River below Pine Flat Dam as part of the Kings River Fishery Management Program. Preliminary results indicate that meeting fishery flow requirements and environmental demands associated with restoration in this area could be integrated with a conjunctive use project in the Upper Basin to provide multiple benefits. This will be studied further during the development of the Upper Kings Basin IRWMP.

KRWA, KRCD, and CDFG have jointly implemented habitat enhancement projects and conducted a series of monitoring programs in the lower Kings River and Pine Flat Reservoir. These activities have been conducted in response to the Kings River Fisheries Management Program Framework Agreement, which was approved on May 28, 1999. The Framework Agreement is a voluntary, 10-year program and includes a number of actions designed to protect and enhance fishery habitat within the lower Kings River and reservoir. The project area covers Pine Flat Reservoir and approximately 60 miles of river downstream of Pine Flat Dam. A Technical Steering Committee is responsible for implementing the actions authorized under the agreement and approved by the Executive Committee. A Public Advisory Group comprises fishing, river, and landowner interests and provides input and direction to the program. A variety of tasks have been implemented during the first five years of the program, including:

- A 100,000-AF-minimum pool in Pine Flat Reservoir;
- Increased flows in the lower Kings River during fall and winter;

- Contribution of \$1,000,000 by the Kings River Conservation District and Kings River Water Association over the 10-year period;
- Contribution of \$1,000,000 in funds and services by the CDFG over the 10-year period;
- Monitoring of hydrology and operations within the river and reservoir;
- Monitoring of water temperature and dissolved oxygen within Pine Flat Reservoir and the lower Kings River;
- Habitat enhancement projects within the river and reservoir;
- Fish stocking within the river and reservoir;
- Implementation of angling regulations;
- Baseline and performance monitoring of fishery program status;
- Public education and outreach;
- Maintenance activities; and
- Development of an annual Five-Year Plan for identifying specific habitat enhancement and monitoring projects on the lower Kings River and Pine Flat Reservoir.

3.2.9 KINGS RIVER OF GEMS

The Kings River Conservancy is working to encourage sound public conservation practices along the Kings River corridor from Pine Flat Dam to Highway 99; foster community involvement in protecting and enhancing the environmental values; enhance and control public access for recreation; educate the public on matters related to environmental values; to preserve agricultural lands. The Conservancy has developed a vision for how to conduct Long-Term management of the Lower Kings River as a sustainable landscape (Kings Ribbon of Gems, A Vision for the lower Kings River. Kings River Conservancy, 2005) and is now working to implement the vision; develop management and financial capacity; and expand partnerships with others through out the region. As the urban growth continues in the Kings Region, open space and public access to recreational assets and outdoor space becomes more critical. The Conservancy's plan and vision includes a list of priorities and potential recreational areas, but is limited by the need for funding, guiding principles, and clearly defined needs and goals.

3.2.10 WATER SUPPLY MONITORING

The IRWMP region has an extensive water supply monitoring program, which includes hourly gauging of surface water stream flows and semi-annual monitoring of groundwater levels. The surface water stream flows from the Kings River are monitored by the KRWA. The KRWA receives records of the stream flow releases from the Pine Flat Dam from the USACE from a

gauging station below the dam, which quantifies the surface water entering the KRWA system. The KRWA monitors the surface water entering its service area, water delivered to its member agencies (AID, CID, FID, and 25 other agencies), and water leaving the service area from the North Fork of the Kings River at the James Weir. The KRWA produces an annual report of the water diverted at the head gates into the individual irrigation systems. The individual irrigation districts monitor the flows and deliveries of the surface water within their district boundaries. The FID currently uses streamflow measurement devices to optimize the operations of the water supply deliveries. AID and CID are currently in the process of updating their system to include streamflow gages and SCADA.

The agencies within the region also monitor the groundwater levels. The individual irrigation districts periodically measures groundwater levels within their boundaries and report results to the DWR. The KRCD groundwater monitoring program area covers the Groundwater Management Area 'A', which include RCWD. A total of 147 wells are monitored in the spring and fall since the inception of the monitoring program in 1997. The KRCD publishes annual groundwater report that includes groundwater level measurements from KRCD, FID, CID, AID, and DWR.

3.2.11 RELATIONSHIP OF LOCAL AGENCY PLANNING DOCUMENTS WITH IRWM WATER MANAGEMENT STRATEGIES

Local planning documents were instrumental in development of the IRWMP objectives. Existing groundwater management plans, agricultural water management plans, urban water management plans, city and county general plans, land use policies, water supply and wastewater treatment master plans, master plans for drainage, and other key documents related to local land use and water supply agency programs were evaluated for the purpose to define and integrate the goals and objectives of these multiple plans with the IRWM water management strategies.

The local agencies document that most uniformly shared common elements found in the IRWM water management strategies are the groundwater management plans. The groundwater management plans were generally accepted and adopted among the irrigation districts, cities, and other municipalities. For example, the Fresno Area Regional Groundwater Management Plan (SB 1938) was developed and adopted in 2006 in a cooperative effort by the overlying water agencies in the Fresno Irrigation District. Alta Irrigation District Groundwater Management Plan (AB3030) also entered in a memorandum of understanding with the cities in support of the plan. This effort is currently in progress to reach the same level of understanding and cooperation with the water purveyor in the Consolidated Irrigation District.

3.3 ENGINEERED ENVIRONMENT AND WATER MANAGEMENT FACILITIES

The IRWMP Region includes a complicated network of engineering facilities managed by the local water and land use agencies. This section discusses engineering facilities, including water storage, water delivery, groundwater recharge, wastewater collection and treatment, flood control, and storm water management. The various systems and their capacities are described and their relationships to the IRWMP are discussed.

3.3.1 KINGS RIVER INTEGRATED WATER SUPPLY AND FLOOD CONTROL FACILITIES

The major water supply and flood control facilities are part of an integrated system that is managed to meet multiple objectives. Multiple districts and land use agencies (city and county) are involved in the operations of the water supply and flood control facilities within the IRWMP Region. The facilities have been uniquely designed and built over time to capture, conserve, and manage the available water flowing into the IRWMP Region.

The following discussion characterizes the major regional water supply and flood control systems within the IRWMP Region and describes the more localized facilities used to manage water. The Kings and San Joaquin Rivers flow westerly from the Sierra Nevada into the IRWMP Region. The San Joaquin and Kings River watersheds contribute recharge to the Kings Groundwater Basin. Figure 3-2 shows these watersheds, the Kings Groundwater Basin and surrounding groundwater basins, and the major water supply infrastructure. The Kings Groundwater Basin is designated by DWR (DWR, 2003a) and is a smaller sub-basin of the larger San Joaquin Basin Hydrologic Study Area. Three dams have been constructed to control flows on the San Joaquin and Kings Rivers. These dams are the Pine Flat Dam on the Kings River, and the Friant and Mendota Dams on the San Joaquin River. The upper watershed has a number of smaller dams that provide both hydroelectric and water storage benefits.

These major regional facilities, in combination with the more localized network of canals, recharge/retention ponds, and flood control reservoirs, provide the foundation for identifying water management opportunities to meet IRWMP objectives. The Central Valley Project (Delta Mendota Canal; Friant Kern Canal) and State Water Project California Aqueduct make up the backbone of the state and federal water distribution system and are also shown in Figure 3-2. Central Valley Project and State Water Project infrastructure are shown because they could potentially be used to develop new sources of imported water (transfers or exchanges) for the IRWMP Region.

Both the San Joaquin and Kings Rivers are sources of supply and groundwater recharge to the IRWMP Region and are subject to extreme variation in annual runoff resulting from annual

changes in mountain precipitation. Reservoir storage has helped to regulate and make more efficient use of available water during dry years and to protect life and property in wet years. However, storage capacity is generally inadequate to accommodate runoff during very wet years and substantial flows are lost to the IRWMP Region due to flood releases. During winter and spring months, river systems in the IRWMP Region swell with heavy rainfall and snow melt runoff. To conserve water, reservoirs are used to store winter rains for use in the summer. These same storage reservoirs are used for flood control.

In addition to the natural stream channels, a complex network of local and regional canals deliver conserved water in summer months for irrigation, groundwater recharge, and municipal purposes, and flood water in winter months for groundwater recharge. The AID, FID, and CID canals convey water supplies primarily to agricultural users, though FID also conveys water to surface water treatment plants in Fresno and Clovis for municipal purposes. In winter months the same facilities are used to convey stormwater around and away from developed areas. In the developed urban areas, local storm drainage systems composed of street gutters, inlets, underground storm drains, retention ponds, pumping stations, and open channels are used to collect and control stormwater runoff and direct runoff to the AID, FID, CID canals for flood control purposes. Many of the stormwater retention ponds are multi-purpose and benefits to groundwater recharge and recreation.

Pine Flat Dam

Pine Flat Reservoir is a major water facility that regulates the flow in the Kings River. It is located approximately 10 miles to the east of the Kings Groundwater Basin in the Sierra Foothills. The dam was completed in 1954 primarily as a flood control project with water conservation storage benefits. It has a capacity to hold 1,000,000 AF of water.

The Pine Flat Dam is managed by three agencies through a cooperative agreement: (1) The Corps determine the flood releases and criteria, (2) KRWA manages the conservation storage, and (3) KRCD operates the hydropower.

The management of the surface water rights has evolved since KRWA's formation in 1927. From its inception, KRWA has coordinated operations to serve each of its 28 members and to manage the Kings River entitlements. In practice, releases, diversions, and flow management on the Kings River are carefully coordinated by KRWA. Under the direction of KRWA, the irrigation releases are made from the dam in accordance with the terms of the water rights licenses, the provisions of Decision 1290 set forth by the SWRCB, and a complex series of agreements and water entitlement schedules ("Blue Book Agreements"). Pine Flat Dam has established operating parameters that change throughout the year and are used to allocate storage and flood capacity. Management of the reservoir space is based on forecasts, expected

runoff patterns, snow measurements, and expected fill dates. With a large volume available for snowmelt and a sufficient storage to runoff ratio, Pine Flat Dam operations normally avoid emergency spillage.

Other Upstream Kings Storage Facilities

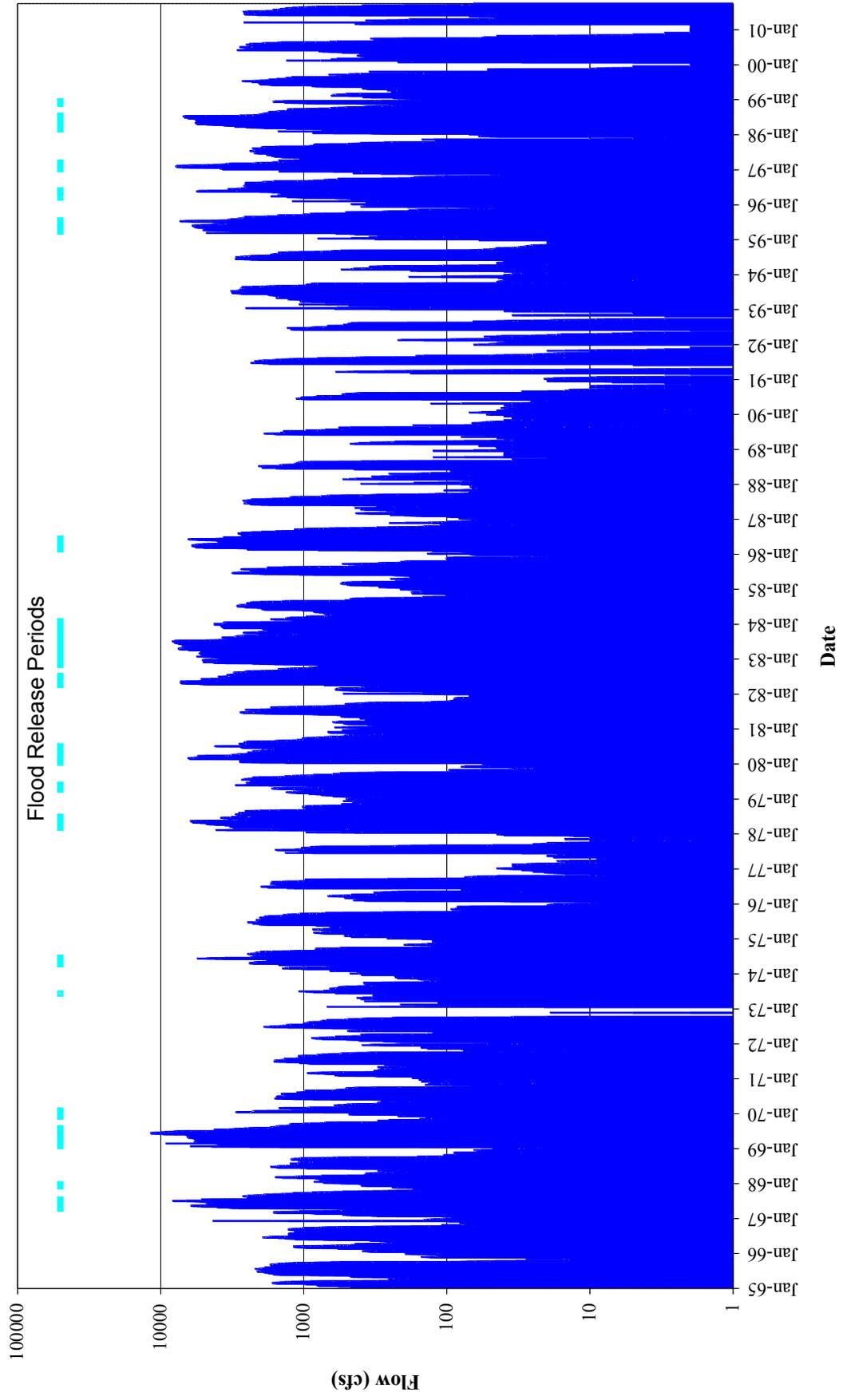
Pacific Gas and Electric (PG&E) owns and operates storage facilities on the Kings River and its tributaries upstream of the Pine Flat Dam. These upstream storage facilities (Courtright Lake and Wishon Dam) have a combined capacity of about 251,700 AF and were shown in Figure 3-2. These facilities are operated primarily for the production of electrical energy. The operation of these projects does not significantly affect the flow, timing, or availability of water in Pine Flat Reservoir.

Other storage reservoirs and power projects have been proposed on the Kings River, most notably at Rodgers Crossing and on Dinkey Creek. Neither of the projects was developed because of environmental and funding issues. Two potential low elevation reservoirs that were previously identified include an off-stream storage site on Mill Creek in Wonder Valley and the Piedra Afterbay below Pine Flat. Neither of these facilities was developed.

Kings River Diversions and Weirs

There are a number of weirs on the river used to divert and manage Kings River flows (Figure 3-3). The individual water districts have authority over the operations for the weirs and water delivery canals. In addition to these 10 major weirs, there are 20 minor weir facilities and a large number of pumps. The weirs control diversions into the specific canals of the various water districts or ditch companies. Water for diversions and use by Upper Kings water users, including the AID, FID, and CID, occurs at the Cobbles, Gould, and Fresno Weirs. Further downstream, water flowing past the Peoples Weir continues to provide groundwater recharge and support other downstream users, but can no longer be diverted and managed by Upper Kings stakeholders or be applied to meeting upper Kings water demands. Figure 3-4 shows the volume of water flowing past the Peoples Weir and the timing of flood releases from Pine Flat Reservoir from 1964 to present.

There are three weirs that direct the Kings River flow to the north or south. Army Weir is located just upstream from SR 41 and used to direct the flow north or south based on specific operating criteria. Crescent Weir is located at the Crescent Bypass southwest of 22nd and Excelsior Avenues. The Crescent Bypass flows north to Fresno Slough. Stinson Weir is located near the confluence of Murphy Slough and Fresno Slough at Elkhorn Avenue. Normal flows are held by these three weirs in the main channel. During storm events, the first 4,750 cubic feet per second (cfs) is diverted to the North Fork towards the San Joaquin River. The next 3,200 cfs



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FIGURE 3-4

Kings River Flow Below Peoples Weir

Upper Kings Basin IRWMP



of additional flow is diverted to the South Fork and Tulare Lakebed. Any flows above this amount are split equally.

During time of flood release and high flows, water diverted to the North Fork travels up the Fresno Slough and through the James Bypass. Figure 3-5 shows the flow past the James Bypass from 1964 to 2005. These flows only occur during the winter in wet years. Once this water flows north and reaches the San Joaquin River, there is no opportunity for further capture or conjunctive use in the Kings Groundwater Basin.

Canals, Delivery Facilities, and Recharge Ponds

There is an extensive canal network owned and operated by AID, CID, and FID. The canal network is used to convey water to users within each district. The water is used directly for irrigation and municipal purposes in the FID, and for agriculture in the CID and the AID.

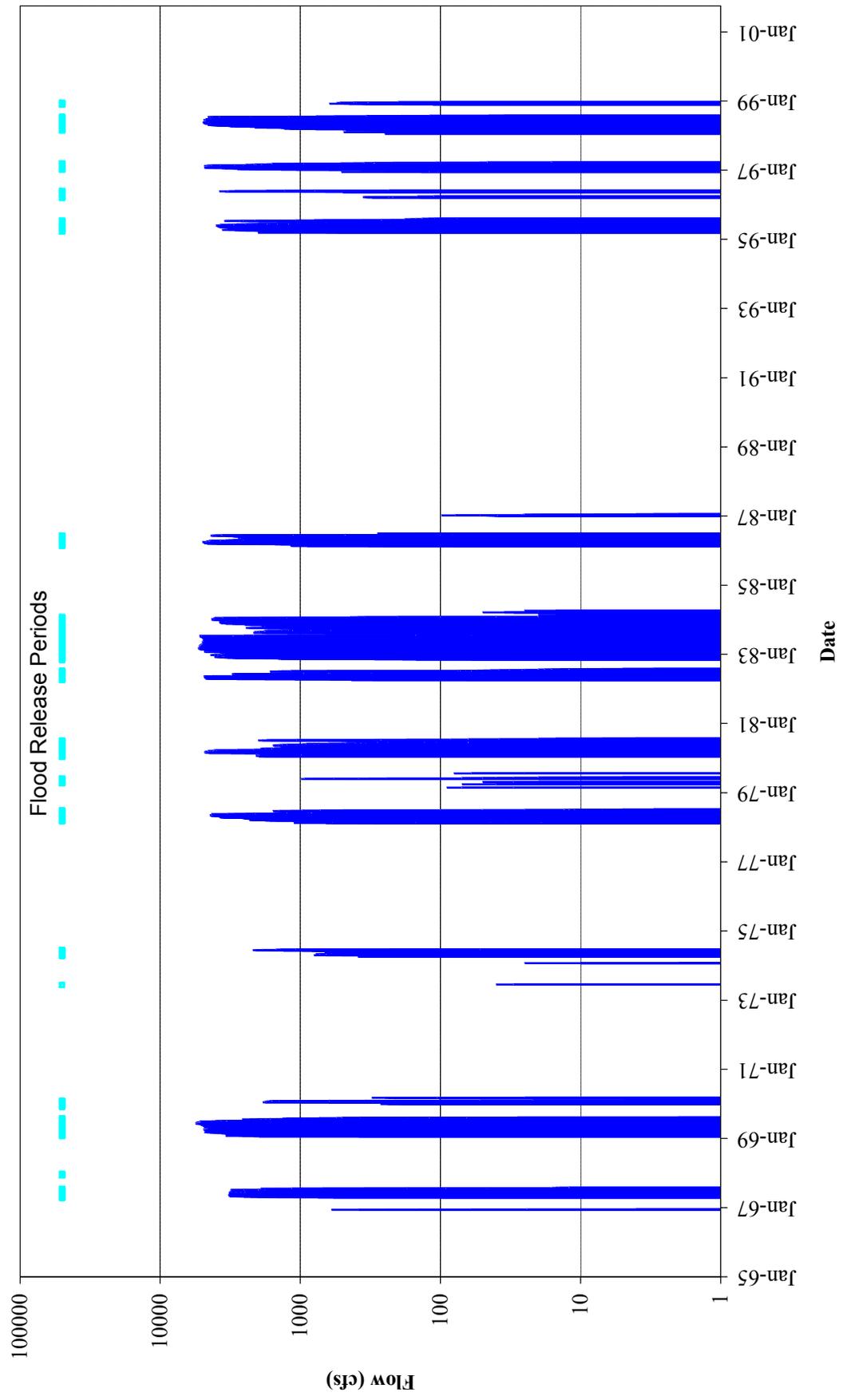
To varying degrees, all three agencies also use their Kings River surface water rights for recharge of the groundwater basin.

The region has more than 1,000 miles of canals to deliver water to agricultural lands and to existing recharge facilities. The major canals that service the Upper Kings Basin include the Fresno Canal, Gould Canal, Alta Canal, and Consolidated Canal. Major AID, CID, and FID canals and recharge facilities are shown in Figures 3-6, 3-7, and 3-8.

Each of the Upper Kings Basin Districts has carried out extensive recharge operations in the Kings Basin for many years. The locations of the existing recharge projects in the AID, CID, and FID service areas are shown in Figures 3-6, 3-7, and 3-8, respectively.

AID uses flood flows from the Kings River to recharge the groundwater basin through approximately 150 acres of existing recharge basins. No estimate of the amount of water recharged through these basins is available, though AID estimates that it gets about 45,600 AF of incidental recharge annually along its 360 miles of unlined irrigation delivery canals.

CID also uses flood flows from the Kings River to recharge the groundwater basin. CID currently operates 46 recharge basins, totaling approximately 1,300 acres. CID also owns and operates about 350 miles of unlined canals, which provide additional recharge to the groundwater basin. Over the last 40 years, CID estimates it has recharged approximately two million acre-feet in its basins and canals. CID estimates that it recharged 308,000 AF in 1969 and about 300,000 AF in the 1982–1983 period. The initial infiltration rates to the recharge basins is estimated to be 1,100 cfs over the 1,300 acres recharge area, with a corresponding long-term infiltration rate of about 700 cfs.



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FIGURE 3-5

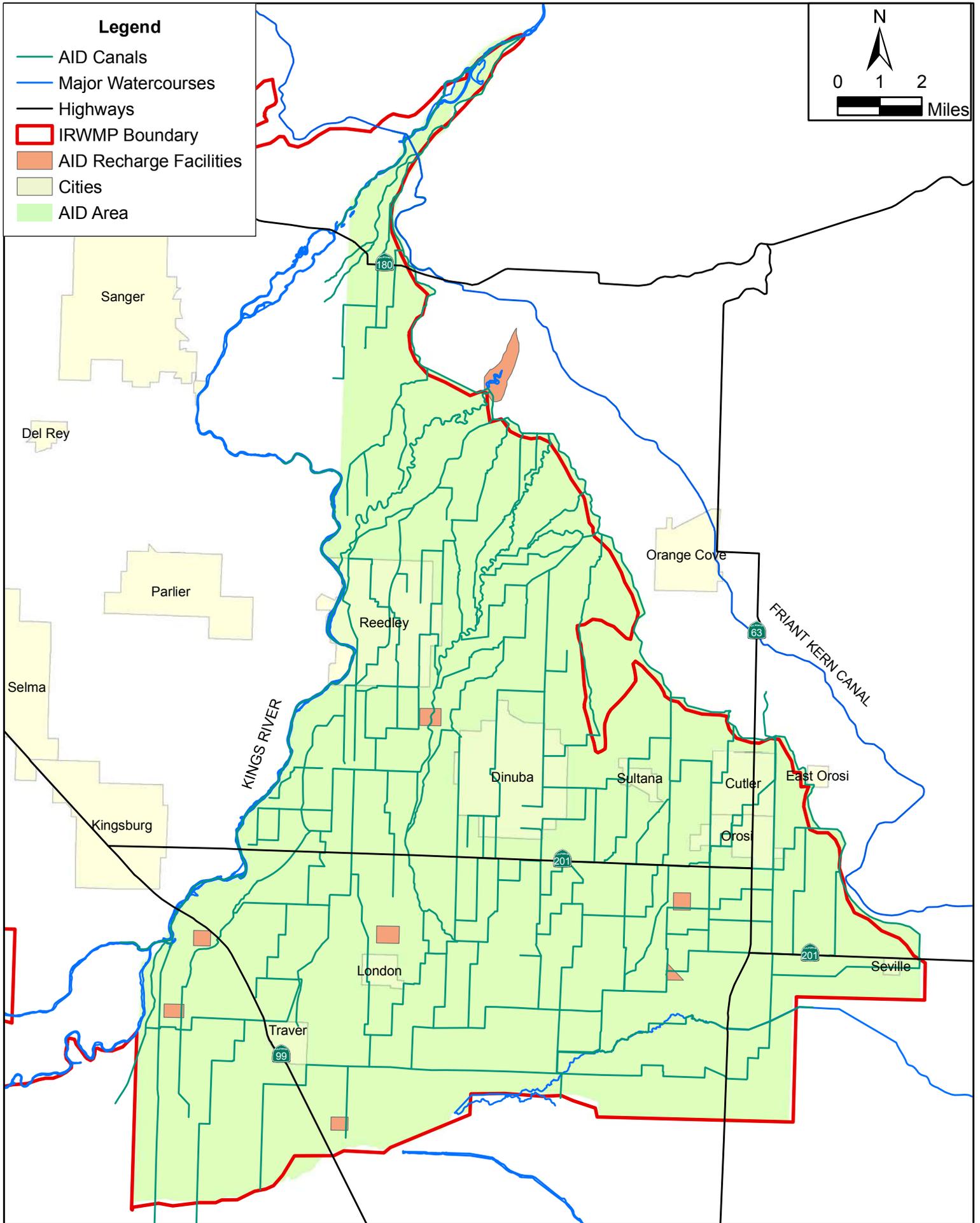
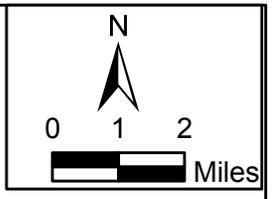
Kings River Flow Below James Weir

Upper Kings Basin IRWMP



Legend

-  AID Canals
-  Major Watercourses
-  Highways
-  IRWMP Boundary
-  AID Recharge Facilities
-  Cities
-  AID Area

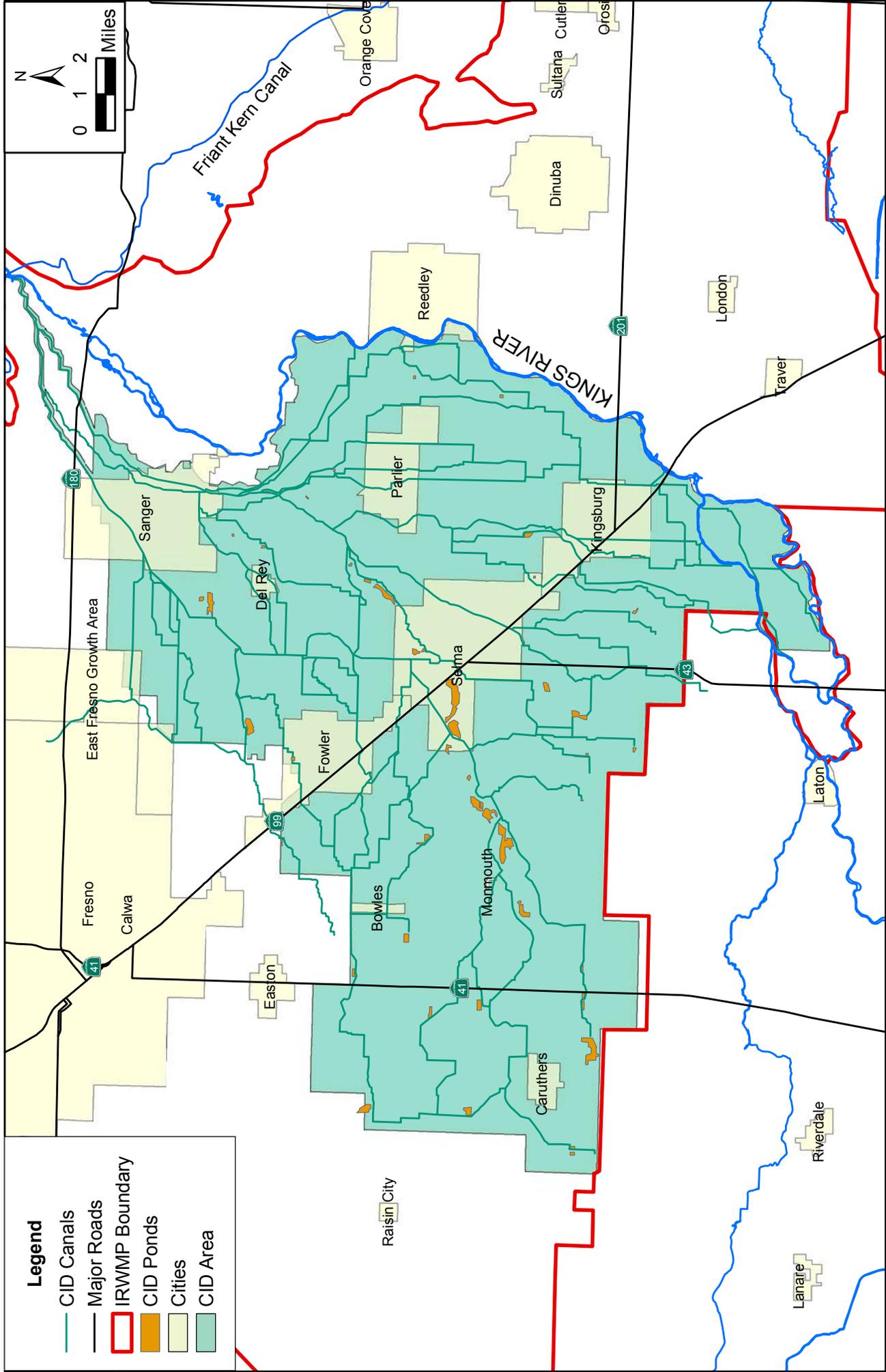


AID Canals and Recharge Facilities

Upper Kings Basin IRWMP

June 2007

Figure 3-6



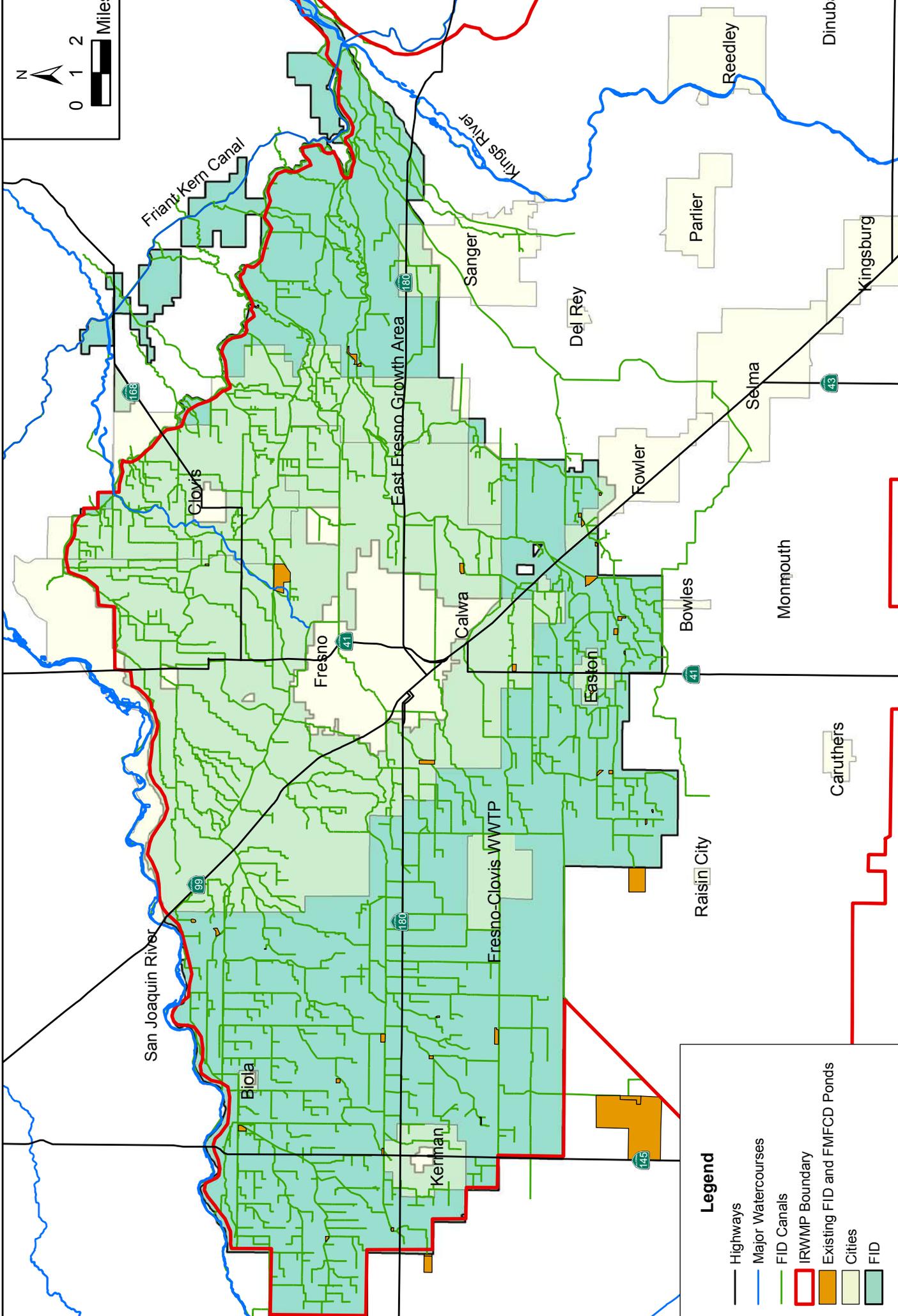
June 2007

Figure 3-7

CID Canals and Recharge Facilities

Upper Kings Basin IRWMP





FID Canals and Recharge Facilities

Upper Kings Basin IRWMP

June 2007

Figure 3-8



FID has recognized the importance of preserving and protecting its groundwater resources and has actively facilitated groundwater recharge in cooperation with FMFCD, City of Fresno, and City of Clovis. This includes 'in lieu' recharge programs that deliver surface water when available to minimize groundwater pumping. As of 2004, the in-lieu program includes delivery of surface water for treatment and distribution by Fresno and Clovis.

Intentional groundwater recharge in FID also involves using FID's delivery system to deliver portions of Fresno and Clovis water allocations to specific FMFCD-owned basins for recharge during the summer months when basins are not needed to control urban storm runoff.

FMFCD recharge ponds are joint use flood control and recharge ponds, and many also provide recreation benefits.

The Cities of Fresno and Clovis both own and operate significant recharge facilities to which a portion of the cities' water allocations is delivered through FID's system. The City of Clovis has recharged an annual average of 6,000 AF and, for the period from 1974 to 1999, has recharged a total of 145,140 AF in joint FMFCD facilities and the 63.5 acres of ponds owned by the City. The City of Fresno began artificial recharge at the 200-acre Leaky Acres facilities in 1971 and averaged 16,000 AF per year of recharge from 1980–1999. Under cooperative agreement with FMFCD, Fresno has also recharged Kings River and CVP water. FID owns recharge facilities located through its service area. Since 1988, an average of 54,450 AF per year has been put into the recharge basins to percolate to groundwater (KRCD, 1999).

Other San Joaquin Storage Facilities

Southern California Edison (SCE) and PG&E own and operate a number of dams and reservoirs on the San Joaquin River and its tributaries upstream of Friant Dam. The most notable of these are Edison Lake and Florence Lake. These upstream storage facilities are operated for the production of electrical energy and have a combined capacity of about 609,530 AF. Their operation affects the flow of water into Millerton Lake and subsequently the timing and availability of releases to Friant Unit Contractors. None of these storage facilities is designed or operated for flood control and the Corps currently has no jurisdiction over releases from these structures. Cumulative flood releases from the upper San Joaquin River dams could result in uncontrolled releases from Friant Dam.

3.3.2 FEDERAL AND STATE FACILITIES

Regional facilities owned and operated by the federal and state governments could have an influence on the IRWMP. Potential sources of future supply could include importation, water

transfers, or exchanges that make use of these facilities to convey water into the IRWMP Region. The regional state and federal facilities in the San Joaquin part of the Central Valley are shown in Figure 3-4.

Central Valley Project Reclamation is the Owner and Operator of the CVP

Central Valley Project facilities are used to manage water north and south of the Sacramento–San Joaquin Delta and to provide irrigation and municipal supplies to users in the San Joaquin Valley. Major CVP facilities include Trinity River Unit that diverts water into the Sacramento Valley, Lake Shasta, Folsom Lake, the Tracy Diversion Plant, Delta-Mendota Canal (DMC), and the San Luis Unit (owned in cooperation with the State of California). The DMC is used to deliver diverted Delta water at the Tracy Diversion for conveyance down the DMC to water contractors along its length and areas west and north of the IRWMP Region. The Mendota Pool is the terminus of the DMC. The CALFED Bay-Delta Program (CALFED), CVPIA, and SWRCB requirements place conditions on the CVP and influence the ability of the project to meet contractors' demands while also protecting public trust resources.

Friant Unit of the CVP

San Joaquin River flows are regulated by Friant Dam, which was constructed in 1942 and is managed by Reclamation as part of the Friant Unit of the CVP. Although Friant Dam serves to reduce release volumes in the main San Joaquin River, it was not sited, designed, or engineered for the purpose of flood control. Any flood control capability of the Friant Unit is incidental to its function as a water storage and diversion facility. The CVP Friant Unit consists of Friant Dam and Millerton Lake, the Friant-Kern Canal, which runs south to Kern County, and the Madera Canal, which runs northwesterly to Madera County. The Friant-Kern Canal conveys water into and through the IRWMP Region.

Releases from Friant Dam to the San Joaquin River and the Friant-Kern Canal provide surface water to users within Fresno County, including City of Fresno, City of Clovis, and the FID. There are no CVP contracts in the Tulare County portion of the IRWMP Region, which includes all of the AID service area.

The reservoir, Millerton Lake, has a storage capacity of about 520,300 AF. The storage capacity of Millerton Lake is inadequate for full flood protection during wet years and emergency releases may result in downstream flooding problems. The Corps has evaluated the operational plans for all the dams in the San Joaquin River system to determine the possibility of coordinated releases to reduce the likelihood of coincident peak flows downstream. Nevertheless, in 1997, emergency releases from Friant Dam combined with large storm events and several levee breaks downstream contributed to flooding along the San Joaquin River.

The amount of capacity in Millerton Lake that Reclamation keeps available for runoff varies throughout the year according to defined operating criteria that have been developed and agreed to by federal agencies (e.g., Reclamation, Corps) and state agencies (most notably the DWR).

The Friant-Kern Canal carries irrigation water from Millerton Reservoir southeast to Kern County. The Friant-Kern Canal was constructed by the Reclamation and is now managed by the Friant-Kern Water Users Authority. The average annual delivery from the canal is about one million acre-feet with a design capacity of 5,000 cfs. There is a spillway into the Kings River just upstream of a double barrel 24-foot diameter siphon under the river. This spillway can be used to deliver San Joaquin River flood water to the Kings River. San Joaquin flood water conveyed down the Friant-Kern Canal is known as 215 Water. However, at the times when San Joaquin Flood water can be delivered, the Kings River is usually in flood conditions as well.

Mendota Dam

Mendota Dam is operated primarily for irrigation. Mendota Pool is a 5,000 AF reservoir created by Mendota Dam located on the San Joaquin River just outside the City of Mendota. The primary functions of the dam are storage and diversion of irrigation water for agriculture, although the water level in the pool also functions to maintain water levels in the Mendota Wildlife Management Area. Mendota Pool provides little or no flood protection. Mendota Dam holds flows from the San Joaquin River as well as discharge and releases from the Kings River via the North Fork (Fresno Slough and James Bypass). The DMC conveys water from the Delta to Mendota Pool from the north. Several irrigation channels then divert the Delta flows to irrigation districts with CVP contracts. Reclamation, in coordination with the Central California Irrigation District, manages this system, which is part of the CVP. Reclamation has proposed replacing the existing structure with a new Mendota Dam, which may raise the water level in the pool.

CVP Exchange Contracts

Reclamation holds the majority of San Joaquin River water rights, which were acquired by Reclamation during the development/construction of the CVP Friant Unit facilities. These water rights were obtained through purchase and exchange agreements with the individuals and entities that held those water rights at the time the Friant Unit facilities were developed. Historically, San Joaquin River water was diverted by the downstream users, who became exchange contractors. The exchange contractors receive water from the DMC in exchange for their San Joaquin water. San Joaquin River water is now delivered to the east side of San Joaquin Valley through the CVP Friant-Kern and Madera Canals to supplement groundwater

pumping and help mitigate overdraft problems. Reclamation has obligations to deliver project water downstream of Friant Dam through water rights settlement contracts in the IRWMP Region.

Reclamation also provides an exchange supply for larger riparian water right holders farther downstream of Gravelly Ford. These water users, comprising Central California Irrigation District, Firebaugh Canal Water District (formerly Firebaugh Canal Company), San Luis Canal Company, and Columbia Canal Company, obtain their water supply from the Delta via the Delta-Mendota Canal and Mendota Pool.

If Reclamation is not able to meet its contractual obligations for water deliveries from the Delta, the exchange contract provides for releases from Friant Dam and delivery using the San Joaquin River. This could reduce water available for other CVP contractors in the IRWMP Region, but would have the benefit of increasing groundwater recharge along the San Joaquin River adjacent to the Kings Groundwater Basin.

3.3.3 STATE WATER PROJECT

DWR owns, operates, and maintains the SWP facilities on behalf of the water contractors. The SWP includes a wide array of facilities—including pumping and power plants; reservoirs, lakes, and storage tanks; and canals, tunnels, and pipelines—that capture, store, and convey water to 29 water agencies. The SWP contractors receive annual allocations as agreed to in their contracts, which will expire in 2035. In return, the contractors repay principal and interest on both the general obligation bonds that initially funded the SWP's construction and the revenue bonds that paid for additional facilities. The contractors also pay all costs, including labor and power, to maintain and operate the SWP facilities.

Water is diverted from the Delta and conveyed down the California Aqueduct, which can convey up to 13,000 cfs. The SWP water supply capability depends on rainfall, snow pack, runoff, reservoir storage, pumping capacity from the Delta, and legal environmental constraints on project operations. Project water supply comes from storage at Lake Oroville and high runoff flows in the Delta. Water deliveries to state contractors have ranged from 1.4 million AF in dry years to almost 4.0 million AF in wet years.

SWP contractors could be involved in multi-party transfers or exchanges as part of the IRWMP implementation strategy. Operations for the SWP may be constrained by SWRCB decisions and requirements to meet water quality objectives and flow standards in the Delta.

3.3.4 REGIONAL AND LOCAL FLOOD CONTROL AND STORM WATER MANAGEMENT

The large scale flood control for the IRWMP Region is provided by Pine Flat Dam and Pine Flat Reservoir and to a lesser degree by Friant Dam and Millerton Lake. More localized flood control and storm water management facilities are operated by a mix of special districts and land use agencies.

Kings River Flood Control Facilities Operations and Maintenance

The Federal Flood Control Act of 1944 authorized the construction of Pine Flat Dam and also authorized certain channel improvements along the Kings River downstream from the dam. Federal law requires that a local agency assume sponsorship of the levee projects. At the urging of the irrigation districts in the area, the KRCD undertook the sponsorship of the channel improvements in 1959 and the waterways banks along the right and left of the Kings River were transferred to the KRCD for operation and maintenance in 1971. In total, the KRCD maintains more than 140 miles of levee. Under the general provisions of the flood control regulations, the KRCD is responsible for maintenance and operation of flood control works for structures and facilities during flood periods and for the continuous inspection and maintenance of the project works at other times.

The principle mission of the Corps during flood emergencies is to operate Pine Flat Dam, work with the KRCD to ensure that flood control works are properly operated and maintained, and offer technical advice to enable local interests to obtain maximum flood protection.

Levee maintenance requires periodic inspections to ensure that maintenance measures are being effectively carried out. Such inspections are made immediately prior to the beginning of the flood season, immediately following each major high water period, and otherwise at intervals not exceeding 90 days and such intermediate times as are necessary to ensure the best possible care of the levees. Measures are taken to control erosion; exterminate burrowing animals; provide for removal of wild growth and drifts deposits; suppress or eradicate invasive plants and repair damage caused by erosion or other forces. In order to ensure that channel maintenance is accomplished in a manner which minimizes any adverse environmental impact, removal of healthy, large-diameter trees within the floodway is avoided where practical and vegetation is preserved as a part of selected clearing of the waterside berm, channel bank, or levee slope during normal maintenance operations. Semiannual reports are prepared for the Corps covering inspection of bridges, weirs, and structures within the designated floodway, maintenance, and operation of the protective works.

The Kings River channel improvement was designed by the Corps to protect the adjacent lands, railroads, highways, and towns from floods expected to occur less frequently than once in

100 years and to safely pass to Tulare Lake and the San Joaquin River the stream flows as regulated by the operation of Pine Flat Dam. Construction on the Kings River generally consists of channel improvement and levee construction as needed to maintain the capacities defined in Tables 3-10 and 3-11.

Table 3-10. Flood Capacities to Be Maintained on the Kings River

River Segment	Flood Capacity
Main Kings River	
Lemoore Weir to Island Weir	9,100 cfs
Island Weir to Crescent Weir	6,300 cfs
Kings River North (Fresno Slough)	4,750 cfs
Kings River South	3,200 cfs
Clarks Fork	2,500 cfs
Crescent Bypass	1,500 cfs

Table 3-11. Designated Flood Flows for the Kings River

Stream	Reach	Flow (cfs)	Gage Location	Gage Height (ft)
Kings River	Lemoore Weir to Island Weir	7,500	Downstream from Lemoore Weir	12.4
Kings River	Island Weir to Crescent Weir	5,000	Downstream from Island Weir	10.1
Kings River	Downstream from Crescent Weir	3,500	Downstream from Crescent Weir	10.0
Clarks Fork	All	2,000	Downstream from Army Weir	7.8
Crescent Bypass	All	500	(no gage)	-

The Fresno Metropolitan Flood Control District and Fresno-Clovis Area

The FMFCD Service Plan adopted in 2004 describes in detail the regional and local storm drainage and flood control facilities for the Fresno-Clovis metropolitan area (FMFCD, 2004). The Service Plan includes 163 adopted or proposed drainage areas, each providing service to approximately one to two square miles. All but five of the developed drainage areas are served by a retention or detention facility. The FMFCD flood control facilities are intended to control, contain, and provide for the safe disposal of storm waters that flow onto the valley floor from the eastern streams. These streams are collectively referred to as the Fresno County Stream Group. Regional FMFCD flood control facilities maps were provided by FMFCD and added to the IRWMP GIS. Table 3-12 lists the FMFCD current regional flood control facilities.

Table 3-12. FMFCD Major Flood Control Facilities

Facility	Description
Big Dry Creek Dam and Reservoir	Located on Big Dry Creek; controls Big Dry and Dog creeks; built in 1948 and enlarged in 1993; gross pool capacity of 30,200 AF; controls up to approximately 230-year event flood flows.
Fancher Creek Dam and Reservoir	Located on Fancher Creek; controls Fancher and Hog creeks, and several unnamed tributaries to Redbank Creek; built in 1991; gross pool capacity of 9,700 AF; controls up to 200-year event flood flows.
Alluvial Drain Detention Basin/Basin 'BX'	Located east of Enterprise Canal on Alluvial Drain; controls flows from Alluvial Drain and an unnamed tributary; built in 1993; gross pool capacity of 385 AF; controls up to 200-year event flood flows. Proposed modifications to the basin will increase the capacity to 891 AF.
Redbank Creek Detention Basin	Located at the confluence of Mill Ditch and Redbank Creek; controls flows from Redbank Creek; built in 1990; gross pool capacity of 940 AF; controls up to 200-year event flood flows.
Pup Creek Detention Basin/Basin 74	Located west of the Enterprise Canal on Pup Creek; controls flows from Pup Creek and from an unnamed tributary; built in 1993; gross pool capacity of 630 AF; controls up to 200-year event flood flows. Proposed modifications to the basin will increase the capacity to 785 AF.
Redbank Creek Dam and Reservoir	Located north of the Enterprise Canal at the confluence of the major Redbank Creek tributaries; controls the flows of Redbank Creek; built in 1961; gross pool capacity of 1,200 AF; controls up to the 200-year event flood flows.
Fancher Creek Detention Basin	Located south of McKinley Avenue at the divide of Mill Ditch and Fancher Creek; controls the flows of Fancher Creek and Mud Creek watersheds; currently under construction; gross pool capacity will be approximately 1,891 AF; will control up to the 200-year event flood flows.
Big Dry Creek Detention Basin	Located south of Ashlan Avenue and East of Freeway 168 at the confluence of Big Dry Creek and the Gould Canal; facility shares capacity with Drainage Area "C," CSUF, and Caltrans; controls flows in big Dry Creek; currently under construction; gross pool capacity will be approximately 259.8 AF; will help manage flows in Big Dry Creek originating from rural streams or urban discharges.

The FMFCD is the local sponsor of the Corps' Redbank-Fancher Creeks Flood Control Project, which consists of five of the system's major facilities. Through its contract with the federal government, the FMFCD is responsible for construction cost sharing, land acquisition, operation, and maintenance of the Redbank-Fancher Creeks project. The FMFCD is also responsible for construction, operation, and maintenance of additional, non-federal flood control facilities required to control the stream group and for Floodplain management.

All structural elements of the system were completed by January 1994. The Fancher Creek project is currently under construction and scheduled for completion in 2010. Fancher Creek Detention Basin will provide direct benefits to both the FMFCD and the Fresno Irrigation

District. An interagency operations agreement will be developed to provide for the joint use of the basin.

Between the easterly boundary of the planned urban storm water drainage system and the FMFCDs eastern boundary, there are approximately 175 miles of streams and channels, many of which are severely obstructed. The FMFCD operates a rural streams program to preserve, restore, and maintain these channels, and to complete any additional facilities necessary to safely convey storm flows through the rural area and the downstream urban areas.

The local drainage program relates to the collection and safe disposal of storm water runoff generated within the urban and rural watersheds or "drainage areas." The FMFCD local storm water drainage system consists of storm drains, detention and retention basins, and pump stations.

Flood Control in the Incorporated Areas

Most of the incorporated cities in the IRWMP Region operate their own storm drainage and flood control system. The exceptions are the cities of Fresno and Clovis which are managed by the FMFCD. Many cities also rely on the larger levee systems maintained by KRCD and the irrigation districts for flood protection. The irrigation district canals also move water around and away from the cities. The local storm drainage and flood control systems for the incorporated cities within the IRWMP Region are described below. The local storm drainage system for the Cities of Clovis and Fresno were described above.

San Joaquin River Flood Control Facilities and Operations

From Friant to Gravelly Ford, the San Joaquin River is part of the Designated Floodway Program administered by the State Reclamation Board. Land use restrictions and river management practices allow the river to meander, flood the overbank areas, and remain in a relatively natural state. Downstream of Gravelly Ford, the river is confined by levees. The design capacity of the San Joaquin River from Friant Dam to Chowchilla Bypass is in excess of 8,000 cfs while the channel capacity downstream is reduced. The major San Joaquin River flow constraint is the reach near Mendota and Firebaugh. Beyond that point, San Joaquin River channel capacity continues to decrease for some distance due to lack of annual flooding and natural channel clearing since Friant Dam was constructed. Further downstream, the river channel has been deepened and widened by historic flows of the Merced River, Tuolumne River, and other tributaries.

Tulare County Unincorporated Areas

Tulare County has summarized existing information regarding Tulare County's drainage facilities, specifically identifying communities that lack storm drain facilities or rely only on surface drainage (Tulare County, 2004). Tulare County is the lead agency in providing storm drain infrastructure within the unincorporated areas of the county. Many of the unincorporated small communities have no underground drainage infrastructure, leaving only surface drainage which is more subject to flooding, and/or have infrastructure that is not properly functioning due to little or nonexistent facility maintenance. The County also recognizes that surface draining also poses a potential threat to wildlife, farm animals, and groundwater supplies, as there is limited ability to treat the water before it flows into a basin, or other surface waters such as a creek, irrigation ditch, or river. Storm water drainage infrastructure within unincorporated Tulare County is owned and managed by the Tulare County Resources Management Agency. Storm drain infrastructure improvements are generally constructed in conjunction with transportation improvement projects and site development projects.

The largest storm drain system within Tulare County is the Cutler-Orosi system. Storm water is collected through a series of pipes and pump stations, the majority of which is transported and discharged into Sand Creek, which discharges to the Kaweah River. A portion of the Cutler-Orosi storm water collection system connects to a state storm drain system that runs along SR 63. Tulare County is currently working with the RWQCB on the preparation of a Storm Water Management Plan. Storm drain infrastructure in smaller communities generally consists of underground and surface collection facilities that transport the water to local retention ponds and/or local streams. Generally, new subdivisions within the county are required to provide land for storm drain infrastructure purposes.

The flood carrying capacity in rivers and streams has decreased as trees, vegetation, and structures have increased along the Kings Rivers and other local drainage ways. Confined floodplains can result in significantly higher water elevations and higher flow rates during high runoff and flood events. Updated channel analyses have not been performed to determine the amount of obstruction posed by vegetation and development in the Kings River channels. As such, the background report acknowledges that the Federal Emergency Management Agency (FEMA) maps depicting the 100-year floodplain for the rivers probably do not reflect the true extent and risk of flooding hazards in Fresno, Kings, and Tulare counties. FEMA is currently updating the flood zone maps in California.

3.3.5 DOMESTIC WATER SERVICE PROVIDERS AND SYSTEMS

Domestic water service is provided by a wide mix of providers. Municipal utilities provide water to most of the larger cities with the exception of Selma, which is served by California

Water Service. Historically, all of the cities relied on groundwater. As a result of overdraft and groundwater quality issues, the Cities of Clovis and Fresno recently completed surface water treatment plants to increase their conjunctive use programs and make use of available surface supplies and entitlements. Unincorporated communities in Fresno and Tulare Counties are served by CSDs, CSAs, or PUDs and rely almost exclusively on groundwater. The capital facilities plans of the domestic service providers are foundational actions for the water quality program element of the Upper Kings Basin IRWMP.

Information on public water systems was obtained through review of the city and county general plans, local GWMPs, available water supply master plans or capital facility plans, and through contacts with Fresno and Tulare LAFCOs, DHS, or local public works departments. Water supply and systems data was not readily available for Orosi PUD, Caruthers CSD, City of Fowler, City of Kingsburg, Del Rey CSD, London CSD, Cutler PUD, Sultana CSD, Fresno County PWD, Easton CSD, City of San Joaquin, City of Mendota, and City of Kerman. The County general plans or other sources were relied on for information on these locations. The Baseline Conditions Technical Memorandum (WRIME, 2006c) contains more detail for each of the water systems.

Areas of residential development exist throughout the unincorporated areas of the IRWMP Region. Domestic users in the areas of development concentration that are not served by public entities, rely on individual wells, or are provided water by small mutual water companies or private community water systems regulated by local Environmental Health departments. This includes the area in and around Raisin City in Fresno County. The public water systems in the unincorporated IRWMP Region are discussed below.

3.3.6 WASTEWATER COLLECTION, TREATMENT, DISPOSAL

The capital facilities plans of the local wastewater treatment service providers are foundational actions for the water quality program element of the Upper Kings Basin IRWMP. Wastewater collection, treatment, and disposal are regulated by the Central Valley RWQCB. Local government and special districts own and operate collection systems (sewers) and wastewater treatment plants. All of the entities that treat and discharge wastewater obtain permits from the RWQCB to discharge treated plant effluent and dispose of biosolids (sludge). Residents in rural areas that are not served by sewers most often use on-site septic systems. Industries are required to provide pretreatment of their waste prior to discharge to a publicly owned treatment works or they must obtain separate discharge permits from the RWQCB if they are operating independent facilities. The objective of such permits is to preserve surface and groundwater quality for beneficial use and to protect the public health. With the exception of Reedley, which has an NPDES permit, none of the plants discharge directly to surface water.

There are 362 permitted dischargers in Fresno County. More than 70% of all discharges are classified as municipal, and are mostly domestic waste, and 90% of municipal flows are generated within corporate city limits. Similar statistics were not readily available for Tulare County. Most non-municipal waste is derived from agricultural-based industries, primarily food processing and packing. Detailed information on wastewater treatment and disposal facilities for the incorporated and unincorporated areas is provided in the Baseline Technical Memorandum.

Incorporated Areas

All incorporated areas within Fresno County and Tulare County are served by local wastewater collection and treatment facilities. The majority of treated wastewater is domestic (household type) waste with a small amount (estimated at 0–11% depending on the city) coming from industrial discharges. Most treatment plants provide secondary treatment, but some smaller cities still have primary treatment facilities. Other cities in the county generally have adequate capacity for the foreseeable future. The Fresno County General Plan Background Report (Fresno County, 2000) provided a summary of treatment facilities and identified sources of available sewer collection system maps. A baseline conditions report has been produced by Tulare County as part of the general plan update program (Tulare County, 2004). The description of existing wastewater collection, treatment, and disposal facilities is provided in this section. There are no metropolitan areas in the Kings County part of the IRWMP Region.

Unincorporated Communities

Unincorporated communities use community service or special districts to provide sewage and wastewater collection and treatment. Fresno County owns and operates nine sewage and wastewater treatment facilities on behalf of water works districts (WWDs) and CSAs. Tulare County unincorporated areas are served by a number of districts as discussed below. The RWQCB actively encourages consolidation of services and increased reclamation of treated effluent as the most economical methods to achieve water quality objectives in the area.

Most treatment facilities currently use evaporation/percolation ponds for effluent disposal. The RWQCB recognizes this as a viable interim disposal solution, but remediation of treated effluent for irrigation purposes is preferred in order to reduce impacts to groundwater and salts accumulation. Tertiary treatment will likely be required to achieve the reclamation goals, but presently few communities are capable of providing advance levels of treatment.

Industries, mostly food processing plants, also treat wastewater treatment and discharge in unincorporated areas of the county. The RWQCB issues discharge permits to industrial facilities.

Many rural landowners use private on-site septic systems for wastewater treatment and disposal. Over the past few years, an average of approximately 500 permits for new individual septic systems have been issued annually in the unincorporated portions of Fresno County, though it is not known how many are issued specifically in the IRWMP Region. Similar information for Tulare County was not obtained.

Fresno County's Mandatory Sewer Connection Ordinance requires connection to public sewer systems, where they are available, precluding the issuance of permits for installation of individual septic systems in such cases. In areas where public systems become available where they did not previously exist, structures of individual septic systems must be connected to the public system within three years or sooner if the existing facilities pose a health risk. In the event that required connections are not made within the required three-year period, the County may cause such a connection to be made, with the cost of the connection assessed to the landowner.

Urban areas served by on-site septic systems have had problems with accumulation of nitrates in groundwater (e.g., the Calwa area in southeast Fresno-Clovis Metropolitan Area); however, these problems have been ameliorated when these areas are connected to a sewer utility. In addition, the Sunnyside unincorporated island in southeast Fresno, which was historically developed with seepage pits, is planned to be connected to the local sewer system.

3.4 WATER QUALITY

This section briefly reviews current surface water and groundwater quality conditions, known problems, and surface water and groundwater quality management programs. Site specific review of water quality issues and data would be conducted as part of the proposed IRWMP development project or during the environmental review of a proposed project.

The quality of the available surface water and groundwater supplies influences the ability to put the water to use. If the quality of the water is degraded beyond the ability to put the water to the intended use, overall supply is limited, or the cost for additional treatment is increased.

3.4.1 SURFACE WATER QUALITY

The major surface water source for the IRWMP Region is the Kings River, which has high quality water due to its origin in the uplands of the Sierra Mountains. As it collects agricultural return flows in the Valley, the instream water quality gradually declines. However, the water quality in the Kings River in its upper reaches is generally of high quality.

The lower Kings River from the Island Weir to the Stinson and Empire Weirs (Figure 3-3) has elevated levels of electrical conductivity, molybdenum, and toxaphene, as listed in the Clean Water Act 303(d) list maintained by the SWRCB. The SWRCB gives the reach a low priority for the development of a TMDL.

The Kings Basin is covered by the Basin Plan (Central Valley Regional Water Quality Control Board [RWQCB] 2004). The Basin Plan addresses the surface water quality issues of the Kings River, indicated by the listing on the 303(d) list, stating that the likely sources of the contaminants are either surface or subsurface agricultural drainage and declaring that additional on-farm management practices may be necessary as the levels of boron, molybdenum, sulfates, and chlorides become high enough to affect agricultural uses and aquatic resources. A number of BMPs have been recommended. The Basin Plan also recommends a surface water monitoring network selected from existing DWR monitoring points. Samples will be taken to monitor for the mineral character of the stream, occurrence of toxic substances, general levels of nutrients and biological responses, and common physical characteristics. In addition, the Basin Plan calls for continued monthly monitoring by KRCD of the Kings River for electrical conductivity, pH, and temperature; continued monitoring by RWQCB for constituents and areas of special concern; and monitoring by RWQCB of storm discharges from Naval Air Station Lemoore for hydrocarbons.

The U.S. Geological Survey (USGS) has done water quality work in the San Joaquin–Tulare Basins through the National Water Quality Assessment (NAWQA) program. The bulk of readily available data has been concentrated in the San Joaquin River and in the areas closer to the Sacramento–San Joaquin Delta; there are few data points for the Kings Basin. Other available USGS information was collected during studies to describe water quality associated with various land uses, rather than identifying local or regional water quality trends and conditions. There is some USGS information on surface water quality, including a bed sediment and tissue sampling event in 1992. Results of bed sediment sampling in 1992 showed levels below detection limits for 16 organochlorine pesticides in the Kings River bed sediments below Pine Flat Dam and below Empire Weir 2 near Stratford. Three sites in the Kings Basin were sampled for 14 organochlorine pesticides in tissue of fish below Pine Flat Dam, at Peoples Weir near Kingsburg, and below Empire Weir 2 near Stratford. Detections were made for P, P'-DDD (6µg/kg below Empire Weir 2 near Stratford) and P, P'-DDE (16 µg/kg at Peoples Weir near Kingsburg and 95 µg/kg below Empire Weir 2 near Stratford); all other locations showed no detections (USGS, 2004).

For nearly two decades, growers in California operated under a conditional waiver that allowed for discharge of agricultural return flow and storm water runoff from agricultural lands (among others) without the issuance of a WDR. In 1999, SB 390 was adopted and resulted in the sunset of all waivers on January 1, 2003. Since the passage of SB 390, the RWQCB has adopted

conditional waivers as an interim step in an evolving irrigated lands program. The interim waivers are focused on building the capacity of local groups, engaging with individual dischargers, and starting data collection, all of which will be part of the foundation for the longer-term program.

As a result, growers have been organizing into groups such as the SSJWQC, which represents KRCD, KRWA, and other water districts to the south. The mission of the SSJWQC is to develop plans and implement practices that address water quality issues and concerns affecting the Tulare Lake Basin as part of the agricultural waster discharge permit waiver program. The SSJWQC participating agencies believe that they will be better served approaching these and other water quality issues on a regional basis rather than individually, and will implement monitoring plans to detect problems and management plans should problems be identified.

3.4.2 GROUNDWATER QUALITY

The Kings River drainage area is predominantly underlain by granitic rocks. Therefore, the water from the drainage area is of the following types: calcium sodium; sodium calcium; and calcium bicarbonate type, the last one being the predominant type. The same type of water is also typically seen in the groundwater system. Groundwater adjacent to both perennial and intermittent streams generally is similar in chemical type to that in the streams. Adjacent to intermittent streams, dissolved solids content in groundwater generally is lower than that in surface water, but near perennial streams it is usually higher than that in surface water. As groundwater in the area moves down gradient from areas of recharge, it exchanges some of its calcium and magnesium with sodium on exchange positions of clay minerals and thus increases slightly in sodium content. In the central western and southwestern parts of the study area, where sodium bicarbonate water occurs, there is an increase in percent sodium. In the northwestern part of the study area near the valley trough, groundwater is sodium chloride type.

Approximately 95% of the groundwater in the IRWMP Region is bicarbonate type containing calcium, magnesium, or sodium as the predominant cation. The average TDS concentration is 250 parts per million (ppm). Concentrations can exceed 2,000 ppm as aquifer depth increases. Aside from pesticide and nitrate concerns in some areas, the groundwater is well suited for drinking.

The most widely detected pesticide in groundwater is the soil fumigant dibromochloropropane (DBCP). DBCP, used primarily on vineyards and orchards, has been widely detected throughout the study area. Triazine and other organonitrogen herbicides are commonly detected in groundwater when DBCP is found. In general, pesticides in groundwater of the east

side of the valley are more prevalent than in groundwater of the west side of the valley. This is primarily due to variations in soil types.

Although DBCP is the most commonly detected pesticide, other detected pesticides include: atrazine; bromacil; 2, 4-DP; diazinon; 1, 2-dibromoethane; dicamba; 1, 2-DCP; diuron; prometon; prometryn; propazine; and simazine. With the exception of diazinon, all these pesticides are applied directly to the soil, not to vegetation. Pesticide concentrations found in the study area rarely exceed drinking water standards, with the exception of DBCP. Pesticide residues in groundwater can be attributed largely to soil properties, chemical or physical properties of the pesticides, types of pesticides used, land use or cropping pattern, and depth to groundwater. Most groundwater pesticide residues are detected on the east side of the valley. These residues were attributed to sandy or coarse-grained soils of Sierra Nevada provenance, a relatively shallow groundwater table in some subareas, and the use of water soluble pesticides with long environmental half-lives. The lack of detections in the west side of the valley is attributable to a long residence time of pesticides in fine-grained sediments of the unsaturated zone and the slow velocity of water recharge. The long residence time allows for degradation reactions to take place.

Nitrate concentrations in study area groundwater have frequently exceeded drinking water standards. A nitrate sampling program conducted from 1950 to 1969 included eight samples that had concentrations greater than 90 ppm; 50 samples had concentrations greater than 45 ppm but lower than 90 ppm; and 1,814 samples had concentrations lower than 45 ppm. In a nitrate sampling program conducted in 1995, nitrate concentrations exceeded the drinking water standard in about 17% of the 30 samples taken from domestic water supply wells. Nitrate concentrations ranged from below detection limits to 34 ppm.

The 303(d) list mentioned in the Surface Water Quality section covers only surface water. The State of California produces a 305(b) report, which contains the 303(d) list pursuant to the Clean Water Act. California voluntarily includes groundwater information in the 305(b) report. The most recent 305(b) report is the 2002 California 305(b) Report of Water Quality (SWRCB August 2003). Groundwater summary statistics in the 305(b) report note that Kings Basin (as defined in Bulletin 118, Basin 5-22.08) contains public supply wells that samples showed exceed MCLs for certain constituents. From the 450 and 500 samples, one or more constituent exceeded MCLs for the following contaminant groups:

- Inorganics-Primary (8 samples);
- Inorganics-Secondary (41 samples);
- Radiological (24 samples);
- Nitrates (23 samples);
- Pesticides (105 samples); and

- Volatile Organic Compounds (VOCs) (17 samples).

3.5 ENVIRONMENTAL RESOURCES

KRCD staff documented the Environmental Baseline Conditions in the Kings Region (KRCD, 2006b). The purpose of the document was to provide a baseline of existing biological and habitat resources in the Kings Region. It describes the biotic regions, plant and wildlife habitats, wildlife and fish species, special status species, wetland, regulatory setting and agencies, standards of significance for environmental impacts and the potential biological impact in the Kings Region. The information was compiled to guide the planning and siting of projects in order to avoid impacts to biological resources; expedite preparing project initial studies or CEQA documents; support resolution of permitting issues; and reduce the potential for project delays due to unforeseen environmental constraints. The compiled information may also help identify how to incorporate environmental benefits into project plans. Information in the document is summarized below.

3.5.1 ENVIRONMENTAL WATER DEMAND

In the Upper Kings Basin, some water is dedicated to meeting environmental demands. In 1964, the California Department of Fish and Game set an instream flow requirement of 50 to 100 cfs below Pine Flat Dam to sustain fish and wildlife. However, this requirement is not restrictive for most of the year. The Kings River is not designated a Wild and Scenic River below Pine Flat Dam, so there is no water requirement for this purpose. During summer months, the large quantities of water that are released to meet agricultural demands are also used to cover the instream flow requirement. During the winter months, Mill Creek and Hughes Creek, tributaries to the Kings River below the Pine Flat Dam, naturally feed the Kings River to meet the instream flow requirement. There is also a small area of managed wetlands that require Kings River water; however, the demand for these wetlands is less than 10,000 AF per year. There is no Bay-Delta outflow requirement because historically the Kings River water did not flow north to the San Joaquin River (KRCD, 1997).

Water dedicated to environmental uses cannot be put to use for other purposes in the location where the water is reserved; however, it may be put to other uses further downstream as mentioned in the above paragraph. Another example is the mainstream of the Kings River and the South and Middle forks above 1,590 feet elevation. These stretches of river are designated as Wild and Scenic Rivers and have water reserved for this purpose. However, after flowing through these sections of river the same water is then used to meet urban and agricultural demand once it reaches the valley.

There are ongoing fisheries studies in the Kings River, below Pine Flat Dam as part of the Kings River Fishery Management Program, described below. Preliminary results indicate that meeting fishery flow requirements and environmental demands associated with restoration in this area could be integrated with a conjunctive use project in the Upper Basin to provide multiple benefits. This will be studied further during the development of the Upper Kings Basin IRWMP.

3.5.2 AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE AND OTHER SENSITIVE HABITATS

Rapid development often tends to create ecosystem imbalances that have long-term adverse impact on a region. Therefore, proper identification and protection of areas of special biological significance and sensitive habitats is an essential component of a successful IRWMP. The currently know areas of special biological significance and other sensitive habitats are described below. During the development of the proposed IRWMP, extensive inventory tasks will be conducted to identify other areas of biological and environmental significance.

Kings River

The Kings River is the main river in the project study area and the lower San Joaquin Valley. The river runs through Fresno, Tulare, and Kings Counties, and is the best and most prominent riparian and wetland habitat in these counties. The river and its associated habitat are special areas of biological significance. The Kings River, its tributaries, and sloughs are the lifeline of riverine-riparian habitat that links the Sierra Nevada mountains to the foothills to the valley floor. Historically, the Kings River has been linked to the Tulare Lake, the expansive wetlands in the Kerman-Mendota area, and the San Joaquin River, and also northward to the Sacramento Delta. These areas have tremendous fish, wildlife, and habitat resources. The habitat linkages and resources still exist, but have been reduced and degraded over the last century. The river and its riparian habitat are the main corridors for fish and wildlife movements. The river is a major stopover habitat for birds migrating south from the Sierra Nevada mountains, western United States, and even Canada. Such birds range from small warblers to the Bald Eagle. The flood corridor also provides a buffer between the river and the adjacent farmland and towns.

Conservation Areas

The IRWMP Region is geographically located among several important conservation areas. Important conservation areas in the region include the San Joaquin River to the north, Sierra and Sequoia National Forests to the east, and the Griswold, Tumey, and Panoche Hills to the west. Important conservation areas closer to the IRWMP Region include a 6,000-acre Wetland Reserve Program parcel near Helm, another 1,000-acre Wetland Reserve Program parcel near

Lemoore, the 12,000-acre Mendota Wildlife Management Area, the 3,000-acre Alkali Sink Ecological Reserve and Kerman Ecological Reserve near Kerman, lands on the Lemoore Naval Air Station near Lemoore, and a 500-acre sensitive plant preserve near Piedra. Also, small parcels of native grassland and alkali sink habitats that have not been developed or farmed are scattered throughout the valley. A few developed and undeveloped county parks occur near the Kings River, which provide open space, wildlife habitat, and recreation. Such parks include Avocado Lake Park, Green Belt Parkway, China Creek Park, Laton-Kingston Park, and Burris Park.

The conservation areas provide riverine, riparian, wetland, Valley Oak woodland, annual grassland, and alkali sink habitats that are all unique. Such areas are known to have a high abundance and diversity of fish and wildlife, including both resident and migratory populations. The areas are also habitat for threatened, endangered, and sensitive species such as the Valley Elderberry Longhorn Beetle, San Joaquin Kit Fox, Fresno Kangaroo Rat, American Badger, Giant Garter Snake, Western Pond Turtle, Swainson's Hawk, Tricolored Blackbird, Burrowing Owl, California Jewelflower, and Keck's Checkerbloom.

3.5.3 PROTECTED AREAS AND IMPAIRED WATER BODIES WITHIN THE REGION

The SWRCB develops a list of water quality limited stream segments or water bodies, known as a 303(d) list pursuant to the Clean Water Act (1972), Article 303(d). This list indicates whether the water body is meeting the needs of the designated beneficial use as a result of known water quality problems. The latest available 303(d) list was prepared by SWRCB and RWQCB in 2002. It includes the segments of the north and south forks of the Kings River from Island Weir to the Stinson and Empire Weirs. The Kings River in this reach has elevated levels of electrical conductivity, molybdenum, and toxaphene. The 303(d) list gives the reach a low priority for the development of a TMDL.

Mendota Pool, on the western edge of the Kings Groundwater basin, as shown in Figure 3-1, is also listed in the 303(d) list and has been defined as impaired by elevated selenium levels, potentially because of agriculture, groundwater withdrawal, or other sources. The 303(d) list also gives Mendota Pool a low priority for the development of a TMDL. The Lower Kings Basin is not likely a significant contributor to the issues at Mendota Pool, but could be affected by water quality issues should Mendota Pool water be considered as a source of water for recharge.

3.5.4 IMPORTANT ECOLOGICAL PROCESSES AND ENVIRONMENTAL RESOURCES

The majority of the IRWMP Region has been ecologically modified through urbanization and agriculture, making the remaining habitat limited and valuable. The IRWMP will seek to

integrate and incorporate the existing resource protection strategies and policies, as defined in the prevailing land use plans, with the water resources strategies as part of the development of the IRWMP. KRCDD and the Water Forum will work with the responsible and trustee agencies through early consultations to collect prior studies and resources inventories so that contemporary information on ecological processes and environmental resources are included in the IRWMP. The information will be used to conduct preliminary environmental evaluations and to screen water management strategies and IRWMP alternatives. The information will also be used to: (1) influence project designs and avoid impacts, and (2) identify opportunities to enhance or improve conditions for the purposes of providing regional benefits.

Wetlands and Riparian Resources

The rivers and streams that flow from the Sierra Nevada Mountains historically meandered through broad floodplains in the San Joaquin Valley. Because of urbanization and agriculture, these broad floodplains have been restricted to narrower belts along the rivers and streams or otherwise modified for flood control. Within this modified landscape, remaining riparian habitat is of great value to resident and migratory animal species as it provides corridors and linkages to and from the biotic regions of the county. The numerous essential habitat elements provided by the remaining riparian/riverine corridors in the area make them perhaps the most significant contributor to wildlife habitat throughout the region. The Kings Basin still contains large wetlands and wildlife refuge areas, while the foothills contain vernal pools. These areas support many specialized plant and animal species. Existing county and city policies will be referenced to provide guidance to the IRWMP and to make the goals, policies, and objectives of the land use or regional habitat conservation plans part of the regional program. Avoidance, minimization, and mitigation will be considered in project designs and to the planning criteria used to rank and evaluate alternatives for the development of the IRWMP.

Fish and Wildlife Habitat

The Region includes a range of habitats that are found from the spine of the Sierra Nevada Mountains, through the foothills of the Sierra Nevada, and into the Central Valley. Different parts of the Fresno County can be described in terms of 29 distinct habitat types based on the composition and structure of vegetation found in each area. Within these habitats, there is a close relationship between natural vegetation and wildlife. The disruption of natural vegetation areas alters the food chain upon which many animals are dependent. The preservation of natural vegetation areas is, therefore, key to the abundance and well being of many wildlife species. Existing land use and habitat management policies will be documented and used to ensure compliance and consistency with current goals to protect natural areas and preserve the diversity of remaining habitats in the Region.

3.6 SOCIAL AND CULTURAL MAKEUP OF THE REGIONAL COMMUNITY

The Central Valley of California is home to five of the top 10 counties in the nation in agricultural production. Fresno and Tulare Counties are ranked number one and two in this list. The Upper Kings Basin IRWMP Region includes these two counties and Kings County, another predominantly agricultural area. However, there is a clear shift in population and demographics in this region due to its proximity to some of the most expensive and growing urban areas in the nation. The cheaper land costs in the Central Valley and population growth in California is expected to make this region a leader in the growth rate over the next 20 years.

This growth is going to test an already challenged region that is home to many of California’s poorer communities. Chronic high unemployment has plagued the counties in the region for more than three decades. Low per capita income and isolation from the economic engines of the Bay Area and Los Angeles Basin have led to a cluster of poverty in many of the counties in Central Valley. According to the 2000 census, around 11.1% of U.S. residents were foreign-born compared to somewhere between 16.0 and 24.0% of those residing in the Central Valley counties. Language barriers also are prevalent in this region. More than 30% of the people in this region speak a language in their home that is other than English as compared to fewer than 18% in the entire nation. Despite these challenges, the region is home to a hard-working people, to labor leaders, to business leaders, and to entrepreneurs who are collaborating to bring about change for the betterment of the region. Relevant social and economic data is presented below in Table 3-13.

Table 3-13. Socio-Economic Information on Counties in the IRWMP Region

	Fresno County	Tulare County	Kings County
Population 1990	667,000	302,000	94,000
Population 2000	763,000	368,000	129,000
Percent Population Growth	14.3%	18.6%	27.6%
Median Household Income	\$35,000	\$34,000	\$36,000
Median Age	30	29	30
% of Total Workers Employed in Agriculture	11.6%	18.6%	19.0%

Source: 2000 Census Data

3.6.1 ECONOMIC CONDITIONS AND TRENDS

Economic development in the region requires a stable and reliable water supply of appropriate quality. The water supply reliability and water quality are critical to maintaining the local economy in three primary sectors: jobs creation, economic diversification, and housing. During the second half of the twentieth century, the Region’s economy has been driven by agriculture

and residential development. Despite the success of the agricultural economies and urban growth, the Region's unemployment rate has remained among the highest in California and the average wage levels have been low. Economic development will require the water districts, counties, cities, private sector, and other organizations to create good jobs at a faster rate than population growth to bring the Region in line with the rest of California in terms of employment rates and wage levels.

3.6.2 JOBS

The counties and cities are working to create jobs, expand and diversify the economic base, and prepare the labor force for the changing global economy. One of the regional priorities is to expand the region's job base to strengthen the area's historical economic base of agriculture. It is essential for the county's agricultural economy to remain at the cutting edge in crop selection and growing practices, and this requires an adequate water supply.

Technological and marketing advances have opened up new global markets for the Region's produce. At the same time, shifts in cropping patterns can have very positive impacts for employment opportunities. Shifts in consumer preferences and technological advances in food processing have created many new economic opportunities in agriculture. Combined with emerging international markets, the volume demand can support a scale of production well beyond the crop levels currently produced. Therefore, value-added food processing can become a much stronger industrial sector in the region, creating an increased number of well-paying jobs, but this can only occur with a sustainable water supply.

3.6.3 DIVERSIFIED ECONOMIC BASE

A stable and reliable water supply is needed to improve economic stability, accelerate the pace of job growth, maintain the quality of life for residents in the county, and diversify the job base in the Region. Opportunities for diversification exist both in old and new industrial sectors. Industries such as metal fabrication and machinery that have emerged from the Region's historical agricultural economy are now heavily engaged in production of a wide range of components for the consumer economy. Newer business opportunities in areas such as information technology have also gained a foothold in the region and should be nurtured and expanded into cornerstones of the future regional economy.

Every year, the area plays hosts to millions of visitors, more than half of which come for recreation. As the region's economy diversifies, demand for business travel will increase, with the need to develop more and better accommodations, amenities, and services. Similarly, the Region's location as a gateway to Yosemite and the other Sierra attractions creates the opportunity for recreational and resort development in the foothills that can have a very

beneficial impact on the local economy. Water is needed to diversify the economy, support recreational uses, and sustain current economic development and land use plans.

3.6.4 HOUSING

Cost effective water supplies are needed to support the areas and meet the housing goals and objectives passed down to the state and adopted in the regional city and county housing element of the local general plans. With low median incomes, additional costs for drinking water treatment, delivery, and wastewater treatment will be important if housing is to be affordable to low and moderate income households.

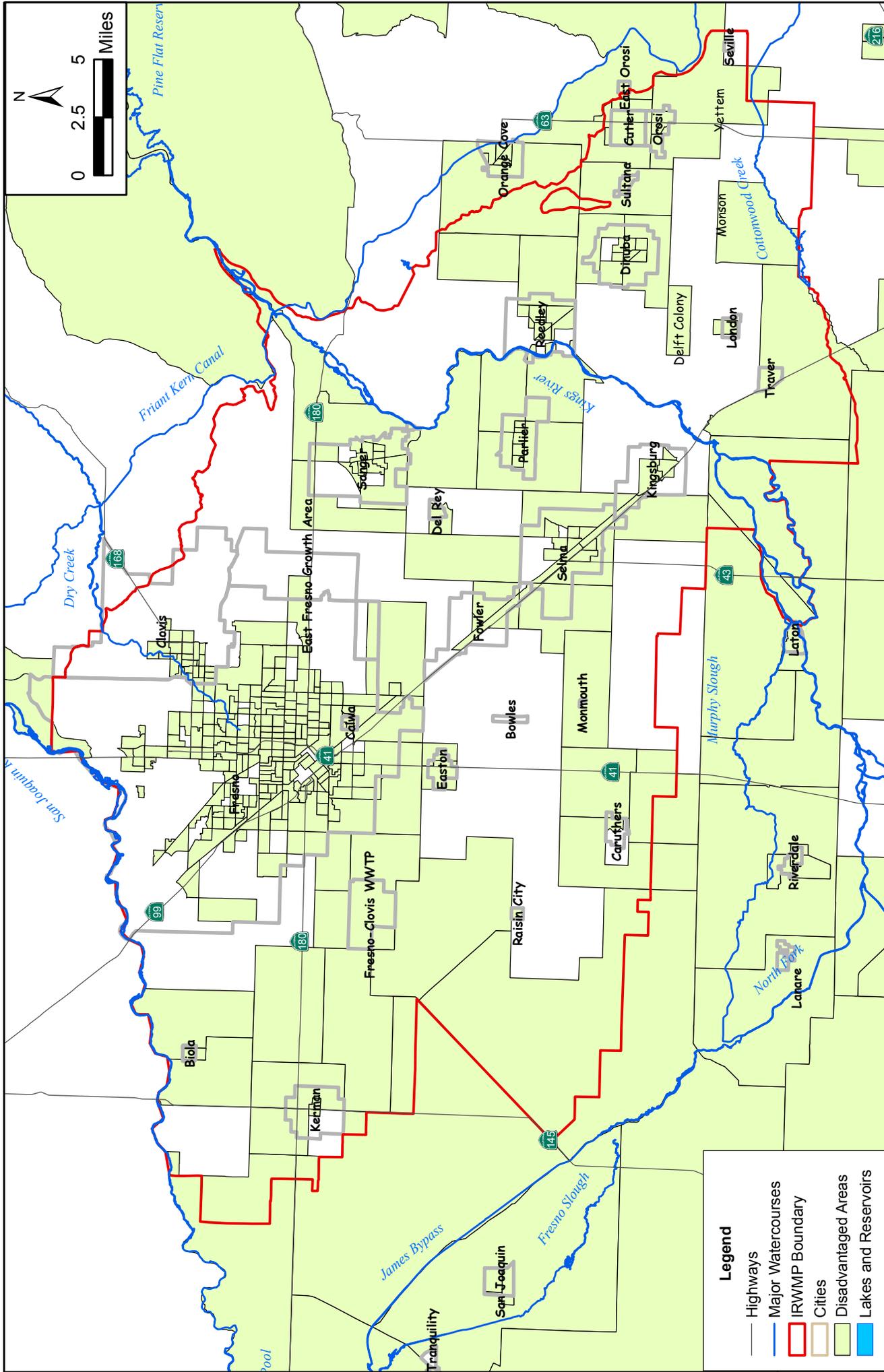
3.7 DISADVANTAGED COMMUNITIES

A process for identifying and including disadvantaged communities (DACs) in the development of the Kings IRWMP was based on the criteria defined in CWC § 79505.5(a). The CWC identifies “a community with an annual median household income (MHI) that is less than 80 percent of the statewide annual MHI” as disadvantages. The Water Forum used Census 2000 data and 80 percent of the statewide annual MHI of \$37,994. The total population for the Region was determined using Census 2000 Summary File 3 (SF-3), file GCT-P14, Income and Poverty in 1999: 2000. The resulting map of DAC is shown in Figure 3-9. DACs have an annual MHI of \$37,994. Table 3-14 lists the unincorporated areas that fall under the category of disadvantaged community. This includes population and income data for the portion of the Region that lies within Fresno and Tulare counties. The projects needs of DACs are discussed further in Chapter 8.

3.7.1 PARTICIPATION AND INVOLVEMENT OF DISADVANTAGED COMMUNITIES IN IRWMP

The purpose of this section is to describe the involvement of the disadvantaged communities in the Upper Kings Basin IRWM planning process.

Water Forum undertook proactive steps to ensure inclusion of the disadvantaged communities’ needs and interests in the planning process of the IRWMP and in the regional project definitions. After the disadvantaged communities’ representatives were identified, the Water Forum extended an invitation to attend the Water Forum meetings. Meeting minutes and educational materials were made available to the representatives to help them become familiar with the Water Forum’s efforts in developing the IRWMP. The opportunity to join the Water Forum was also extended to interested disadvantaged communities. Several cities that met the criteria for disadvantaged communities, such as, the cities of Dinuba, Fowler, Kerman, Parlier,



- Legend**
- Highways
 - Major Watercourses
 - IRWMP Boundary
 - Cities
 - Disadvantaged Areas
 - Lakes and Reservoirs

Disadvantaged Communities within the IRWMP Area

Kings Basin IRWMP

June 2007

Figure 3-9



Table 3-14. Unincorporated Disadvantaged Communities

Unincorporated Disadvantaged Communities	County	Population	Median Household Income	Entity
Biola	Fresno	1,000	\$32,667	Biola CSD
Cutler	Tulare	4,491	\$24,330	Cutler PUD
Delft Colony	Tulare	400	unknown	TCCSAZOB ¹
Del Rey	Fresno	950	\$26,458	Del Rey CSD
Easton	Fresno	1,966	\$31,172	Easton CSD
East Orosi	Tulare	426	\$26,071	East Orosi CSD
Laton	Fresno	1,236	\$35,408	Laton CSD
London	Tulare	1,848	\$21,678	London CSD
Monson	Tulare	200	unknown	unknown
Orosi	Tulare	7,318	\$30,400	Orosi PUD
Raisin City	Fresno	165	\$24,167	FCCSA #43 ²
Seville	Tulare	unknown	unknown	Seville Private Wtr Co -D Lane
Seville	Tulare	unknown	unknown	TCCSAZOB
Sultana	Tulare	750	\$12,000	Sultana CSD
Traver	Tulare	732	\$24,500	Traver LLC Private Water Co
Traver	Tulare	732	\$24,500	TCCSAZOB
Yettem	Tulare	400	\$31,736	TCCSAZOB

1. Tulare County County Service Area #1 Zone of Benefit

2. Fresno County County Service Area

and Selma, joined the Water Forum. The disadvantaged communities, as members of the Water Forum, participated in the development of the goals and objectives for the IRWMP.

Additional outreach efforts targeted underrepresented communities that were unincorporated such as Biola, Cutler-Orosi, Raisin City and others. The disadvantaged communities of Cutler-Orosi and Raisin City, represented by Raisin City Water District, joined the efforts in defining the process of meeting the goals of the IRWMP. The water issues affecting the disadvantaged community of Culter-Orosi are the primary issues that would be addressed by an IRWMP priority project sponsored by the Alta Irrigation District. The RCWD sponsored a long-term project identified in the IRWMP to meet local water issues. In addition, the RCWD committed a funding contribution toward the efforts of developing the IRWMP.

For the DAC communities that remained unrepresented, the Water Forum recruited the services of Self-Help Enterprises, Tulare County, to identify and provide needs assessment of the unincorporated disadvantaged communities. The results of the needs assessment can be found in Chapter 8, Table 8-3.

4.1 INTRODUCTION

This chapter discusses the water resources setting, historical water supply and demand conditions, historical water budget, and technical analysis used to evaluate two Future Without Project scenarios consisting of two levels of development in the Kings Basin.

Water resources setting in Kings Basin including surface water system, groundwater system, historical conditions, and overdraft problem is discussed in Section 4.2. Development process and description of the Kings Basin Integrated Groundwater and Surface water Model (Kings IGSM) are presented in Section 4.3. Detailed water budget data for 1970 conditions is provided in Section 4.6 for comparison with Future Without Project scenarios of Existing Conditions and 2030 Conditions. Use of these development conditions will provide snapshots of 30 years into the past and future and a basis to evaluate impacts of land use and water use changes in the Kings Basin.

The Kings IGSM was used to evaluate the two Future Without Project conditions and the groundwater impacts of the land use changes that would occur under each set of growth conditions. The assumptions used to define the future growth conditions, and the results of the modeling are presented in Sections 4.6 and 4.7. The findings of the analysis of the Future Without Project Conditions are provided in Section 4.8.

4.2 KINGS BASIN WATER RESOURCES SETTING AND OVERDRAFT PROBLEM

The Kings Basin is primarily an agricultural area, which has historically used both surface water and groundwater for irrigation purposes and primarily groundwater for municipal water supply. Water use in Kings Basin exceeds the natural supply and the Basin is operated under overdraft conditions.

Historically, irrigation water supply in the basin has been provided by surface water from the Kings River and San Joaquin River via Friant-Kern Canal. Over the years, the natural system has been modified by construction of canals, dams and reservoirs, and groundwater recharge ponds to further improve the agricultural productivity of the basin. The surface water supplies are supplemented in dry years by groundwater pumping to meet the water demands in the

basin. In wet years, water may be intentionally applied in excess of the immediate irrigation demand to recharge the underlying groundwater aquifer.

Pine Flat Dam was completed in 1954 primarily as a flood control project with water conservation storage benefits. It has a capacity of 1,000,000 AF of water. It captures water in the winter for release in the summer irrigation season, and in wet years for release in dry years. To alleviate depletion in the groundwater basin, recharge ponds have been built to put water into storage in the groundwater basin when surface water is available. Despite this and the other conjunctive use measures, groundwater overdraft continues in Kings Basin.

4.2.1 SURFACE WATER SYSTEM

The primary source of surface water in the Kings Basin is the Kings River, including Pine Flat Reservoir releases, and stream inflows from Mills and Hughes Creeks, supplemented by imports from Friant-Kern Canal of the Central Valley Project (CVP). The Kings River Water Association (KRWA) is the water master for the Kings River and includes 28 members that divert water and have rights to the Kings River. Based on streamflow data for water years from 1964 to 2004, the average annual total surface water inflow to the basin is about 1.85 million acre-feet. Of the total inflow, the Kings River on the average contributes 1.78 million acre-feet, with a low of 500 thousand acre-feet in dry years, and a high of 4.25 million acre-feet in wet years. Much like the rest of California, the Kings Region observes the “average conditions” on a relatively infrequent basis, and water management activities must respond to wet or dry conditions. In addition, wet and dry periods can be prolonged and occur over multiple years.

The San Joaquin River supply is delivered to the Kings Basin through the Friant-Kern Canal. The reliability of this supply is variable depending on the contract allocation. There are three types of water supplies available to the Kings Basin from the Friant-Kern Canal: Class 1, Class 2, and Section 215 water. Class 1 water is the most reliable supply, while Class 2 water is less firm and more available in wet years. Section 215 water is non-contract water that becomes available during flood periods. City of Fresno has annual contract for 60,000 acre-feet of Class 1 water. Fresno Irrigation District has annual contract for 75,000 acre-feet of Class 2 water.

4.2.2 GROUNDWATER SYSTEM AND OVERDRAFT PROBLEM

Groundwater supply is a major component of the total water supply in the Kings Basin. Unlike surface water diversions, groundwater pumping is mostly unregulated and not metered except for pumping at urban wells for cities’ water use. According to Bulletin 118 (DWR, 2003), the groundwater in storage in Kings Basin was about 93 million acre-feet in 1961. The estimate was to a depth of 1,000 feet or less. Historical groundwater level data is indicative of groundwater pumping in excess of the long-term sustainable yield, which resulted in gradual decline in

groundwater levels since 1950. Although there have been several wet periods, the groundwater levels in most areas of the Kings Basin continue to decline. The current trend of decline is expected to continue into the future.

The analysis of the historical conditions in the Kings Basin using the groundwater and surface water model of the Basin, as presented in Figures 4-1a and 4-1b, reveals that 3.2 million acre-feet of groundwater was mined from the IRWMP area during the past 40 years (WRIME, 2007). This is equivalent to an average annual overdraft of 78,000 acre-feet per year. Figure 4-1b shows the annual and cumulative change in groundwater storage in Kings Basin. The total overdraft in the Kings Basin during the past 40 years is 6.6 million acre-feet, which is equivalent to an average annual overdraft of 161,000 acre-feet per year. These two figures also show the wet, dry, multiple wet, and multiple dry years and the groundwater storage response during these periods. Groundwater storage could recover in the wet years during the 1964-1986 period. However, groundwater storage has not recovered since 1986.

Overdraft conditions in Kings Basin have resulted in development of groundwater depressions. Currently, two water level depressions are present in Kings Basin; one beneath the Fresno/Clovis metropolitan area, and the second larger and deeper depression in Lower Kings Basin in the area of the RCWD. Over the past 40 years, water levels in Fresno area have dropped by 40 feet. Water levels drop in RCWD area has been more drastic and exceeds 150 feet.

The general movement of groundwater in the Kings Basin is from the northeast to the southwest direction. However, the overdraft conditions in Kings Basin have changed direction of groundwater flow towards the depression areas. The primary drivers contributing to the changes in groundwater levels and overdraft are:

- groundwater pumping to meet agricultural water demand when surface water diversions are inadequate to fully meet the crop water requirements;
- high reliance on groundwater for all demands in much of the western parts of Kings Basin; and
- urban development and reliance on groundwater once lands are converted to urban use from agricultural uses.

Historical conditions in the Kings Basin and the expected future growth and changes in land use indicate that without corrective measures water levels will continue to drop, the existing depression areas will expand, and new depression areas will develop.

Figure 4-1a. Change in Groundwater Storage in IRWMP Area

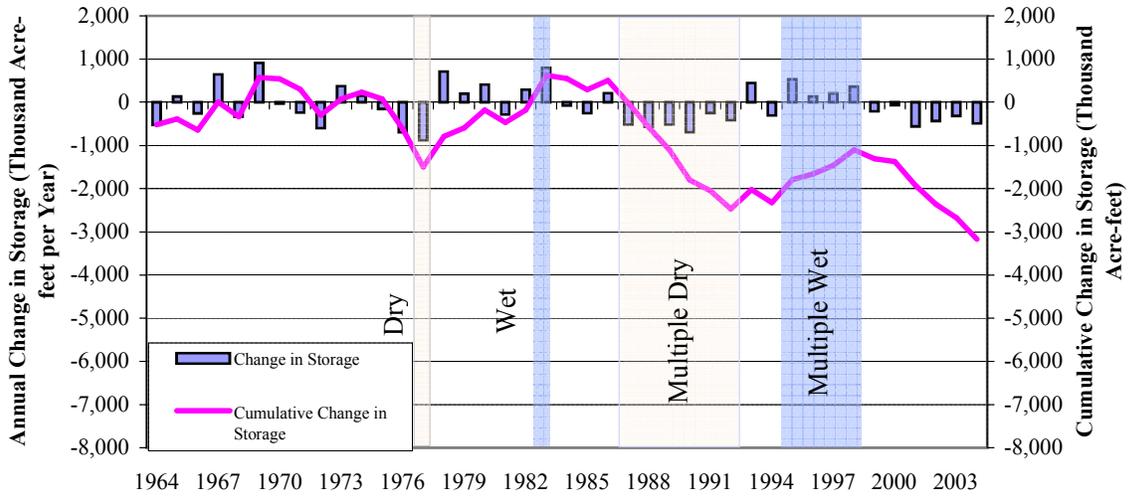
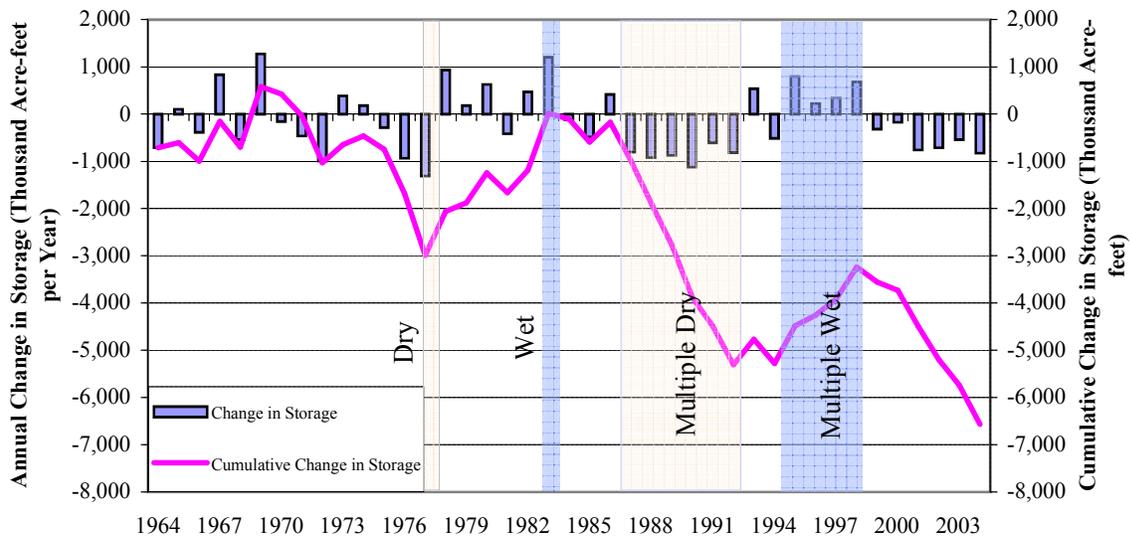


Figure 4-1b. Change in Groundwater Storage in Kings Basin



4.2.3 LAND AND WATER USE SYSTEM

The primary water use in the Kings Basin is irrigation. The major water users in the Kings Basin include Fresno Irrigation District, Consolidated Irrigation District, and Alta Irrigation District that jointly hold rights and deliver roughly 65% of the total water of the Kings River. The major source of supply is the natural flow of the Kings River or the water stored in Pine Flat Dam. The surface water supplies are supplemented by groundwater pumping during times when surface water is not available for diversion. Urban demands are a smaller percentage of the overall water use in the Kings Basin and most municipal supplies are obtained through groundwater pumping. The cities of Fresno and Clovis are the only municipal suppliers that treat surface water at dedicated surface water treatment plants and which do not rely exclusively on groundwater.

4.3 KINGS BASIN REGIONAL MODEL

The Kings River Conservation District (KRCD) and the Upper Kings Basin Water Forum (Water Forum) participants have worked together to develop an Integrated Regional Water Management Plan (IRWMP) for the Upper Kings Basin. The California Department of Water Resources (DWR) has provided water management and technical support, as well as facilitation services to the Water Forum to develop its water management strategies and conjunctive use programs. As part of this cooperative effort, the Water Forum has decided to develop a basin wide regional integrated groundwater and surface water model as a planning analysis tool for development of the IRWMP.

The Water Forum established the modeling objectives (WRIME, 2006d) that included:

- Representing the groundwater and surface water flow systems and their interactions;
- Providing quantitative information on a comparative basis to help answer different questions on the groundwater and surface water system characteristics; and
- Evaluating alternative water management strategies.

The Technical Analysis and Data (TAD) Work Group of Water Forum provided technical review, guidance, and coordination to the model development team. Representatives from various stakeholder entities have attended the TAD Work Group meetings. TAD Work Group has met ten times over the course of model development during 2006-2007 and participated in discussion, review, and decision-making regarding the technical assumptions and analysis and data used in the model development and calibration.

The Kings IGSM is a regional model that covers the entire Kings Basin and simulates the surface water and groundwater systems of Kings Basin. Kings IGSM is the first comprehensive model of the Kings Basin that incorporates the past four decades of detailed historic conditions of the Kings Basin. Detailed information on the Kings IGSM model is available in Kings IGSM model development and calibration document (WRIME, 2007b). Figure 4-2 shows the IRWMP area, model area, and model subregions depicting urban areas and irrigation and water districts in Kings Basin. Kings Basin hydrogeologic conditions, land use, crop pattern, major diversions of King River and major canals in the IRWMP area are included in Kings IGSM. The calibration time period, 1964-2004, was selected based on discussions with TAD Work Group. The features of this time period include:

- 1964 is the beginning of the Pine Flat Reservoir operation under contemporary guidelines;
- Reasonable amount of data is available for this time period;
- A long (41-year) period that provides a reasonable basis for calibration of the model;
- The inclusion of wet, dry, normal, and extreme conditions of the regional hydrology in the basin, such as the 1976-1977 drought and 1983 flood; and
- Significant changes in land and water use in the model area.

The Kings IGSM, calibrated over the past 41-year period, is used to simulate the future conditions in the Kings Basin.

4.4 FUTURE WITHOUT PROJECT CONDITIONS

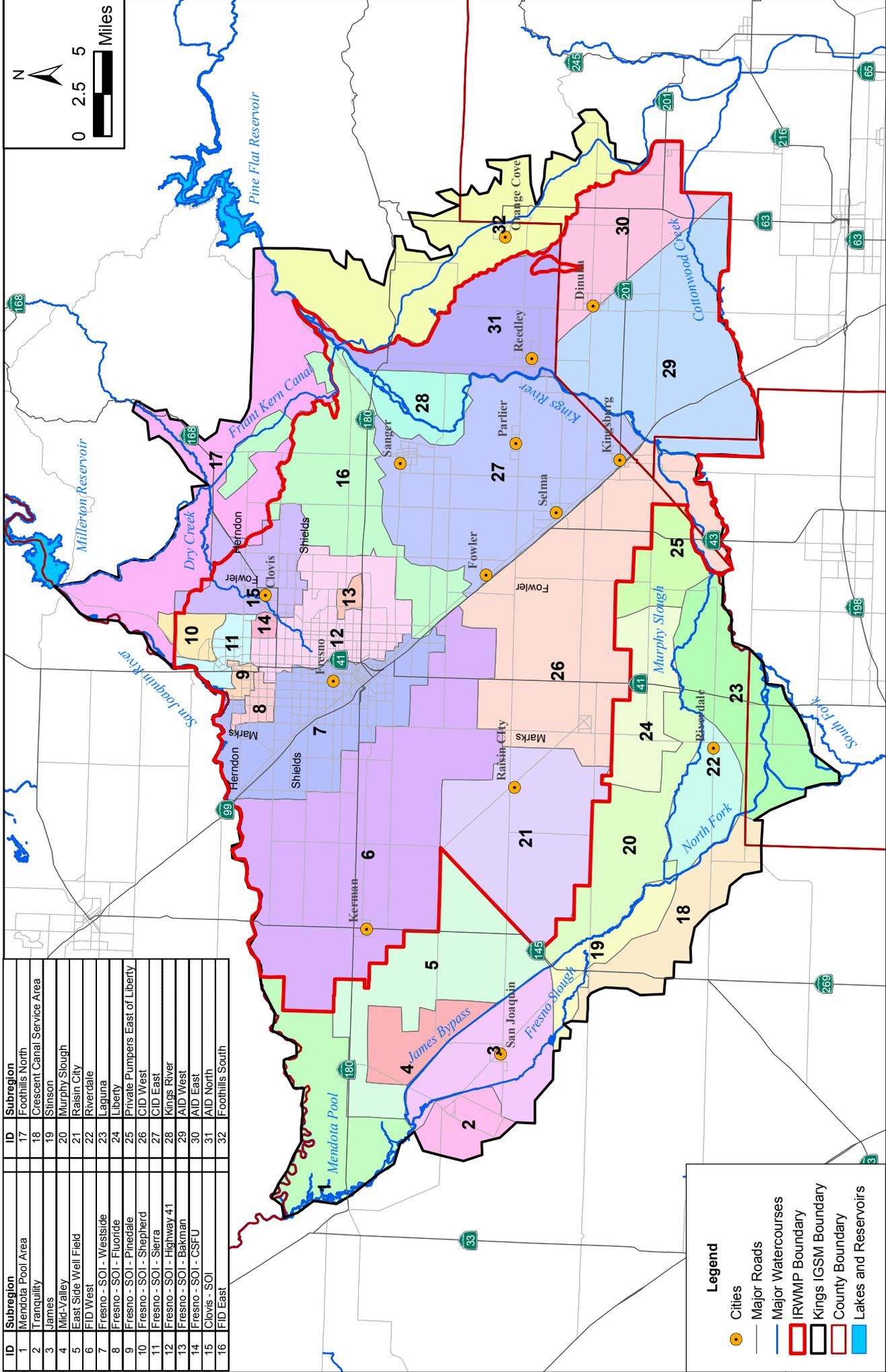
Two scenarios of Future Without Project conditions were developed to predict and quantify the future conditions of the Kings Basin. The two levels of development used to define the Future Without Project conditions are:

- Existing Conditions, and
- 2030 Conditions.

The Existing Conditions scenario assumes the current levels of agricultural and urban developments will continue into the future and there will be no additional development in the Kings Basin. Agricultural and urban demand will remain at current levels. Cities of Fresno and Clovis will use surface water to meet their demand. Pine Flat reservoir operation will follow the historical releases and flows.

The 2030 Conditions assumes additional growth will occur in the urban areas. The agricultural areas within the spheres of influence of the cities are expected to fully develop into urban areas

ID	Subregion	Subregion	
1	Mendota Pool Area	17	Foothills North
2	Tranquility	18	Crescent Canal Service Area
3	James	19	Stinson
4	Mid-Valley	20	Murphy Slough
5	East Side Well Field	21	Raisin City
6	FID West	22	Riverdale
7	Fresno - SOI - Westside	23	Laguna
8	Fresno - SOI - Flunoride	24	Liberty
9	Fresno - SOI - Pinedale	25	Private Pumpers East of Liberty
10	Fresno - SOI - Shepherd	26	CID West
11	Fresno - SOI - Sierra	27	CID East
12	Fresno - SOI - Highway 41	28	Kings River
13	Fresno - SOI - Bakman	29	AID West
14	Fresno - SOI - CSFU	30	AID East
15	Clovis - SOI	31	AID North
16	FID East	32	Foothills South



IRWMP Area and Kings IGSM Subregions

Upper Kings Basin IRWMP

June 2007

Figure 4-2

by the year 2030. Cities of Fresno and Clovis will use 30 MGD of surface water to meet their demand. Pine Flat reservoir operation will follow the historical releases and flows.

The assumptions used to develop the two Future Without Project conditions are presented in Section 4.5. The analysis of the two Future Without Project scenarios will help to:

- Determine the effects of future growth;
- Define the need and relative size for new water supply facilities; and
- Provide a basis for comparing the impacts and benefits of project alternatives.

The method of analysis, assumptions used to develop the scenarios, and the results of the analysis are presented in the following chapters.

4.5 METHOD OF ANALYSIS

The Kings IGSM model was used to evaluate the impact of the two Future Without Project scenarios. The TAD Work Group provided oversight and direction for development and analysis of results of the scenarios. Description of historical data and the assumptions used to evaluate historical conditions and to develop the Future Without Project scenarios are presented in the following sections. The model results are used to evaluate the effects to groundwater from future land uses for the IRWMP and surrounding areas.

4.6 ASSUMPTIONS

The assumptions used to develop the Future Without Project scenarios are divided into the following seven categories:

- Hydrology,
- Land Use,
- Crop Acreage,
- Urban Demand and Supply,
- Agricultural Demand,
- Surface Water Availability, and
- Miscellaneous Assumptions.

Detailed descriptions of these assumptions are presented in the following subsections. A summary of the assumptions for Future Without Project scenarios is presented in Table 4-1.

Table 4-1. Summary of Assumptions for Future Without Project Scenarios

Data Category	Existing Conditions	2030 Conditions
Hydrology		
Kings Basin Hydrology	1964-2004 Daily rainfall and streamflow data	1964-2004 Daily rainfall and streamflow data
Land Use		
Kings Basin Land Use	2005 Land Use	2030 Land Use
City of Fresno Land Use	2005 Land Use by Fresno Metro Plan	2025 Land Use by Fresno Metro Plan
Crop Acreage		
Kings Basin Crop Acreage	2004 Crop Mix	2030 Crop Acreage (2004 crop acreage minus agricultural areas converted to urban)
Kings Basin Urban Demand and Supply		
Urban Water Demand	2004 Urban Demand	2030 Urban Demand
Wastewater Treatment Plants Flows	Use 2004 conditions for: - Selma-Kingsburg-Fowler (SKF) WWTP - Other non-Fresno/Clovis WWTP	Use 2004 conditions for: - SKF WWTP - Other non-Fresno/Clovis WWTP
Fresno Urban Demand and Supply		
Urban Water Demand	2005 Urban Demand Estimate by Fresno Metro Plan	2025 Urban Demand Estimate by Fresno Metro Plan (91.3 TAF/yr increase over 2005 urban demand, includes Southeast Growth Area)
Surface Water Treatment Plant	Use Full Capacity Rates (32.5 TAF/yr with no flow in November for maintenance)	Use Full Capacity Rates (32.5 TAF/yr with no flow in November for maintenance)
Wastewater Treatment Plant Total Flows	78,400 AF	127,700 AF
Municipal Wells Pumping	- Use wells that are active in 2005 - Use 2005 Pumping Rates minus Surface Water Plant's 2005 Flows - Proportionally reduce pumping rate of each well	- Same as existing conditions - 90 new municipal wells in western Fresno and south east growth area
Land Use, Demand, Supply for Backman, Pinedale, and CSUF areas	2004 Conditions	2004 Conditions

Data Category	Existing Conditions	2030 Conditions
Clovis Urban Demand and Supply		
Surface Water Treatment Plant	- Use 2005 Calendar Year Rates (6.7 TAF/yr) - Use 2005 Monthly Rates	- Use 2030 Rates (30 MGD) - Use 2005 Monthly Flow Ratios
Municipal Wells Pumping	- Use 2005 Pumping Rates	- Same as 2005 conditions
Wastewater Treatment Plant Flows (Clovis Satellite Treatment Plant (tertiary treatment))	None	- 7,600 AF/yr - Plant outflow to be used for landscape irrigation in Clovis and CSUF
Agricultural Water Demand		
Agricultural Water Demand	Based on: - 2004 Land Use and Crop Acreage - 1964-2004 Hydrology	Based on: - 2030 Land Use and Crop Acreage - 1964-2004 Hydrology
Surface Water Availability		
Pine Flat Reservoir Operations	Historical releases and flows	Same as 2005 conditions
San Joaquin Settlement Flow Assumptions	No	No
Surface Water Deliveries - F-K & CVP to Non-Fresno/Clovis Areas	Historical deliveries and diversions	Same as 2005 conditions
Surface Water Deliveries - Friant-Kern	Fresno Metro Plan estimates of deliveries to FID & Fresno (60 TAF/yr, 17.9 TAF/yr for critically dry years)- Adjust for SWTP flows	Same as 2005 conditions
Surface Water Deliveries - Kings River	Historical deliveries and diversions - Adjust for SWTP flows	Historical deliveries and diversions revised for capture of flood flows at Waldron/Harter ponds - Adjust for SWTP flows
Miscellaneous Assumptions		
Kings Basin Recharge Ponds	2004 Conditions	2004 Conditions plus - Waldron Ponds (FID) - Harter Ponds (AID)
Recharge at creeks and streams	Use 2004 conditions	Use 2004 conditions

Data Category	Existing Conditions	2030 Conditions
Recharge at FMFCD Ponds	<ul style="list-style-type: none"> - For 1994-2004 use historical recharge rates - For 1964-1993 use 1994-2004 recharge rates based on San Joaquin Hydrology Index - Use ponds that are active in 2004 - Use 2000-2004 average recharge ratios for distribution of total recharge to individual ponds 	Same as 2005/Existing Conditions plus 2,734 AF/yr additional recharge at growth areas.
Recharge at Leaky Acres	<ul style="list-style-type: none"> - For 1973-2004 use historical recharge rates - For 1964-2004 use 1973-2004 recharge rates based on San Joaquin Hydrology Index 	Same as 2005/Existing Conditions
Initial Conditions	- Use End of Sep 2004 values for GW levels, soil moisture, unsaturated soil moisture, and small watershed soil moisture	Same as 2005 conditions
Boundary Conditions	1964-2004 General Head Boundary Conditions	1964-2004 General Head Boundary Conditions

The model input files for the two scenarios were developed using projected data from the cities or water purveyors, and the assumptions listed in Table 4-1. Water supply and demand data and estimates for City of Fresno were obtained from Fresno Metro Plan (Fresno, 2006).

The Kings IGSM model inputs can be specified for each subregion (Figure 4-2). This allows for varying land use and water supply assumptions within specific geographic areas. The model also produces analysis results for each subregion. This helps evaluate and explain the dynamics of the groundwater response to varying conditions. Some of the pertinent data inputs to the model that have an influence on the groundwater budget are: hydrology, surface water deliveries, land use, water use, groundwater pumping, and groundwater recharge.

For each of the scenarios, the model represents the land use and water supply changes, the existing surface water treatment plants, the existing or approved groundwater recharge facilities (Leaky Acres, Waldron Ponds, Fresno/Fresno Metropolitan Flood Control District ponds); and the wastewater that is treated and recharged at the City of Fresno and Selma-Kingsburg-Fowler (SKF) wastewater treatment plants.

4.6.1 HYDROLOGY

In the absence of future hydrologic data, it is assumed that the historical trends would repeat themselves. As for surface water deliveries, it is assumed that the Pine Flat operation and respective deliveries would be the same as historic. Although, future operation may vary from historical conditions, as the land use and hydrology may change, for purposes of the Future Without Project scenarios, the Pine Flat operation is not changed. The model uses the hydrology and surface water deliveries that occurred during the calibration period, from water year 1964 to 2004, to represent future conditions (Figure 4-3). In other words, it is assumed that the hydrologic conditions observed over the past 40 years for rainfall in Kings Basin, Kings River, and San Joaquin River streamflows and diversions would occur over the next forty years. The 1964 to 2004 period contained both wet and dry periods and appropriate hydrologic variability to represent a range of conditions.

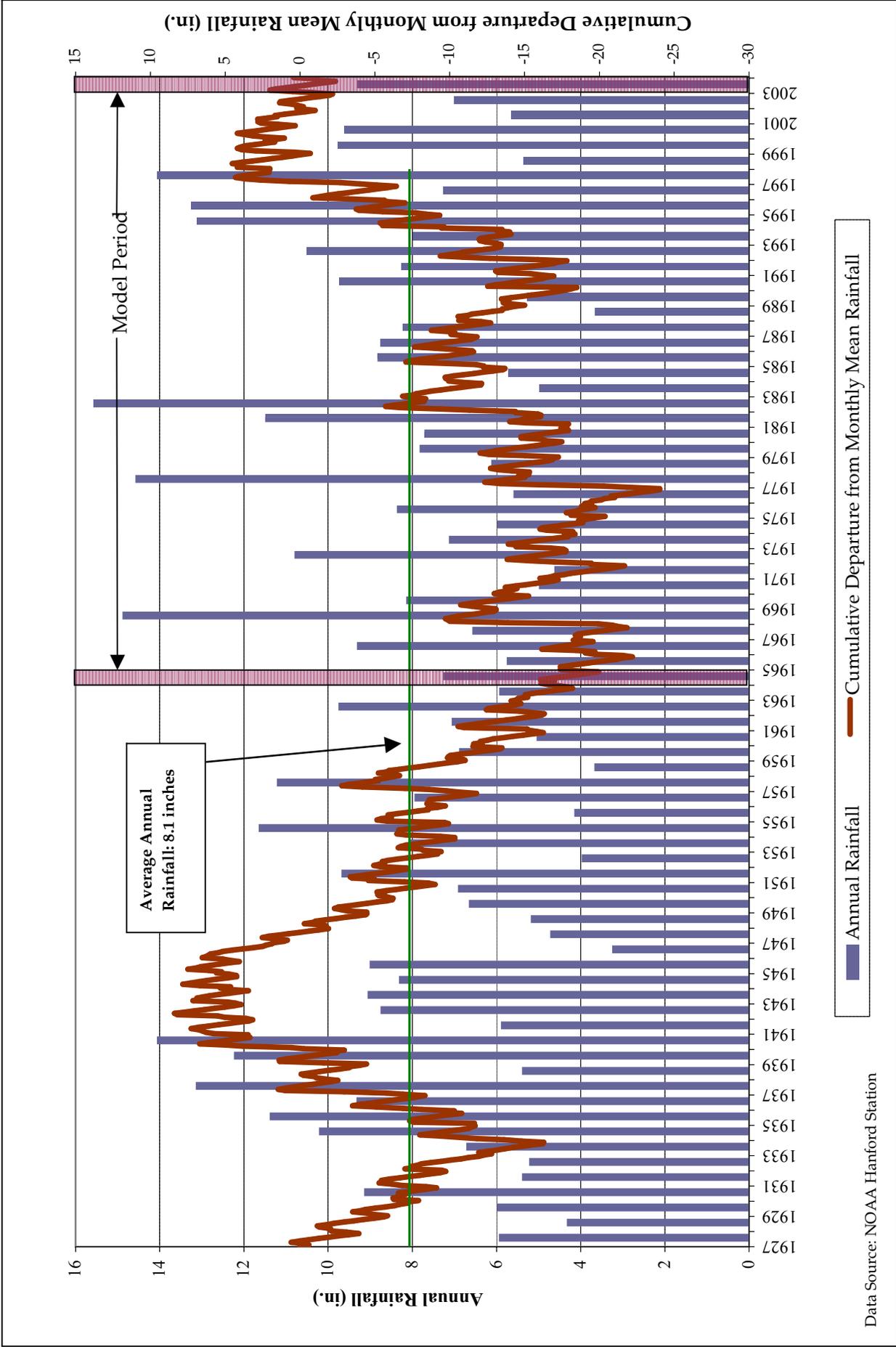
4.6.2 LAND USE

The growth in the Kings Basin results in the land use conversion from vacant, native lands or agriculture uses to urban use. Most of the urban areas are in the eastern half of the Kings Basin and in the Highway 99 Corridor. Figures 4-4 and 4-5 show the 1970 and 2005 land use maps of the Kings Basin. These maps also show the current boundaries of the cities spheres of influence (SOI). The 1970 land use map provides the historical land use conditions for comparison with 2005 and 2030 land use maps.

Land use for the Existing Conditions scenario is fixed at the 2005 level of development and it is assumed that there will be no further conversion of agricultural land to urban use. This essentially freezes urbanization, population growth, water use and other factors that may ultimately change with time. It is assumed that there are no new water resources projects or supplies.

The 2030 Conditions scenario was developed for the 2030 level of development as depicted in the land use of Figure 4-6. The changes in land use for major areas of the Kings Basin are quantified in Table 4-2. There are 65,000 acres of new urban areas in 2030, which includes 55,000 acres of agricultural land that is converted to urban use. Almost all of the new urban areas are within the IRWMP area.

According to Fresno Metro Plan (Fresno, 2006), by 2030, the City of Fresno is expected to grow outside of its current SOI into the Southeast Growth Area (Figure 4-6). It is assumed that areas within SOI of the cities will be completely converted to urban use.

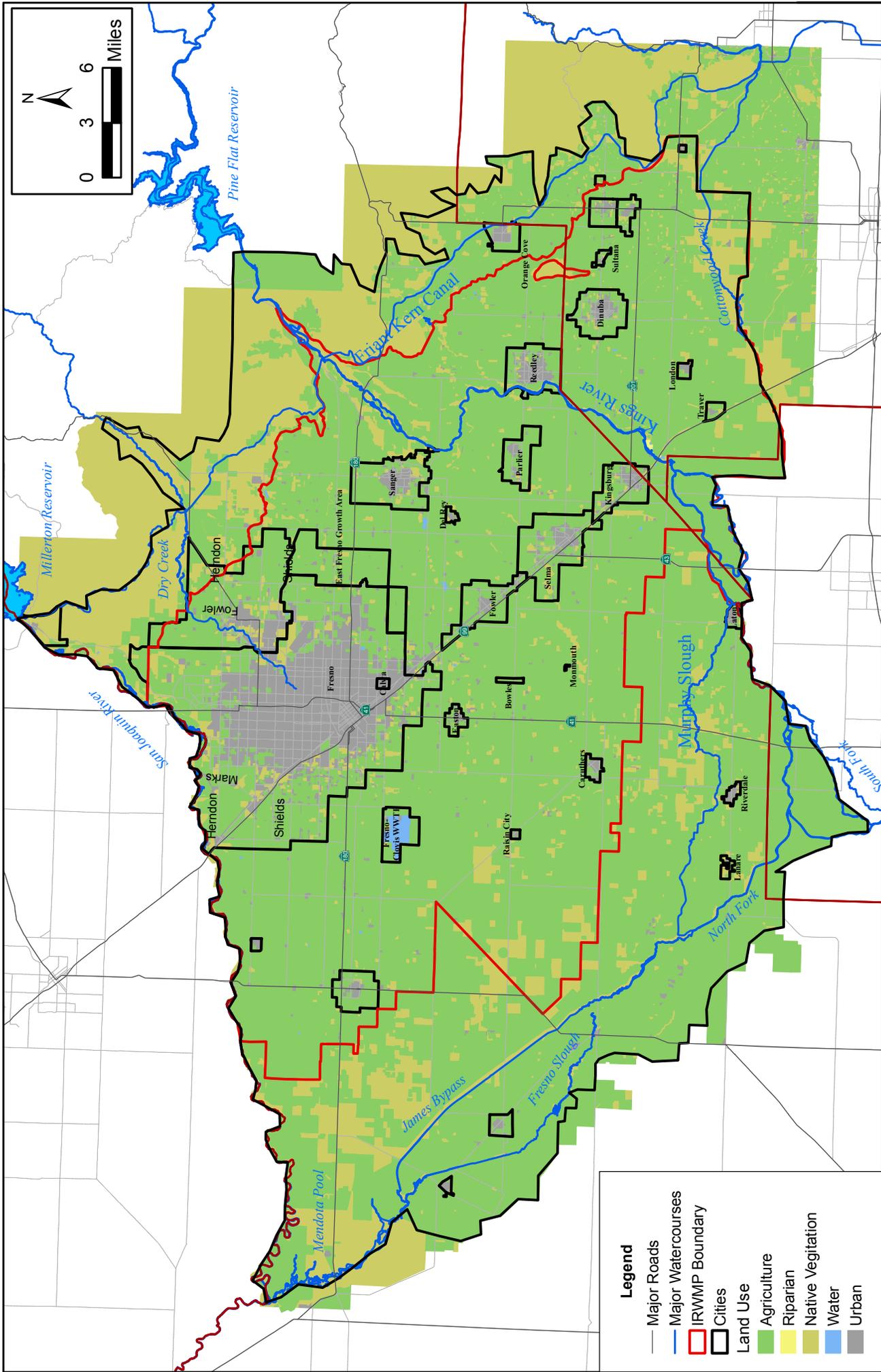


June 2007

Figure 4-3

Kings Basin Annual Rainfall and Selected Hydrologic Period for Future Without Project Scenarios





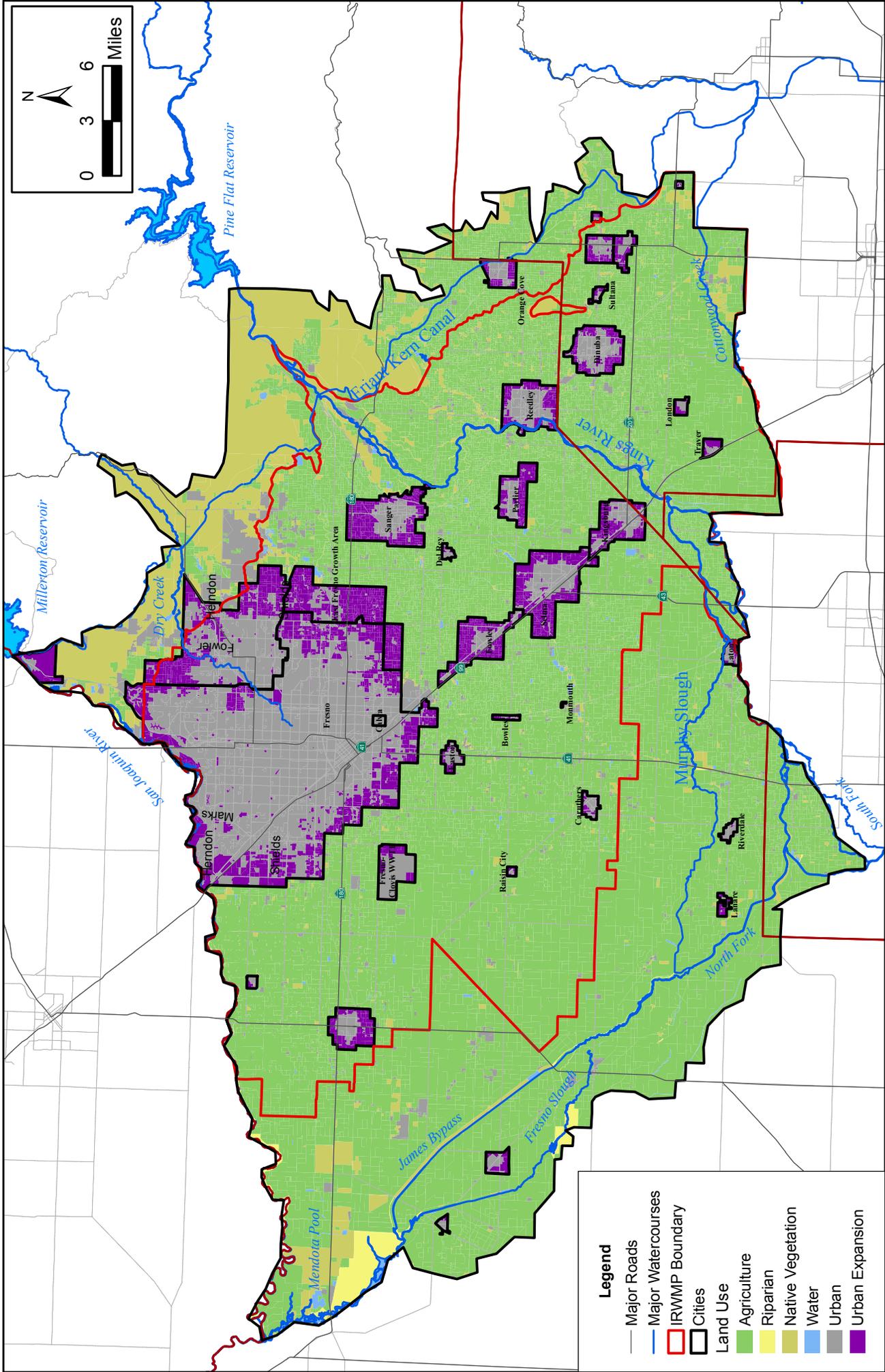
1970 Land Use

Upper Kings Basin IRWMP

June 2007

Figure 4-4





2030 Land Use

Upper Kings Basin IRWMP

June 2007

Figure 4-6



Table 4-2. Summary of 1970, 2005, and 2030 Land Use in Kings Basin

Area		Urban Land Use (Thousand Acres)			Agricultural Land Use (Thousand Acres)			Other Land Use (Thousand Acres)			Total Land Use (Thousand Acres)
District	Subregion	1970	2005	2030	1970	2005	2030	1970	2005	2030	
AID	29,30,31	4	10	16	103	114	108	28	11	11	135
CID	26,27	5	13	29	140	145	130	13	5	4	163
FID	6-16	37	94	136	192	159	126	43	19	10	272
RCWD	28	0	1	1	33	48	48	17	1	1	50
IRWMP (includes KRWD)		47	118	182	477	476	423	104	40	29	634
Kings Basin		48	125	190	671	727	672	201	68	58	920

4.6.3 CROP ACREAGE

Agricultural area in Kings Basin has increased from 671,000 acres in 1970 to 727,000 acres in 2005. Most of this increase has occurred outside the IRWMP area, while the agricultural area within the IRWMP area remained at approximately 480 thousand acres. Table 4-3 presents the crop acreage in the IRWMP area and Kings Basin for 1970, 2005, and 2030. Grain, field crop, alfalfa, and pasture acreages have decreased from 1970 to 2005 while the more permanent deciduous crops, citrus, and vineyards acreages increased during this time. It is assumed that crop pattern will not change from 2005 to 2030. However, crop acreages will be reduced for the agricultural areas that will convert to urban areas.

Table 4-3. Crop Acreage in the Kings Basin

Crop Type	Crop Acreage (thousand acres)					
	IRWMP Area			Kings Basin		
	1970	2005	2030	1970	2005	2030
Grain and Hay	15	6	6	56	21	21
Rice	0	0	0	3	0	0
Field Crops	88	44	37	163	131	123
Alfalfa	42	11	9	58	14	12
Pasture	43	20	19	86	67	65
Truck and Nursery Crops	8	12	7	9	17	12
Deciduous Fruit and Nut	64	128	112	67	166	151
Citrus	9	25	23	9	25	23
Vineyards	200	216	198	209	264	246
Semi-agricultural	8	14	13	11	21	20
Total Agriculture	477	476	423	672	727	672

4.6.4 URBAN DEMAND AND SUPPLY

When land is converted from agricultural to urban uses, the water supply shifts from agricultural irrigation mostly with Kings River or Central Valley Project (CVP) surface water to pumping of groundwater by municipal wells. This shift to exclusive use of groundwater occurs except in the cities of Fresno and Clovis where treated surface water from surface water treatment plants will be used to meet a portion of the urban demand.

Demand in urban areas of Kings Basin for 1970 and the 2005 Existing Conditions and 2030 Conditions is shown in Table 4-4 and Figure 4-7. Urban demand increases from 228 thousand acre-feet (TAF) for Existing Conditions to 389 TAF for 2030 Conditions. Most of the urban areas are on the east side of Kings Basin and Highway 99 Corridor.

The total urban demand of cities of Fresno and Clovis is 183 TAF in 2005 and increases to 303 TAF in 2030. It is assumed that Fresno surface water treatment plant (SWTP) operates at full capacity (32.5 TAF/yr) for Future Without Project simulations. However, Clovis SWTP flow is set to its current operation rate of 6.7 TAF/yr for Existing Conditions and increased to full 30 MGD capacity for 2030 Conditions. The remaining demands of Fresno and Clovis will be met by existing municipal wells. It is assumed that for 2030 Conditions 90 new municipal wells will be installed in western Fresno and South East Growth Area. No growth is assumed for other water producing agencies within the City of Fresno SOI: Pinedale Water District (Pinedale), Bakman Water District (Bakman) and California State University Fresno (CSUF).

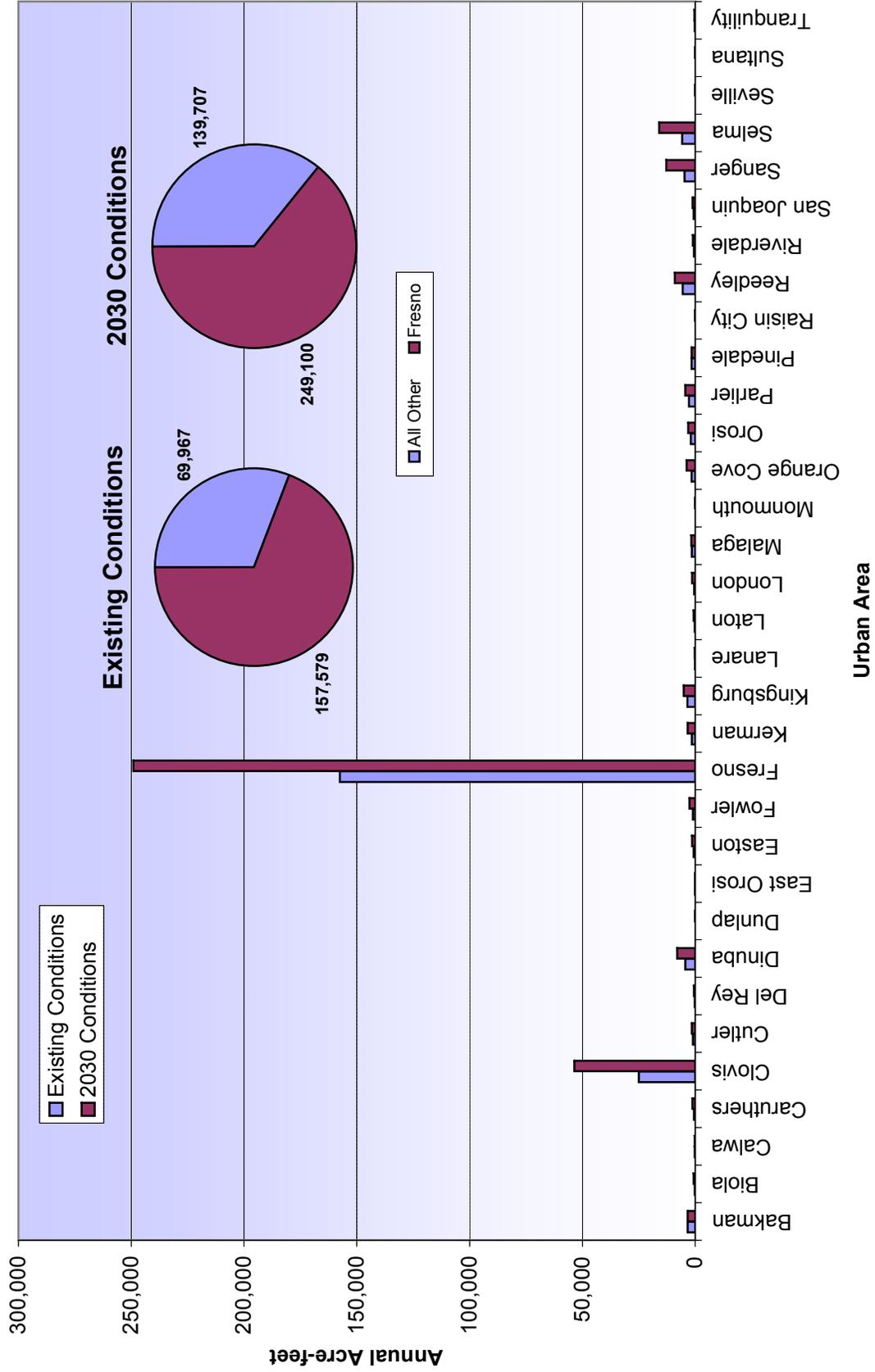
Treated wastewater from Fresno Wastewater Treatment Plant (WWTP), Clovis Satellite Treatment Plant Flows, and Selma-Kingsburg-Fowler WWTP will be used for landscape irrigation, agricultural irrigation, or recharge at percolation ponds. Fresno WWTP flows increases from 78 TAF/yr for Existing Conditions to 128 TAF/yr for 2030 Conditions. Clovis Satellite Treatment Plant will provide 7.6 TAF of tertiary effluent for landscape irrigation for 2030 Conditions only.

In addition to meeting the demand by the cities, groundwater is pumped to meet the demand of the rural residential areas, and urban industrial and commercial water requirements. For Existing Conditions, it is assumed that rural residential areas in Kings Basin need 27 TAF/yr of groundwater (1.5 AF/Acre) and urban industrial and commercial demand is 18 TAF/yr. It is assumed that the rural residential and urban and commercial water demand will not change for 2030 Conditions.

Table 4-4. Urban Demand for 1970, Existing Conditions and 2030 Baseline Conditions (AF/yr)

Urban Area	1970	Existing Conditions	2030 Conditions
Bakman	1,876	3,337	3,337
Biola	115	275	752
Calwa	84	202	263
Caruthers	337	552	1,224
Clovis	3,761	24,991	53,568
Cutler	602	1,088	1,521
Del Rey	108	269	568
Dinuba	1,899	4,386	7,929
Dunlap	20	49	64
East Orosi	36	87	145
Easton	342	675	1,426
Fowler	724	1,023	2,561
Fresno	63,837	157,579	249,100
Kerman	629	1,520	3,389
Kingsburg	1,253	3,446	5,101
Lanare	60	143	229
Laton	254	281	720
London	209	465	1,391
Malaga	1,391	1,491	1,765
Monmouth	11	27	133
Orange Cove	617	1,573	3,839
Orosi	656	1,952	3,175
Parlier	485	2,792	4,357
Pinedale	974	1,638	1,638
Raisin City	18	44	70
Reedley	2,175	5,586	9,007
Riverdale	405	621	994
San Joaquin	300	744	1,190
Sanger	2,539	4,691	12,877
Selma	2,402	5,779	16,020
Seville	11	27	77
Sultana	13	30	86
Tranquility	76	183	293
Total	88,219	227,546	388,807

Figure 4-7. Urban Demand for Existing Conditions and 2030 Conditions



4.6.5 AGRICULTURAL DEMAND

It is assumed that water conservation remains at 2004 level for the Existing Conditions and 2030 Conditions. Therefore any reduction in agricultural water demand will come from conversion of agricultural areas to urban use. Historical hydrology of 1964-2004 is used to estimate crop water needs for the Future Without Project scenarios. Table 4-5 shows the average annual agricultural water demand for IRWMP area and Kings Basin.

Table 4-5. Average Annual Agricultural Water Demand

Simulation	Agricultural Water Demand (TAF/yr)	
	IRWMP Area	Kings Basin
1964-2004	1,540	2,224
Existing Conditions	1,510	2,260
2030 Conditions	1,338	2,085

Besides meeting the agricultural demand rates of Table 4-5 by surface water and groundwater pumping, surface water is applied to agricultural areas to recharge the groundwater. Depending on availability of surface water, this recharge water could be as high as 300 TAF/yr for Kings Basin.

4.6.6 SURFACE WATER AVAILABILITY

Surface water deliveries to Kings Basin from Kings River, Friant-Kern Canal, and CVP are assumed to follow the 1964-2004 historical conditions. No changes in rates or timing of Kings River 1964-2004 historical diversions are assumed. No changes are assumed in Pine Flat reservoir operations. It is assumed that San Joaquin River flows will be at 1964-2004 rates and no additional settlement flows will occur for the Future Without Project scenarios.

4.6.7 MISCELLANEOUS ASSUMPTIONS

Recharge at FMFCD Ponds

Observed recharge data was available from the Fresno Metropolitan Flood Control District (FMFCD) for the period from 1979 to 2004 when most of the ponds were in operation. To evaluate potential future conditions a synthetic recharge schedule was developed using the average monthly recharge distribution and the San Joaquin River hydrologic index. The same synthetic schedule is used to approximate the recharge that will occur in the Future Without Project scenarios. Impacts on total recharge for low water years, maintenance, excavation and other unknowns were taken into account in the estimated and calculated average annual

recharge. Additional recharge of 2.7 TAF/yr is assumed to occur at new FMFCD recharge ponds in the Southeast Growth Area for 2030 Conditions.

Recharge at Leaky Acres and Other Areas

Observed recharge data for Leaky Acres Ponds was available for 1973 to 2004. Similar to FMFCD ponds, a synthetic recharge schedule was developed for Leaky Acres using the average monthly recharge distribution and the San Joaquin River hydrologic index. The same synthetic schedule is used to approximate the total recharge that will occur in the Future Without Project scenarios.

Recharge at other recharge ponds in the IRWMP area is assumed to remain at 2004 levels for the Future Without Project scenarios. However, for 2030 Conditions additional recharge is assumed to occur at Waldron Ponds (1 TAF/yr) and Harter Ponds (1.6 TAF/yr). Intentional recharge at creeks and streams are assumed to remain at 2004 conditions.

Initial and Boundary Conditions

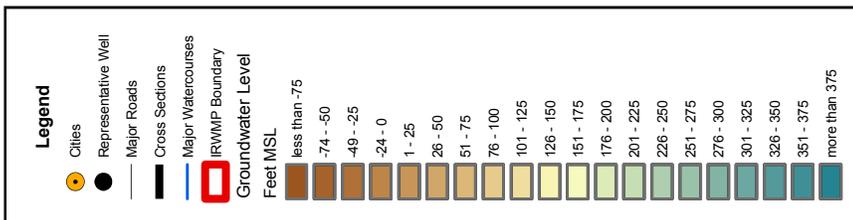
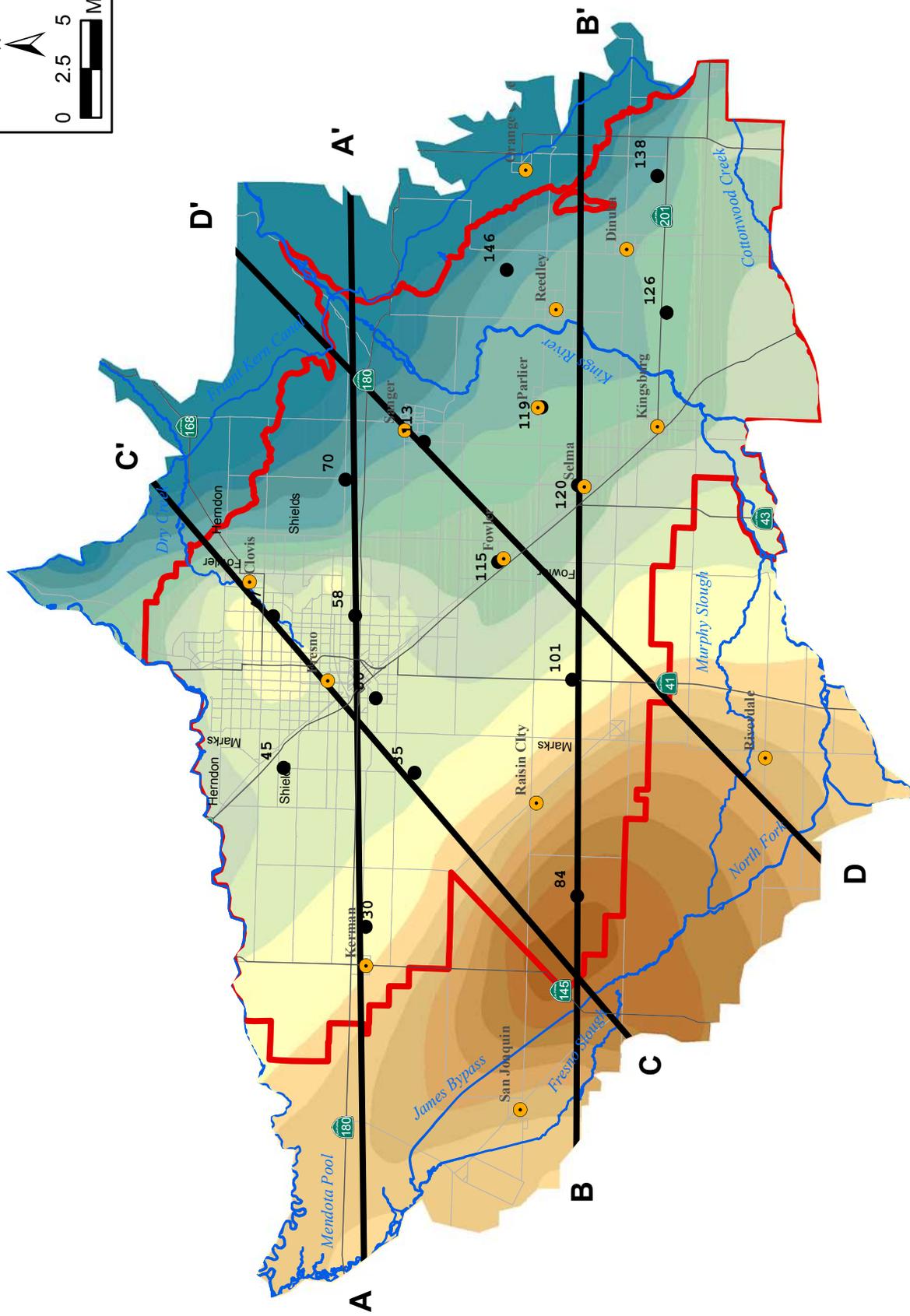
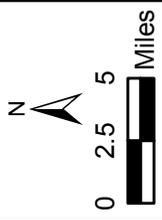
Water levels from the end of Kings IGSM calibration period (September 2004) is used as initial conditions for the Future Without Project scenarios. General head boundary conditions of 1964-2004 for northern, western, and southern boundaries of the model are assumed to apply to the Future Without Project scenarios. Small watershed conditions of the eastern boundary will be used for the Future Without Project scenarios.

4.7 RESULTS

This section provides a summary of the Kings IGSM modeling results for the Future Without Project scenarios. The results show the impact of two development levels on groundwater in Kings Basin. The groundwater response is depicted by:

- Groundwater level hydrographs,
- Change in groundwater level contour maps,
- Groundwater Profiles, and
- Groundwater storage changes.

Figure 4-8 shows the groundwater levels at the beginning of the Future Without Project scenarios, locations of 16 representative wells, and locations of four water level profiles. The representative wells are selected from the 242 wells used for calibration of Kings IGSM. The



Note: Display bound by Kings IGSM Model Boundary

Current Groundwater Levels, Representative Wells and Cross Sections

Groundwater levels represent Fall of 2004 at the end of simulation of the Kings IGSM model

Upper Kings Basin IRWMP

June 2007

Figure 4-8



well numbers refer to the well numbers used for the calibration wells. Groundwater levels hydrographs at the representative wells are presented in Appendix B.

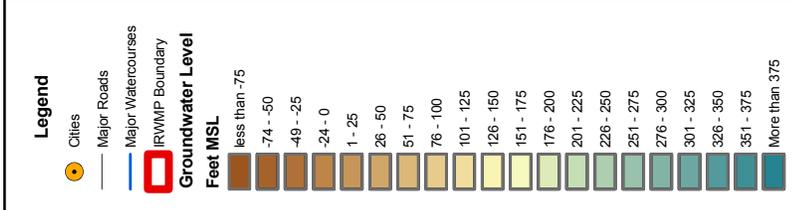
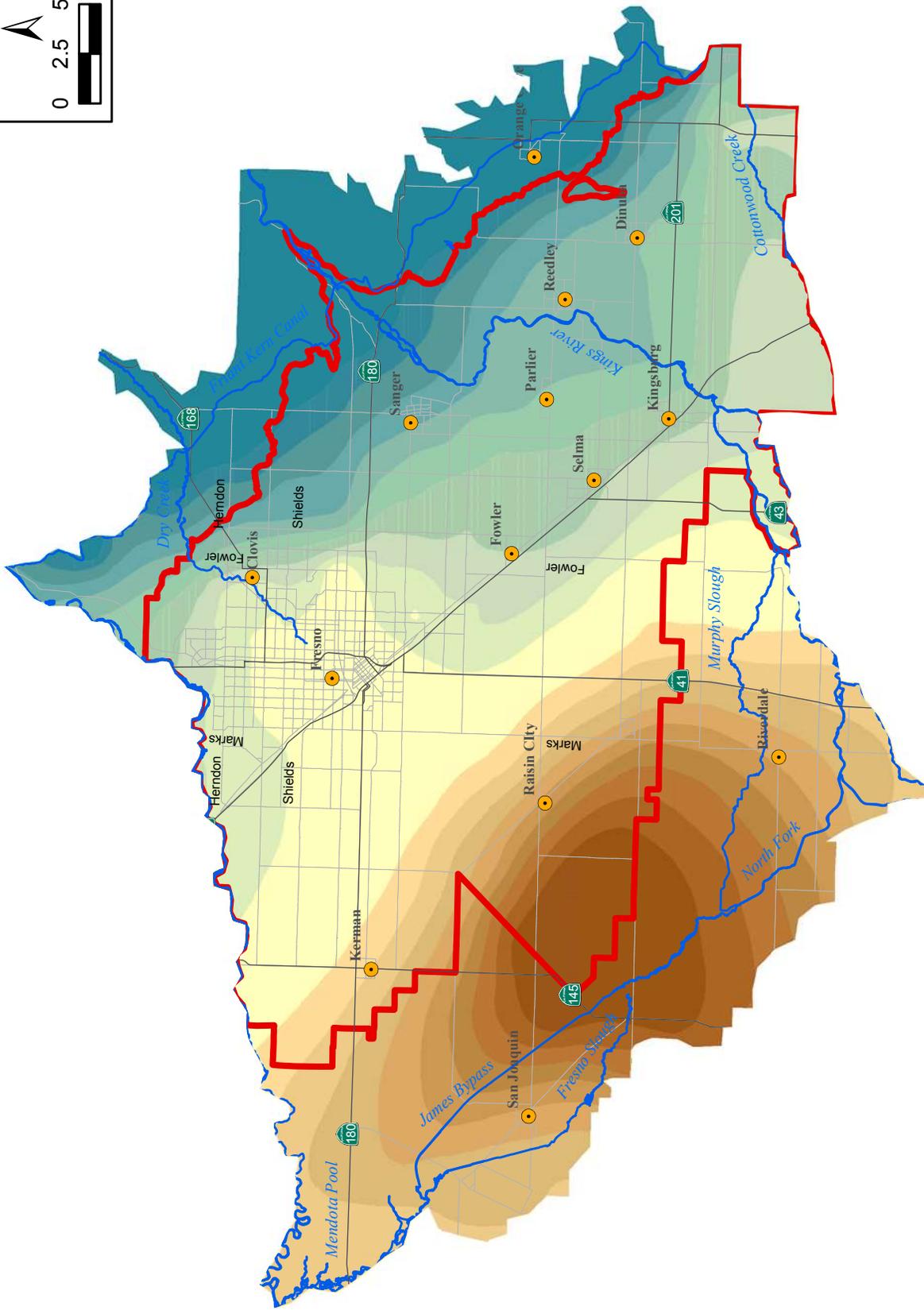
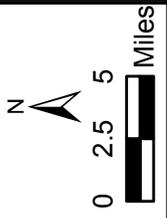
Two groundwater depression areas are observed in Figure 4-8. A major groundwater depression area with groundwater levels lower than 75 feet below MSL is located in the western half of Kings Basin. The second groundwater depression area is apparent in the Fresno/Clovis area. The general direction of groundwater flow is from east to west, however, the groundwater depressions have impacted the groundwater conditions by altering the flow directions and lowering the water levels in the surrounding areas.

4.7.1 CHANGE IN GROUNDWATER ELEVATION

The changes in groundwater elevation in Kings Basin are shown by several representative well hydrographs (Appendix B), a series of groundwater level contour maps, and four water level profiles. To show the effects of variable hydrologic conditions, the 1964-2004 hydrologic period was evaluated to identify dry, multiple dry, wet and multiple wet years for the region. The hydrologic periods were selected as follow: 1976 Dry; 1983 Wet; 1987-1992 Multiple Dry; and 1995-1998 Multiple Wet years. These hydrologic water years are highlighted on the well hydrograph charts (Appendix B).

Figures 4-9 and 4-10 represent the groundwater elevation at the end of the 41 year simulation period under the 2005 Existing Conditions and 2030 Conditions, respectively. Figures 4-11 and 4-12 show the change in groundwater levels between the Existing Conditions and Fall 2004, and the 2030 Conditions and Existing Conditions. The figures show continued decline in water levels, and a deeper and larger groundwater depression area in RCWD Area (Figure 4-11). Groundwater levels are significantly lower for 2030 Conditions in Fresno and urban areas of CID. In contrast, water levels in Clovis area are higher for 2030 Conditions. This is due to high ratio of surface water to groundwater use in Clovis.

Cross sections AA' and CC' pass through urban areas of Fresno and show the impact of increased urban demand of 2030 Conditions (Figures 4-13 - 4-16). 2030 Conditions groundwater levels in Fresno are 25 to 30 feet lower than Existing Conditions and approximately 50 feet lower than water levels in Fall 2004. Groundwater levels in agricultural areas for 2030 Conditions and Existing Conditions simulations are not significantly different. However, these water levels are 20 to 50 feet lower than the Fall 2004 water levels.



Note: Display bound by Kings IGSM Model Boundary

40 Year Groundwater Level Projection Under Existing Conditions

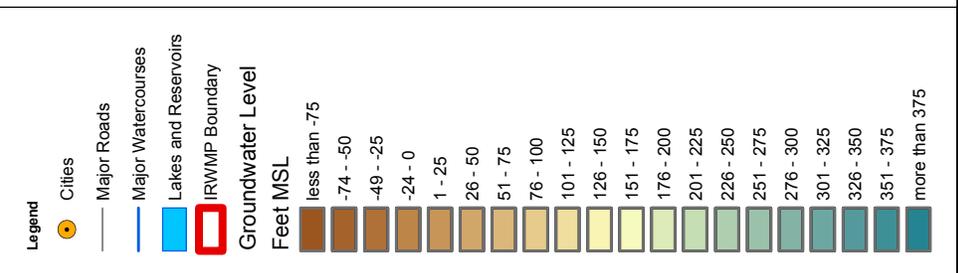
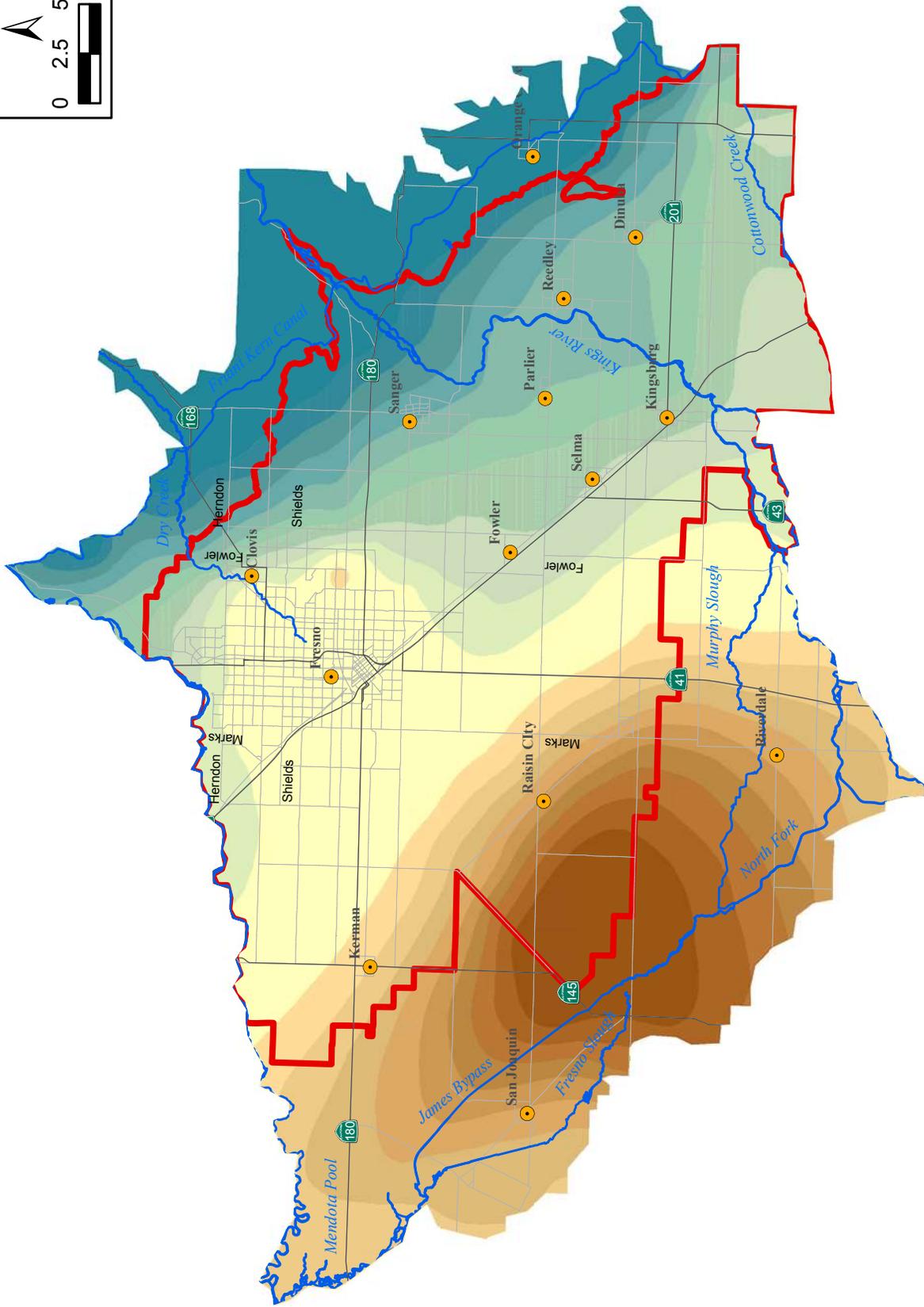
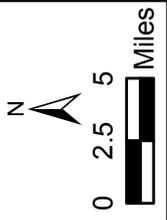
Groundwater levels represent fall levels at the end of simulation of the Kings IGSM model using Existing Conditions

June 2007

Figure 4-9

Upper Kings Basin IRWMP





Note: Display bound by Kings IGSM Model Boundary

40 Year Groundwater Level Projection Under 2030 Conditions

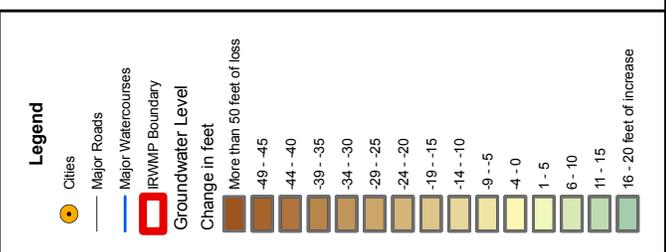
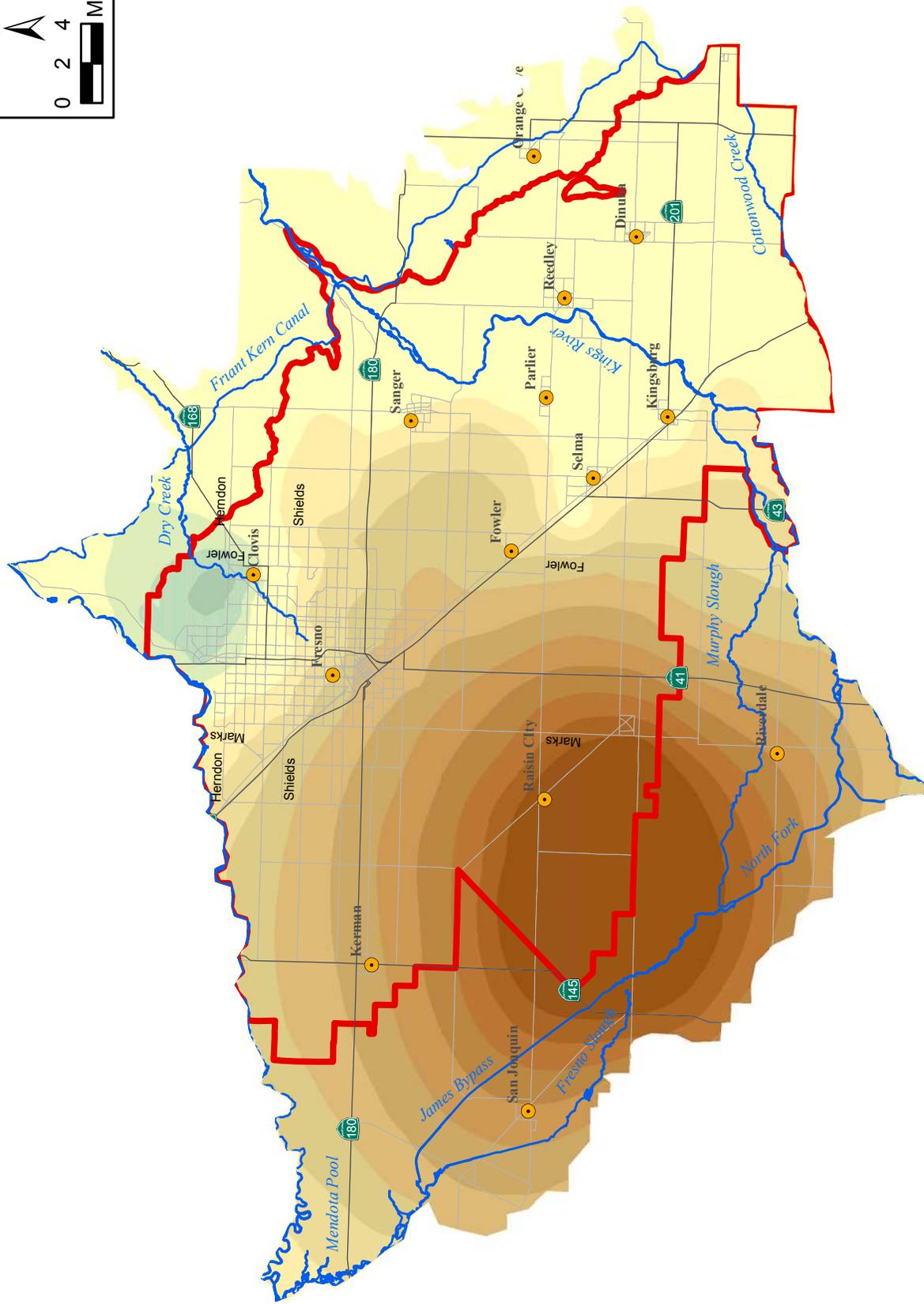
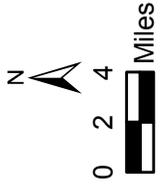
Groundwater levels represent fall levels at the end of simulation of the Kings IGSM model using 2030 Conditions

Upper Kings Basin IRWMP

June 2007

Figure 4-10





Note: Display bound by Kings IGSM Model Boundary

Change in GW Levels between Existing Conditions and Fall 2004

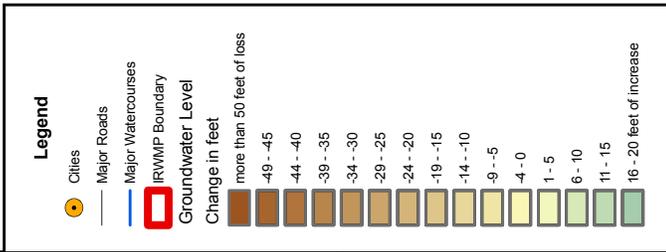
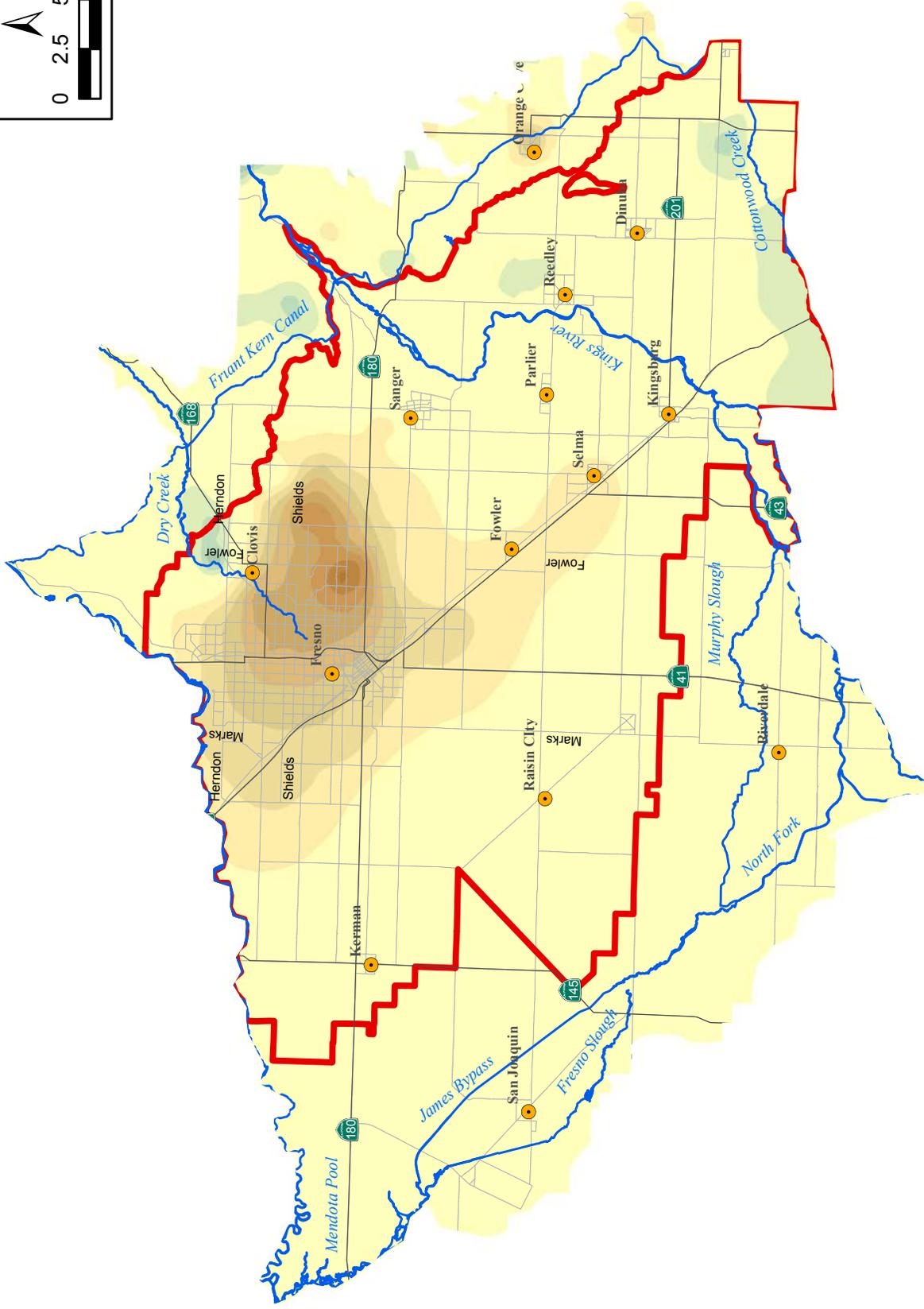
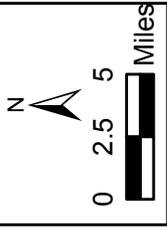
Contours represent change in groundwater levels between Existing Conditions at the end of the 40-year period and Fall 2004

Upper Kings Basin IRWMP

June 2007

Figure 4-11





Note: Display bound by Kings IGSM Model Boundary

Change in GW Levels between 2030 Conditions and Existing Conditions

Contours represent change in groundwater level between the 2030 Conditions and the Existing Conditions at the end of the 40-year period

June 2007

Figure 4-12

Upper Kings Basin IRWMP



Figure 4-13. Cross Section A-A'

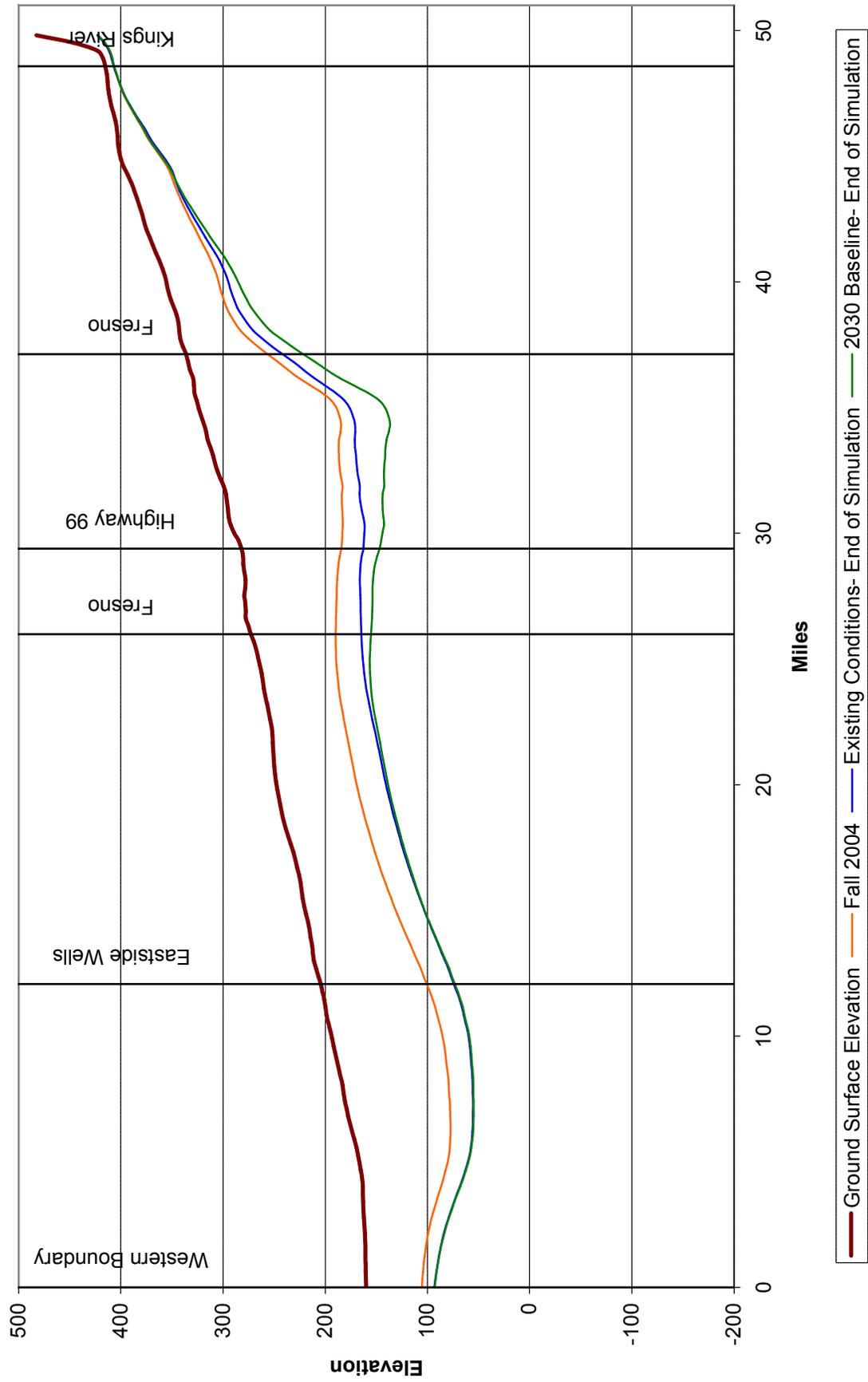


Figure 4-14. Cross Section B-B'

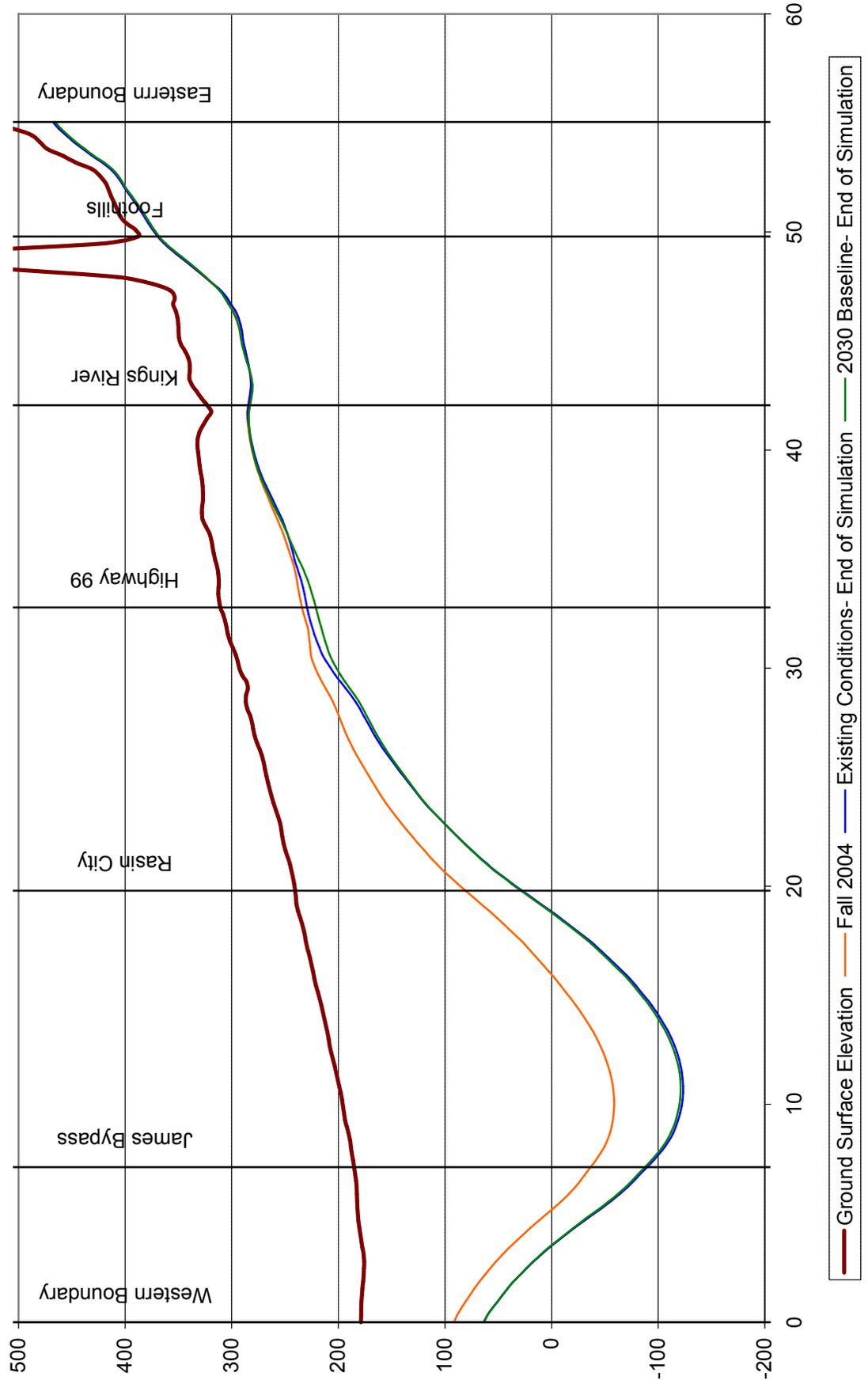


Figure 4-15. Cross Section C-C'

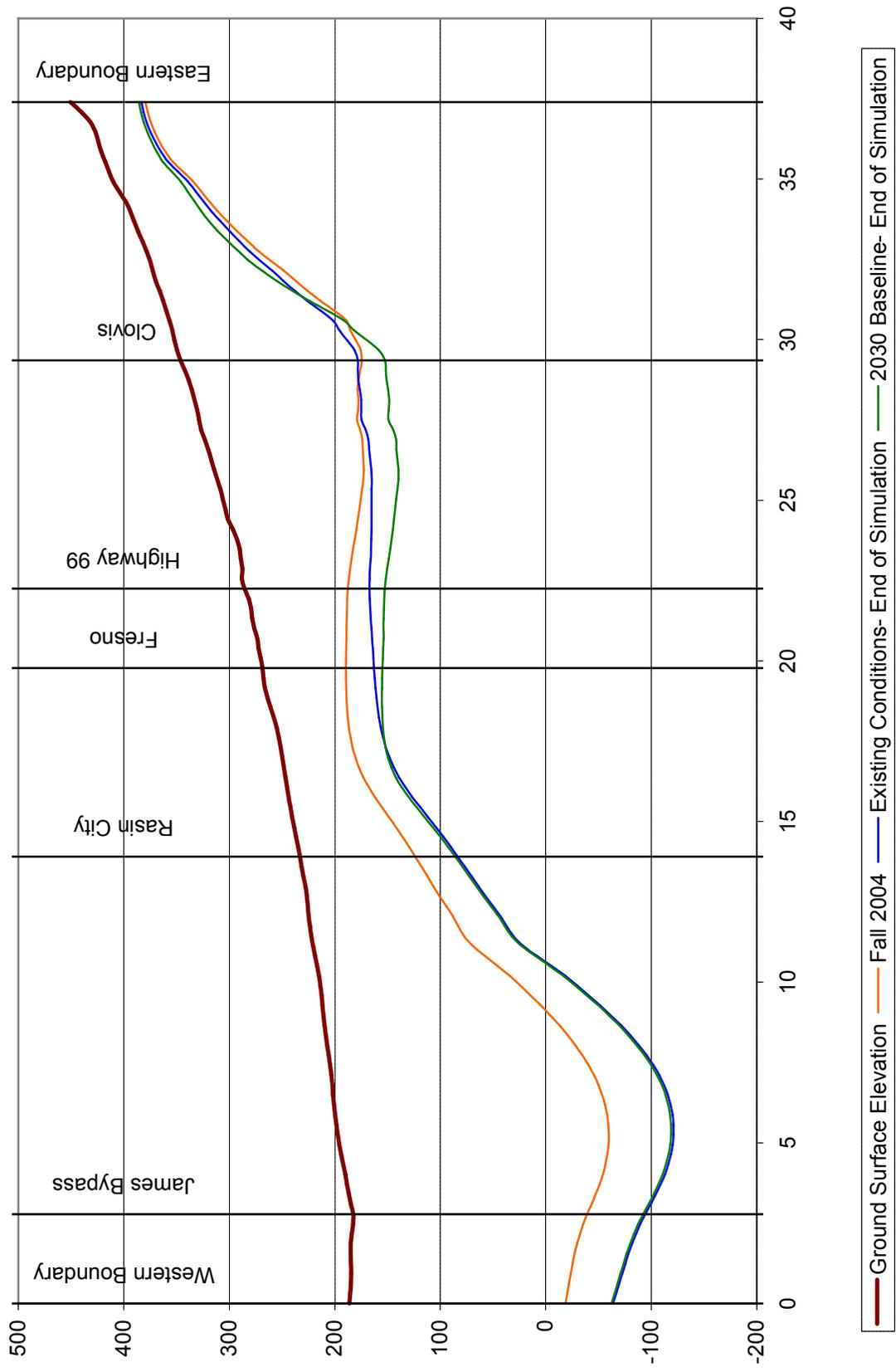
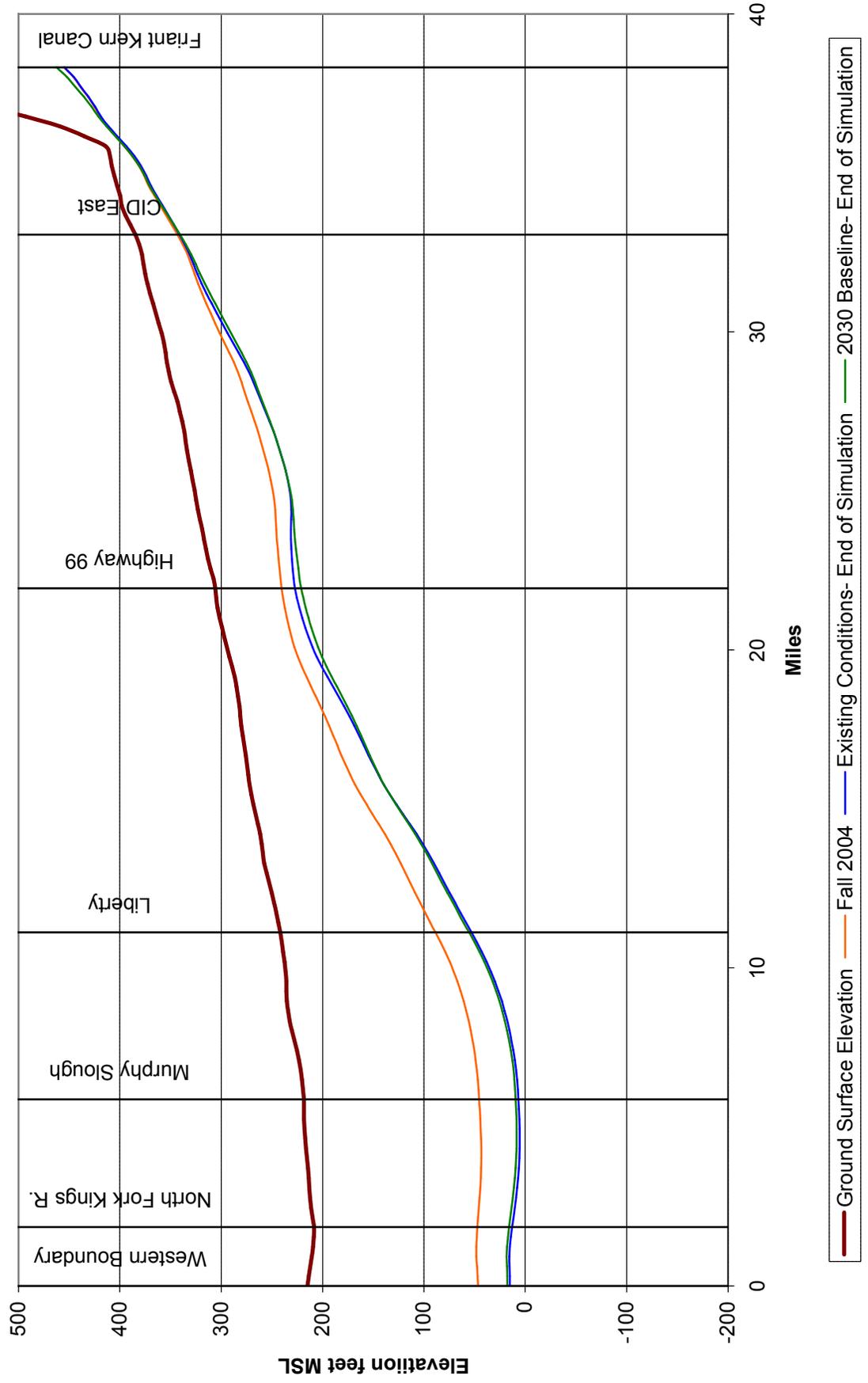


Figure 4-16. Cross Section D-D'



4.7.2 CHANGE IN GROUNDWATER STORAGE AND CONTINUED OVERDRAFT CONDITIONS

Changes in groundwater elevation are directly proportionate to the changes in groundwater storage. Figures 4-17 and 4-18 show the cumulative change in groundwater storage in the IRWMP area and Kings Basin, respectively. Summary of the long-term average change in groundwater storage for the Existing Conditions and 2030 Conditions is provided in Table 4-6. For purposes of comparison, the table includes the “1964-2004 Historical” data. The 1964 to 2004 period included changing urban growth over time. Between 1964 and 2004; 78 TAF/yr and 161 TAF/yr were removed from storage in IRWMP Area and Kings Basin, respectively.

Table 4-6. Change in Groundwater Storage at the End of 41-Year Hydrologic Period

Area	Change in Groundwater Storage	1964-2004 Historical	Existing Conditions	2030 Conditions
IRWMP Area	Cumulative Change in Groundwater Storage at the End of 41-Year Period (TAF)	-3,200	-1,900	-2,200
	Average Annual Change in Groundwater Storage (TAF/yr)	-78	-46	-54
Kings Basin	Cumulative Change in Groundwater Storage at the End of 41-Year Period (TAF)	-6,600	-4000	-4300
	Average Annual Change in Groundwater Storage (TAF/yr)	-161	-98	-105

The model indicates that if the 2005 existing land use conditions were to occur over the next 41 year modeling period, 46 TAF/yr would be removed from groundwater storage in IRWMP area. For the 2030 conditions, 54 TAF/yr would be removed from groundwater storage in IRWMP area. The increase in 2030 Conditions depletion of groundwater storage are associated with the increased urban development and the increased urban reliance on groundwater. The loss of groundwater from storage in the Kings Basin will be 98 TAF/yr and 105 TAF/yr for 2005 Existing Conditions and 2030 Conditions, respectively. Additional loss of storage is due to groundwater pumping for agricultural use in lower Kings Basin.

4.8 FINDINGS

Review of the model results indicate:

- Continued Overdraft Conditions and Decline of Groundwater Levels – Current trend of water level declines will continue into the future. Water level declines are more significant in the groundwater depression area in RCWD and major urban areas in Fresno and Clovis.

Figure 4-17. Cumulative Change in GW Storage in IRWMP Area

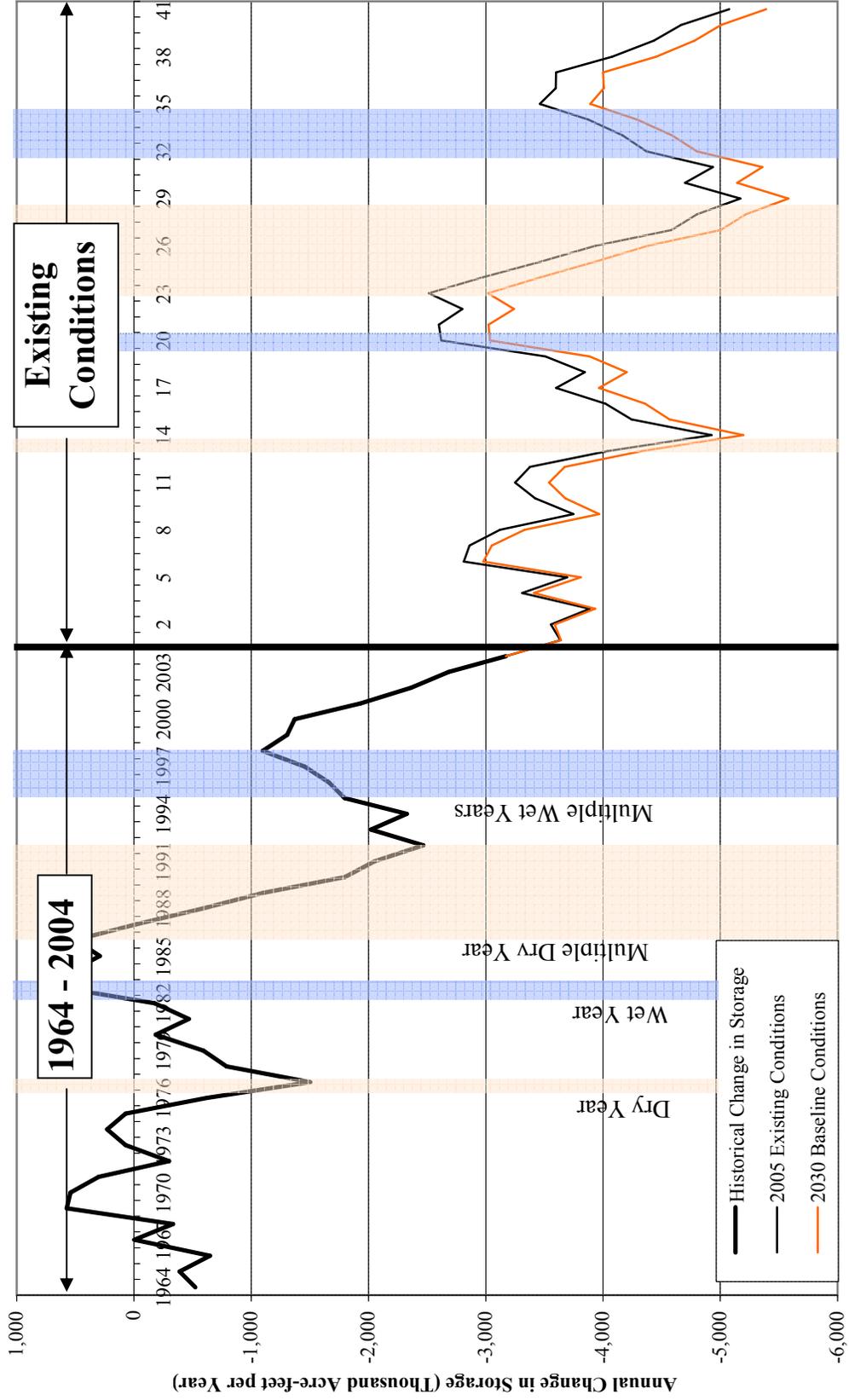
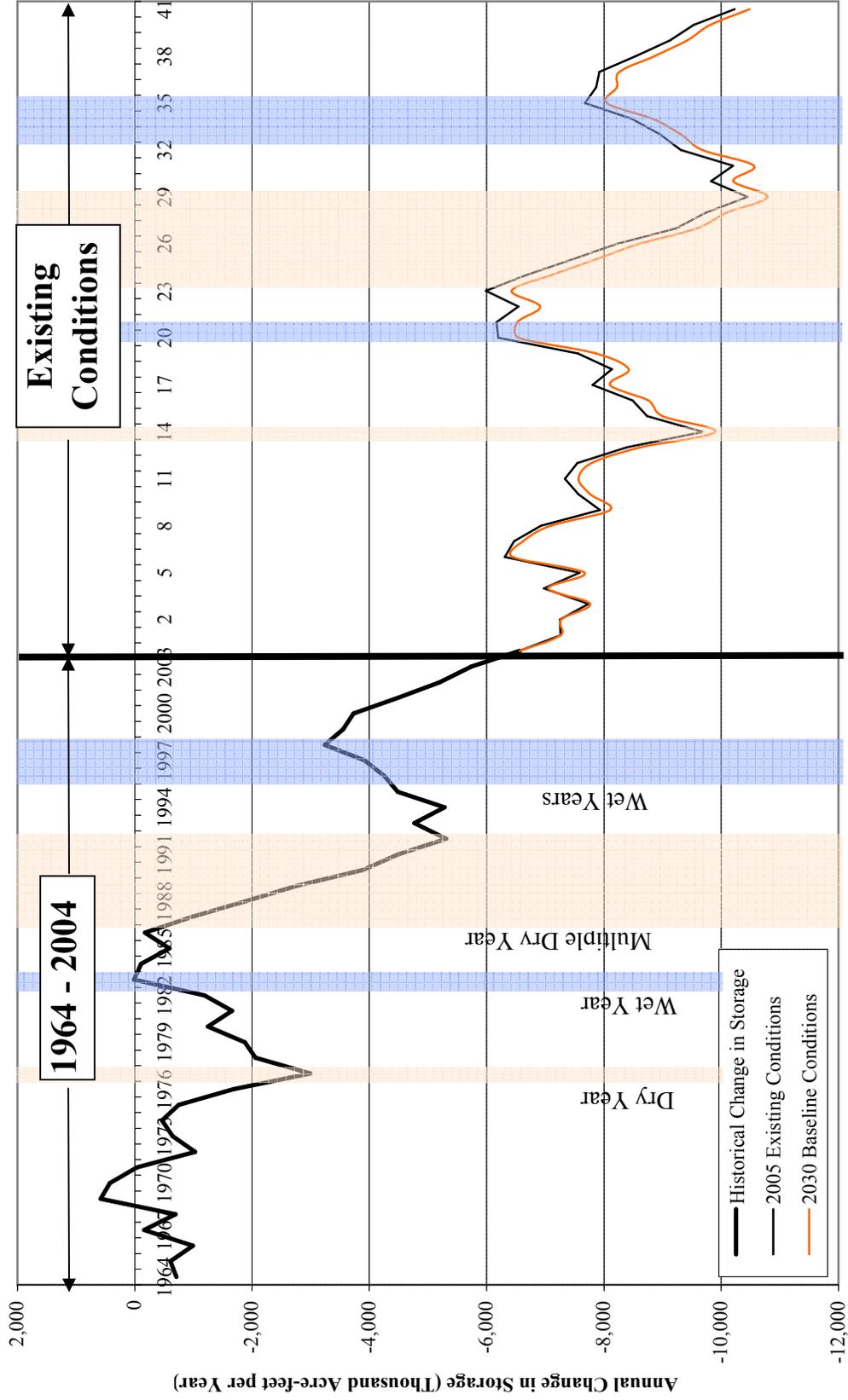


Figure 4-18. Cumulative Change in GW Storage in Kings Basin



- Increased Impact in Urban Areas – Additional urban demands of 2030 Conditions result in lower groundwater levels when compared to Existing Conditions. The groundwater levels in Fresno for 2030 Conditions is approximately 25 to 30 feet lower than Existing Conditions while water levels in urban areas of CID show 5 to 10 feet of difference. Since agriculture relies mostly on surface water, the difference between groundwater levels of Existing Conditions and 2030 Conditions is not significant where land use remains predominantly agricultural.
- Beneficial Impact of Projects – Projects that include reduction in groundwater pumping and increase in surface water use, similar to surface water use by City of Clovis, could reduce the rate of decline of groundwater levels and, if provided in sufficient quantities it would reverse the decline.

An explanation of the regional planning process and overall integration strategy used to develop the Upper Kings Basin IRWMP is provided in this section along with the description of the goals and objectives. This IRWMP provides a planning framework and management structure from which local water management policies, projects, and programs can be formulated, evaluated, integrated, and implemented. The Water Forum first worked to develop a consensus on the regional problems, issues, and potential conflicts. Goals and objectives were then established to address these issues and to set the stage for the development of the projects, programs, and actions. A planning framework and integration strategy was defined to help the Water Forum work with stakeholders to prioritize projects and alternatives to be included in the IRWMP.

5.1 PROCESS OF DETERMINATION OF REGIONAL PLANNING ISSUES, GOALS, AND OBJECTIVES

The Water Forum worked through the fall of 2003 and winter of 2004 to identify priority problems and issues, and generate a consensus on the purpose and need for the IRWMP. A number of existing information sources, as listed below, were reviewed during this process:

- The original MOU adopted in May 2001 by the DWR, KRCD, AID, CID, and FID;
- The Water Forum Concept Paper (2004);
- Basin Assessment Report (WRIME, 2003b); and
- IRWMP Guidelines (DWR, 2004).

On the basis of the above review, the Water Forum members developed the IRWMP goals, regional planning objectives, and specific water management objectives for the region. These goals and objectives were adopted at the February 2004 Water Forum meeting. These were forwarded to each of the stakeholder groups for consideration before adopting the Resolution of Support for the IRWMP.

5.2 REGIONAL PROBLEMS, ISSUES, AND CONFLICTS

Water Forum participants have identified and developed consensus on priority problems, issues, and sources of potential conflicts in the Kings Basin.

5.2.1 GROUNDWATER OVERDRAFT

Overdraft of the groundwater resource is the primary problem to be addressed in the Upper Kings Basin IRWMP. Overdraft provides a unifying theme for the IRWMP and is the major “driver” for the planning process. The Basin Advisory Panel (BAP) composed of original MOU partners documented that the Kings groundwater basin was in overdraft condition (WRIME, 2003) and recommended that the Water Forum support development of the Kings IGSM to provide a tool to analyze the regional water budget and quantify the nature and extent of overdraft. The Kings IGSM was developed and applied under direction of the Water Forum’s Technical Analysis and Data Work Group. The Kings IGSM provides the scientific and technical basis for quantifying the current and potential future overdraft (WRIME 2007b). The area water budget and model results are further explained in Chapter 4 and in Appendix B.

The model and related technical work helped the Water Forum by providing data and analysis results to conclude that the primary water management goal should be to “halt and ultimately reverse the current overdraft of the groundwater aquifer”. It is expected that attainment of this goal would “lead to overall maintenance or improvement in the quantity, quality and cost of development of groundwater resources in the region.” The continued overdraft over a long period has resulted in the loss of groundwater supply in some areas in the eastern part of the Kings Basin and is not sustainable.

Overdraft increases the competition for the available supply and creates conflicts between agricultural, environmental, and urban water users, and between geographic areas within the region. Declining groundwater levels and groundwater migration across jurisdictional boundaries are also a potential source of increased conflict. In addition, site-specific issues associated with groundwater quality, groundwater recharge, and the need for water and wastewater management facilities to address overdraft have been identified as high priority issues.

5.2.2 WATER SUPPLY RELIABILITY

Water demand has exceeded the available surface and groundwater supplies as they are currently developed and managed with the existing capital facilities and institutional arrangements. A reliable surface water supply is not assured in normal and dry years. Groundwater makes up the balance of urban and agricultural water demands when surface water is not available. In addition, some areas in the basin are entirely reliant on groundwater. Therefore, the long-term sustainability and reliability of the surface and groundwater supply must be addressed in the IRWMP.

An improvement in the capture and storage of storm water and flood water both annually (winter storage for summer use) and during multi-year climatic variations (wet year storage to meet dry year demands) will increase the water supply reliability in the region. The ability to utilize the available groundwater storage is contingent upon construction of capital facilities and on agreements for how to operate and manage the available groundwater storage space. The community, through the Water Forum and IRWMP process, seeks to avoid litigation over water resources and to develop a consensus solution for creating sustainable water supplies with minimum environmental impact.

5.2.3 DEGRADATION OF WATER QUALITY

Degradation of water quality in parts of the IRWMP Region has the potential to reduce the available supply or increase treatment costs. Also, the migration of poor quality water is a factor in the operation of the groundwater basin. Therefore, existing water quality needs to be maintained or improved to ensure that there is water of acceptable quality to meet current and future agricultural, urban, and environmental requirements. A wide range of local, state, and federal programs, both regulatory and voluntary, need to be better coordinated to avoid additional burdensome regulations and to provide benefits to the region.

5.2.4 URBAN DEVELOPMENT

Significant urban development is occurring throughout the planning area, placing increased demands on already stressed resources and increasing the potential for conflicts between existing and new water users. Recent legislation requires urban areas to document and prove that long-term water supplies are available. Potential conflicts exist due to inconsistent planning horizons, lack of compatibility between land use and water supply plans, decreased water quality, and increased treatment costs and requirements for both drinking water and wastewater treatment. Urban areas reduce the amount of applied irrigation water and have a potential effect on the amount of groundwater recharge. Urban water use serves to “harden” the water demand and require a reliable supply of high quality water as compared to agricultural uses. Current urban use is not measured in some areas.

5.2.5 PROTECTION OF WATER RIGHTS

A complex system of water rights exists and is managed by the KRWA on behalf of its 28 members. This water rights system and the associated agreements were put in place to resolve long standing historical conflicts. These agreements demonstrate that local interests can solve and manage conflicts at a local level. The existing agreements, rights, and entitlements

will provide the basis for further basin planning and management because the protection of existing rights is a premise for the IRWMP planning effort and is required to avoid conflicts.

Overlying groundwater rights must also be protected to avoid conflicts. Agreements, similar to those that are used in surface water management, need to be developed for the operation of the groundwater basin and any potential groundwater management facilities for recharge and storage.

5.2.6 SUSTAINING THE AGRICULTURAL ECONOMY

The Kings Basin is a rich agricultural region, and agriculture is a pillar of the local economic and cultural landscape. Agricultural interests developed and paid for many of the local water supply facilities and hold some of the most senior water rights in the Kings Basin. Agricultural and urban users have differences in the ability to pay for new water supplies. Existing agricultural land uses need to be protected to avoid conflicts associated with water and land use conversions.

5.2.7 PROTECTION OF LIFE AND PROPERTY FROM FLOODING

Major storm events have the potential for impacts to existing land use. Regional and local flood control facilities may need improvement to better manage flood runoff and protect existing or proposed land uses. Urbanization increases impervious areas and therefore, will increase runoff, which will have impacts on existing drainage, water delivery infrastructure, and downstream agricultural land uses. Cities and water districts need to work together to avoid these impacts and plan for long-term regional flood control solutions.

5.2.8 PROTECTION OF THE ENVIRONMENT

Community and social programs designed to protect or enhance environmental conditions must be identified and factored into project designs. Environmental protection goals and objectives may be in conflict with other economic development goals and objectives. Integrated solutions to land use and water supply issues also need to factor in potential ecosystem management benefits and costs. Ignoring ecosystem needs could result in projects that do not meet regulatory requirements, are subject to legal challenge, and therefore are subject to schedule delays, cost overruns, or abandonment.

5.2.9 ENVIRONMENTAL JUSTICE

Environmental justice issues can be a source of conflict for IRWMP projects. Therefore, a scientific and open approach needs to be followed in selecting potential project sites. The project sites will be selected based upon soil conditions, water availability, water delivery facilities, agency coordination, and landowner cooperation. Potential projects in areas, towns, or cities will not be rated and prioritized based upon characters of size, ethnicity, economics, or religious beliefs.

5.3 REGIONAL GOALS AND PLANNING OBJECTIVES

The regional goals and planning objectives were established to guide the development of the IRWMP and the planning process. These objectives also defined how the Kings Basin stakeholders integrated other community values into the process to define water management strategies.

5.3.1 REGIONAL GOALS

The regional goals are the broadest statement of intent or purpose for the IRWMP and are intended to address the primary problems and resource conflicts in the region. The Water Forum consulted and elaborated on the original goals and objectives developed by the Basin Advisory Panel (WRIME, 2003b). The goals of the IRWMP are:

- Halt, and ultimately reverse, the current overdraft and provide for sustainable management of surface and groundwater;
- Increase the water supply reliability, enhance operational flexibility, and reduce system constraints;
- Improve and protect water quality;
- Provide additional flood protection; and
- Protect and enhance aquatic ecosystems and wildlife habitat.

5.3.2 REGIONAL WATER RESOURCES OBJECTIVES

Regional water resources objectives were adopted by the Water Forum to address specifically the water resources issues. They are designed to address the priority water supply problems by integrating land, water, and environmental management strategies that will provide multiple benefits and the greatest return on investment. It should be noted that resolution of the groundwater overdraft is still a primary purpose and unifying theme for the IRWMP. The IRWMP water management objectives are:

- Define local and regional opportunities for groundwater recharge, water reuse/reclamation, and drinking water treatment;
- Develop large scale regional conjunctive use projects and artificial recharge facilities to:
 - Enhance operational flexibility of existing water facilities, consistent with existing agreements, entitlements, and water rights;
 - Improve the ability to store available sources of surface water in the groundwater basin;
 - Capture storm water and flood water currently lost in the region;
 - Provide multipurpose groundwater recharge facilities that provide flood control, recreation, and ecosystem benefits; and
 - Integrate the fishery management plan;
- Promote 'in-lieu' groundwater recharge to reduce reliance on groundwater through reclamation and reuse of treated wastewater, surface water treatment and delivery for municipal drinking water, and delivery of untreated water for agricultural use;
- Negotiate and develop institutional arrangements and cost sharing for water banking, water exchange, water reclamation, and water treatment;
- Design programs to improve water conservation and water use efficiency by all water users;
- Identify interconnections or improvement of conveyance systems to provide multiple benefits; and
- Enhance wildlife habitat through surface water reclamation, recharge, and treatment facilities.

5.3.3 REGIONAL PLANNING OBJECTIVES FOR THE UPPER KINGS BASIN IRWMP AND PLANNING PROCESS

The regional planning objectives were adopted by the Water Forum to guide the Upper Kings Basin IRWMP development process. The regional planning objectives reflect community values and acknowledge a range of stakeholder perspectives towards land use, water supply, and environmental resources. Proposed regional planning objectives included:

- Use the Water Forum to help:
 - Create a framework for ongoing regional collaboration and conflict resolution;
 - Coordinate the regional planning process to produce an IRWMP;
 - Define local and regional water management strategies;
 - Evaluate and compare alternatives;

- Prioritize cost effective local and regional solutions; and
- Increase public understanding of water management issues.
- Collect and compile water quality baseline data for the region and define opportunities to integrate existing local, state, and federal programs.
- Investigate and resolve legal and institutional issues that may affect project development.
- Identify and pursue sources of funding needed to support project development.
- Compile an inventory of existing water resources plans and policies for the region (including state agencies); include an inventory of local government and water district strategies and initiatives for dealing with water resources problems.
- Develop an integrated hydrologic model to determine regional water budgets, understand how the groundwater basin operates, evaluate and compare alternatives, and support decision making.
- Involve local water districts and land use agencies in generating and confirming the current and future water needs.
- Seek to ensure compatibility and consistency with land use and water supply plans.
- Create and define opportunities to share data and information.
- Develop and implement a community affairs strategy to provide outreach and educate the public and decision makers on water management problems and solutions.
- Evaluate local and regional economic impacts and benefits of proposed projects.
- Identify potential environmental and ecosystem benefits associated with developing the IRWMP.
- Avoid environmental impacts during planning and project design where possible.
- Coordinate needed environmental review of the final alternative projects and programs.

During development of the IRWMP, the Water Forum has realized many of the preliminary planning objectives that were initially established in 2005. The implementation plan contained herein updates the approach to oversight and coordination and establishes long-term strategies for ongoing Water Forum operations. The Water Forum will continue to coordinate stakeholder involvement during implementation of the Upper Kings Basin IRWMP and will use adaptive management to continuously respond to changing circumstances.

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The Water Forum worked collaboratively to develop a regional Planning Framework that integrates existing land, water, and habitat projects, plans, and programs. The Planning Framework also helped to design new projects and programs. The Upper Kings Basin IRWMP acts as a nexus between statewide and local planning efforts, helping to synchronize the large, complex planning processes, regulations, and priorities at the state level, with the specific issues, data, concerns, planning, and implementation needs at the local level. The purpose of this chapter is to describe the Planning Framework used by the Water Forum to integrate water management strategies that were considered for inclusion in the IRWMP. It describes the Planning Framework and evaluates each of the water management strategies and the potential for applying the strategy in the Kings Region.

6.1 PLANNING FRAMEWORK AND INTEGRATION STRATEGY

The planning framework and integration strategy was presented and discussed first to the Projects Work Group on April 21, 2006, then to the Planning and Steering Committee and full Water Forum on April 27, 2006. Comments on the Planning Framework were originally to be submitted to KRCD by May 21, 2006. The Water Forum requested additional time so the deadline was extended to June 21, 2006. The Water Forum discussed its approach at a June 22, 2006, meeting and decided to move forward with the process for identifying projects. The purpose of the planning framework and integration strategy was to:

- Define how the Water Forum worked with the community to identify water management strategies, projects, plans and policies for inclusion in the IRWMP;
- Provide criteria for prioritizing projects that are fair, rigorous, and fully integrated;
- Identify how projects, programs, and policies are to be integrated into the IRWMP;
- Increase the number and quality of projects to be included in the IRWMP so that they meet the IRWMP goals and will fit within the already established statewide Planning Framework;
- Document the design assumptions for IRWMP projects; and
- Refine the basin management objectives that provide project design guidelines and performance measures for subsequent tracking of progress in implementing the IRWMP.

6.1.1 APPROACH TO INTEGRATION OF WATER MANAGEMENT STRATEGIES AND PROJECTS IN THE IRWMP

After reviewing the water management strategies, the Water Forum established Conjunctive Use & Groundwater Management as the prevailing theme of the Upper Kings Basin IRWMP. This theme was selected because groundwater overdraft of the basin (DWR, 2003a; WRIME, 2003b) is the highest priority problem. Overdraft has the greatest potential to result in conflicts between water users, result in economic losses to both urban and agricultural economies, and to impact the environment. All of the other strategies are integrated within the prevailing theme.

The state legislature and DWR Guidelines have defined the “water management strategies and elements” that must be considered for inclusion in the IRWMP. The water management strategies provided the tools or building blocks for the Water Forum and local stakeholders to consider when defining projects that meet both the local goals and objectives and the statewide priorities.

A consolidated list of water management strategies and elements is presented in Table 6-1 to show how the DWR Guidelines and California Water Code requirements are related, and how the Water Forum combined the state’s required management strategies into the five major IRWMP project categories. The IRWMP integrations approach is shown graphically in Figure 6-1. The project categories will be used to identify project linkages and interdependencies.

Table 6-2 is presented to show how the IRWMP Water Resource Objectives can be met by integrating the various water management strategies recommended by the state.

The Water Forum added two water management strategies to help meet IRWMP conjunctive use objectives: Conveyance and Land Acquisition. This is necessary because conveyance and access to land are important factors for developing conjunctives use projects.

The water management strategies include structural and non-structural solutions.

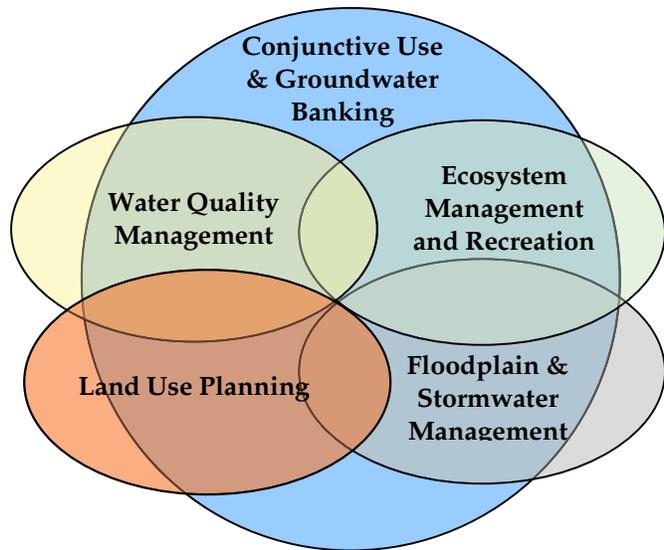


Figure 6-1. Upper Kings Basin IRWMP Project Categories and Integration Strategy

Table 6-1. Water Management Strategies and Elements Defined by the State

Water Management Strategies from Guidelines (Appendix A—Standards)	Water Management Elements from the California Water Code (CWC § 79561 per Section III.C of Guidelines, Eligible Projects)	IRWMP Project Category
Groundwater Management*	Groundwater recharge and management projects	Conjunctive Use & Groundwater Banking
Conjunctive Use		
Water Recycling*	Water banking, water exchange, water reclamation, and improvement of water quality	
Water Supply Reliability*		
Imported Water		
Water and Wastewater Treatment		
Water Transfers		
Conveyance Facilities ⁽¹⁾		
Land Acquisition ⁽¹⁾		
Surface Storage		
Water Conservation*	Programs for water supply reliability, water conservation, and water use efficiency	
Desalination	Contaminant and salt removal through reclamation, desalting, and other treatment technologies	
Ecosystem Restoration*	Removal of invasive non-native plants, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands	Ecosystem Management and Recreation
Environmental and Habitat Protection and Improvement*		
Wetlands Enhancement and Creation*		
Recreation and Public Access*		
Flood Management*	Planning and implementation of multipurpose flood control programs that protect property; improve water quality, storm water capture, and percolation; and protect or improve wildlife habitat	Floodplain and Stormwater Management
Stormwater Capture and Management*	Storm water capture, storage, treatment, and management	
Water Quality Protection and Improvement*	Demonstration projects to develop new methods of drinking water treatment and distribution	Water Quality Management
NPS Pollution Control	NPS pollution reduction, management, and monitoring	
Watershed Planning	Watershed management planning and implementation	
Land Use Planning		Land Use Planning

* Pursuant to CWC §§ 79562.5 and 79564, these water management strategies must be considered to meet the minimum IRWM Plan Standards.

⁽¹⁾ Added by the Water Forum

Structural solutions would involve development of capital facilities and public works projects like conveyance structures (pipelines or canals), recharge ponds, and water treatment plants. Non-structural solutions are programmatic or policy solutions. Examples include such programs as the Kings River Fisheries Management Program and the various water conservation programs of each city and water district. Non-structural solutions also include the various plans or agreements needed to resolve conflicts or implement policies. One example is the KRWA “Blue Book” that defines the operational policies for the 28 members with water rights to the Kings River. The Blue Book has been instrumental in reducing conflict between water users, managing available surface supplies, and resolving water rights disputes and interregional water rights issues in the IRWMP Region.

6.2 PROJECT DEFINITION AND IDENTIFICATION

The project identification process used by the Water Forum is shown in Figure 6-2. The Water Forum held public meetings and formed work groups to reach out to other stakeholders in the IRWMP Region and identify potential projects, plans, and policies that were considered for integration in the IRWMP. A “Call for Projects” requested that each potential project sponsor complete a Project

Information Form, that was available on the project web site (Appendix C). The Form includes specific sections to obtain information about the:

- Project sponsor,
- Project summary,
- Project integration,
- Project budget, funding, schedule,
- Planning information, and
- Statewide evaluation criteria.

The project information forms were designed so that information was obtained in a format that supported the application of the ranking criteria adopted by the Water Forum. The screening process also required proponents to provide detailed information on engineering and economic feasibility, readiness to

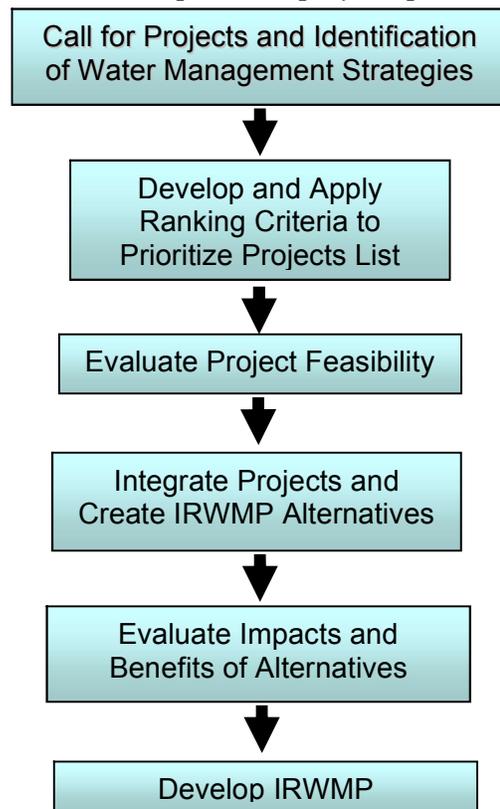


Figure 6-2. Planning Framework for Project Definition and Alternatives Evaluation

proceed, technical and scientific merit, and how the project would best meet IRWMP objectives. No projects were rejected from consideration or excluded.

6.3 PROJECT RANKING CRITERIA

In developing the project ranking and evaluation criteria, the Water Forum also consulted the *Grant Program Guidelines* that define the IRWMP requirements and standards (DWR, 2004a) and the *Proposal Solicitation Packages for Steps 1 and 2 for Proposition 50 Implementation Grants* (DWR, 2005a, 2006). Appendix C presents the criteria adopted by the Water Forum for ranking and evaluating the proposed projects. Once the project sponsors submitted the information, it was anticipated that the consulting team and a Water Forum work group would apply the criteria. In addition to the statewide evaluation criteria in the *Proposal Solicitation Package for Steps 1 and 2 of the Implementation Grant*, IRWMPs for other regions were also reviewed to compare the different approaches to project prioritization and to develop the recommended Upper Kings Basin IRWMP approach.

The purpose of the ranking criteria was not to eliminate or screen projects, but to set priorities and to document near-term, mid-term, and long-term actions to be included in the IRWMP implementation program; and to help project proponents decide what other prerequisite actions were needed to get the project to a high level of readiness to proceed and be competitive.

6.4 ANALYSIS OF STATEWIDE PREFERENCES AND PRIORITIES

The Water Forum was acutely aware that the IRWMP and related projects were to be evaluated in the context of the statewide requirements in a highly competitive environment. The Water Forum sought to make the IRWMP responsive to the state's Preferences and Priorities as defined in the Proposition 50 Proposal Solicitation and the IRWMP statewide standards. Briefing materials on the state's Preferences and Priorities were provided to the PSC and Water Forum in advance of the April 2006 meetings. The briefing described how the Preferences and Priorities might apply to the Kings Region and the IRWMP. The purpose of this briefing is to support discussion of how the IRWMP Water Resources Objectives are consistent with the State Priorities and Preferences defined in the Proposition 50 Guidelines (DWR, 2004a). The relationship of the IRWMP Water Resources Planning Objectives to the State's Preferences and Priorities is presented in Table 6-3.

Originally, Proposition 50 included requirements that an IRWMP and related project meet both the statewide Preferences and Priorities. The requirement to meet the statewide Priorities has been de-emphasized by DWR and the SWRCB as a result of the public hearings and input, and this requirement no longer is applicable to Proposition 50 Implementation Grant projects.

Table 6-3. IRWMP Objectives and Relation to State Preferences and Priorities

	Statewide Preferences										Statewide Priorities									
	Integrated projects with multiple benefits	Support and improve local and regional water supply reliability	Contribute to maintenance of water quality standards	Reduce pollution in impaired waters and sensitive habitat	Water quality projects that serve disadvantaged communities	Reduce conflict between water users or resolve water rights disputes	Implement Total Maximum Daily Loads Management Initiative	Implementation of SWRCB's Non-point Source Pollution Plan	Assist in meeting Delta Water Quality Objectives	Implement recommendations of floodplain management task force, recycling task force, or state species recovery plan	Address environmental justice concerns	Help achieve goals of the CALFED Bay-Delta Program								
Define local and regional opportunities for groundwater recharge, water reuse/ reclamation, and drinking water treatment.	•	•	•	•	•	•			•	•	•	•								
Develop large scale regional conjunctive use projects and artificial recharge facilities to:	•	•																		
Capture storm and flood water currently lost to the region.	•																			
Enhance operational flexibility of existing water facilities, consistent with existing agreements, entitlements, and water rights.	•				•															
Improve the ability to store available sources of surface water in the groundwater basin.	•				•							•								
Provide multi- purpose groundwater recharge facilities that provide flood control, recreation and ecosystem benefits.	•			•	•							•								
Design programs to improve water conservation and water use efficiency by all water users.	•											•								
Integrate the fishery management plan.	•																			
Promote 'in- lieu' groundwater recharge to reduce reliance on groundwater through reclamation and reuse of treated wastewater; surface water treatment and delivery for municipal drinking water; and delivery of untreated water for agricultural use.	•	•		•	•							•								
Negotiate and develop institutional arrangements and cost sharing for water banking, water exchange, water reclamation, and water treatment.																				
Enhance wildlife habitat through surface water reclamation, recharge and treatment facilities.	•			•								•								
Identify beneficial interconnections or improvement of conveyance systems to provide multiple benefits.	•	•			•															

Although the Statewide Priorities have been removed as a requirement, the Water Forum had previously evaluated how these might be applied by the state to the Kings Region, and these are discussed in this Section.

The Water Forum used the briefing materials to define the planning framework and integration approach for the Kings Region, and to develop the project ranking criteria. The Upper Kings Basin IRWMP has sought to implement a strategy that is consistent and supportive of the Statewide Preferences.

6.4.1 STATE PREFERENCES

The California Water Code and implementing legislation for Proposition 50 specify that preference will be given to specific project types. These program preferences are reflected in the Water Forum's evaluation criteria and were taken into consideration during the review process.

The State's Program Preferences include:

- Integrating projects with multiple benefits;
- Supporting and improving local and regional water supply reliability;
- Contributing expeditiously and measurably to the long-term attainment and maintenance of water quality standards;
- Eliminating or significantly reducing pollution in impaired waters and sensitive habitat areas, including areas of special biological significance; and
- Including safe drinking water and water quality projects that serve Disadvantaged Communities (DAC).

Each of these preferences is discussed below.

Include Integrated Projects with Multiple Benefits

The Kings Objectives are specifically crafted so that projects each achieve multiple benefits. The process for defining priorities and configuring IRWMP Alternatives is also intended to demonstrate local preference for projects that provide regional, as compared to strictly local, benefits. The objectives integrate groundwater recharge, storm water capture, ecosystems enhancement, and wastewater reclamation into the overall IRWMP strategy. In addition, many of the incorporated cities and unincorporated areas in the IRWMP Region are classified as DACs and are experiencing water quality and supply problems or issues related to complying with wastewater standards; these issues will be addressed through the IRWMP to define opportunities.

Support and Improve Local and Regional Water Supply Reliability

The Kings Groundwater Basin has been recognized by the state as being in critical overdraft (DWR, 2003a) and the Upper Kings Basin IRWMP is targeted towards resolution of overdraft. The IRWMP Project will seek to bring the basin back into balance by integrating water management strategies into a coherent whole. The Planning Framework and process to identify projects and programs will use the Kings Objectives to establish priorities and configure alternatives. The project may include groundwater recharge, conservation, and reclamation and reuse of recycled wastewater. Any project (structural) or program (non-structural) proposed that helps to increase the water supply reliability and reduce the impacts of overdraft, especially in dry years, will be recognized as providing regional benefits. An analysis of the reliability of existing supplies will be conducted during the alternatives evaluation. The Kings Integrated Groundwater and Surface Water Model will be used to quantify the overall IRWMP benefits and to compare alternatives to increase water supplies, improve reliability, and reduce overdraft. Specific performance measures for these areas will be defined and used to evaluate alternatives.

Contribute to the Long-Term Attainment and Maintenance of Water Quality Standards

The Kings Basin is experiencing a range of groundwater quality problems which include presence of nitrates, organic chemicals, arsenic, and other contaminants that could cause impairment and/or result in problems complying with drinking water standards. The groundwater recharge elements of the Upper Kings Basin IRWMP will result in clean Kings River water being stored in the groundwater basin. This will help dilute existing contaminant levels. Any negative impacts of recharging water that could occur as a result of changes to groundwater levels (e.g., potential to cause changes in the rate or direction of groundwater flow and induce migration of poor quality water) will be addressed in the IRWMP during the feasibility evaluation and in any environmental compliance documents prepared pursuant to the CEQA. The storm water capture strategy may include diverting and capturing runoff in combined multipurpose ponds for flood control, groundwater recharge, and provision of incidental habitat and/or recreation benefits, and will also potentially reduce sediment loads or other contaminants to local streams or rivers. Current integrated flood control/groundwater recharge programs in and around Clovis and Fresno include objectives for compliance with urban storm water runoff requirements and control of non-point sources of pollution from municipal runoff. To the degree possible, regional recharge facilities may be designed to increase retention times in order to settle sediments originating from land surfaces and agricultural areas prior to placing water in the recharge ponds. A feasibility study and final designs for large-scale recharge ponds will evaluate this opportunity.

Eliminate or Significantly Reduce Pollution in Impaired Waters and Sensitive Habitat Areas, Including Areas of Special Biological Significance

There are limited opportunities for the Upper Kings Basin IRWMP to significantly reduce pollution in impaired water bodies or sensitive habitat areas because there are currently only a small number of problems with surface water quality impairment or impacts to sensitive habitats. The current 303(d) list of impaired water bodies produced by the RWQCB indicate that there are only a small number of constituents, primarily high TDS, causing impairment of beneficial uses of surface water, and that these effects are observed in the very limited area of the Crescent Bypass, which is located in the lower Kings Basin outside of the IRWMP Region. There are no designated areas of special biological significance in the IRWMP Region, though there are areas with significant habitat value that will be protected and preserved. The Upper Kings Basin IRWMP will protect and enhance the fishery in the Kings River consistent with the existing and adopted Fisheries Management Program. In addition, the evaluation of regional groundwater recharge projects includes identification of opportunities to improve flows in Kings River and to create habitat at the recharge locations.

Include Safe Drinking Water and Water Quality Projects That Serve Disadvantaged Communities

As previously described, many of the DACs in the IRWMP Region are experiencing water quality problems at their wells. The IRWMP is seeking to document and identify these problems and establish regional priorities to support the DACs in meeting water quality standards and protecting public health and safety. This is also considered an important element to ensure that economic justice is defined and met.

6.4.2 ANALYSIS OF STATEWIDE PRIORITIES

Statewide Priorities established by the DWR and SWRCB are to be considered during the Upper Kings Basin IRWMP project evaluation process and when developing alternatives to be included in the IRWMP implementation efforts. Statewide Priorities that are to be considered in the project evaluation process include:

- Reducing conflict between water users or resolving water rights disputes, including interregional water rights issues;
- Implementing TMDLs that are established or are under development;
- Implementing RWQCB Watershed Management Initiative Chapters, plans, and policies;
- Implementing the SWRCB's Non-point Source (NPS) Pollution Plan;

- Assisting in meeting Delta Water Quality Objectives;
- Implementing recommendations of the floodplain management task force, desalination task force, recycling task force, or state species recovery plan;
- Addressing environmental justice concerns; and
- Assisting in achieving one or more goals of the CALFED Bay-Delta Program.

The relationship between the IRWMP Objectives and Statewide Priorities is discussed below.

Reduce Conflict Among Water Users or Resolve Water Rights Disputes, Including Interregional Water Rights Issues

Regional overdraft of the groundwater basin has the greatest potential to cause conflicts water users in the IRWMP Region, among geographic areas within the region, or among regions. The consequences of overdraft in terms of declining water levels, increased pumping costs, subsidence, and migration of poor quality water are experienced to different degrees depending on the location. In the long term, overdraft could also impact economic development opportunities, cause conflicts between overlying users, and result in litigation to define rights and entitlements. The IRWMP seeks to develop regional, physical solutions to groundwater overdraft that are fair and equitable and which anticipate and avoid potential conflicts.

In addition to adoption of specific Water Resources Planning Objectives, the Water Forum adopted Regional Planning Objectives intended to guide the Water Forum during the development of the IRWMP. The Regional Planning Objectives reflect community values and acknowledge a range of stakeholder perspectives towards land use, water supply, and environmental resources. The objectives define a consensus and conflict resolution process to be applied during plan development. The IRWMP will refine these objectives and develop the long-term institutional strategy to implement the plan.

Implementation of Total Maximum Daily Loads that are Established or Under Development

There are no TMDLs established in the IRWMP Region and, therefore, no opportunities to further their implementation.

Implementation of RWQCB Watershed Management Initiative Chapters, Plans, and Policies

To protect water resources effectively, a mix of point and non-point source discharges, ground and surface water interactions, and water quality and quantity relationships must be considered. The complexity of these issues presents considerable challenges to water resource

protection program elements of the Upper Kings Basin IRWMP. The state and regional water boards have developed the WMI designed to integrate various surface water and groundwater regulatory programs while promoting cooperative, collaborative efforts within a watershed. The RWQCB is a participant in the Water Forum and the IRWMP will evaluate opportunities to further work with the RWQCB in a voluntary, cooperative fashion, to acknowledge the regulatory programs of the state, and to integrate additional non-regulatory water quality protection elements into the IRWMP that are consistent with the WMI. The last complete revision of the WMI occurred in 2001. The RWQCB will be asked to present the WMI to the Water Forum and the RWQCB's help will be sought in identifying opportunities to integrate the WMI into the water quality protection element of the Upper Kings Basin IRWMP.

Implementation of the SWRCB's Non-point Source Pollution Plan

The IRWMP will integrate the regional Agricultural Waivers Program being coordinated by KRCD and involving all of the water districts and growers in and surrounding the IRWMP Region. In addition, the urban areas that are represented on the Water Forum are independently implementing the storm water programs consistent with the requirements of their NPDES Permits. Opportunities for regional storm water management to meet water quality protection objectives will be investigated in the IRWMP feasibility study and evaluation of alternatives.

Assist in Meeting Delta Water Quality Objectives

The IRWMP is in the Tulare Lake Region and water from the Kings River and IRWMP Region only flows to the Delta in the more extreme flood events. If the Upper Kings Basin IRWMP includes groundwater banking with imported water, there could be opportunities to support other state interests in meeting water quality objectives in dry years. Such a program could potentially increase operational flexibility for CVP and SWP contractors during dry years. Currently, there are no concrete proposals or specific opportunities for groundwater banking of imported water, but this is an element of the IRWMP that will be considered and further evaluated in the feasibility and alternatives evaluation.

Implementation of Recommendations of the Floodplain Management Task Force, Desalination Task Force, Recycling Task Force, or State Species Recovery Plan

The recommendations will be reviewed and summarized for the Water Forum during the planning effort. The Water Forum will schedule a specific agenda item to review the task forces' reports and recommendations and to discuss how these recommendations provide opportunities or constraints within the IRWMP Region.

The Desalination Task Force report does not apply to inland areas and, currently, there are no cost-effective sources of water subject to desalination that could help meet IRWMP objectives, as desalination is not a viable strategy. Long-term salt build-up of water is an issue that will be studied; specific actions or monitoring may be included in the IRWMP Implementation program. There is currently no specific state species recovery plan that includes the IRWMP Region.

Address Environmental Justice Concerns

Specific prioritization criteria have been established for DACs in the IRWMP Region and specific outreach efforts to those DACs are part of the project definition and prioritization effort. In addition, subsequent performance measures and alternative evaluation criteria related to DACs are anticipated for inclusion in the planning process. Long-term priorities to protect and treat water quality in the areas of DACs will help to ensure economic justice within the IRWMP Region.

Assist in Achieving One or More Goals of the CALFED Bay-Delta Program

One of the CALFED goals is to encourage development of 0.5 to 1 million AF of groundwater storage. The Upper Kings Basin IRWMP has specific objectives for groundwater banking and an emphasis on overcoming overdraft, which would support achieving CALFED goals. Water transfers and groundwater banking of imported water from others (e.g.; CVP and SWP contractors) are elements being considered for inclusion in the IRWMP, but it has not been determined if these are near-, mid-, or long-term elements.

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CHAPTER 7 REVIEW OF WATER MANAGEMENT STRATEGIES

Chapter 3 described the baseline and existing conditions and the program foundations from which to build the Upper Kings Basin IRWMP. Chapter 4 discussed the water resources and water budget conditions observed in the past and that are likely to occur in the future, documenting that overdraft is a significant problem. Both chapters provided information used by the Water Forum to define problems and issues and establish the goals and objectives of the IRWMP.

This chapter takes the next step and reviews the water management strategies considered by the Water Forum. The DWR recommended that water management strategies be grouped by the project categories adopted by the Water Forum. To meet the IRWMP goals, the Water Forum added a number of local water management strategies, including land acquisition, conveyance, and drought response. Each water management strategy is discussed in context of the Water Forum project categories:

- Conjunctive Use and Groundwater Banking,
- Water Quality Management,
- Land Use Planning,
- Ecosystem Management and Recreation, and
- Floodplain and Stormwater Management.

The linkages, opportunities, and constraints are discussed for each of the water management strategies. The Water Forum has made findings regarding the appropriateness and relative priorities of the individual water management strategies to the Kings Region. The findings were intended to help establish priorities, define projects, formulate alternatives and develop management actions to be included in the implementation plan.

7.1 CONJUNCTIVE USE AND GROUNDWATER BANKING

Conjunctive Use and Groundwater Management are two of the key water management strategies recommended by DWR. Since overdraft has a great potential for causing conflicts within the Kings Region, the Water Forum has established conjunctive use and groundwater management as the primary focus and basis for integration of programs and projects in the Kings Region. Table 7-1 provides a summary of the water management strategies, defining how they may be integrated with the primary theme of conjunctive use and groundwater management. The other DWR water management strategies that have been integrated in the

Table 7-1. Upper Kings Basin IRWMP: Conjunctive Use and Groundwater Management Relationships, Opportunities, and Constraints

Water Management Strategy	Relationship with Conjunctive Use and Groundwater Management	Project Opportunities	Constraints	Notes	Overall Potential for Upper Kings Basin
Conjunctive Use* and Groundwater Banking*					
Conjunctive Use and Groundwater Banking	High	<p>Surface water sources - Kings River floodwater and entitlements, Friant CVP Class 1, Class 2, and 215.</p> <p>Regional and subregional ponds and facilities within the AID, FID, and CID.</p> <p>In-lieu surface water delivery and treatment for urban area.</p> <p>Inter-regional groundwater banking and storage with external third parties.</p> <p>Coordinate recharge functions with local stormwater retention/detention facilities.</p> <p>Include environmental/habitat features into facility designs and operations.</p> <p>Provide recreation benefits at recharge operations.</p>	<p>Gaining consensus with other KRWA members, negotiating necessary agreements.</p> <p>Evaluating benefits and distributing costs, defining revenue sources and governance.</p> <p>Currently no regional groundwater management plan to guide groundwater basin operations.</p>	<p>Primary theme for integrating other management elements.</p> <p>Could recover costs by selling sand and borrowing materials.</p> <p>Could be related to gravel mining operations and recovery plans.</p>	High
Groundwater Management	High	<p>Integrate existing GMPs.</p> <p>Meet SB 1938 requirements through IRWMP.</p>			High
Conveyance Facilities**	High	<p>Use existing or expanded AID, FID, CID facilities when capacity is available to increase operational flexibility.</p> <p>Develop new conveyance facilities to deliver surface water in lieu of groundwater to agricultural areas not currently served (i.e., Raisin City).</p> <p>Develop easements for spreading floodwaters.</p> <p>Use existing facilities or develop new facilities to convey surface water for treatment and use in municipal areas in lieu of groundwater pumping.</p> <p>Develop new facilities where needed to convey imported water from Mendota Pool or San Joaquin River.</p> <p>Develop agreements to use other KRWA facilities.</p>	<p>Capacity constraints for conveying flood water.</p> <p>Some areas lack conveyance (e.g., Raisin City).</p> <p>Funding mechanisms need definition.</p> <p>Expansion within existing easements or agency-owned property.</p> <p>Need to acquire land or easements to build or enlarge conveyance facilities.</p> <p>Time needed to comply with the CEQA.</p>	<p>Need to evaluate available canal capacities and map current facilities.</p>	High
Land Acquisition**	High	<p>Acquire land to develop recharge facilities.</p> <p>Develop easements for spreading floodwater.</p> <p>Apply land use policies to develop mitigations for urban areas facing development pressure in overdrilled basin and resolve problems complying with state laws (SB 610 and SB 221).</p>	<p>CEQA review required for land acquisition.</p> <p>Land acquisition costs are rising under development pressure.</p> <p>Need to generate funding mechanism.</p>	<p>Necessary part of conjunctive use and groundwater recharge strategy.</p> <p>Can demonstrate near-term success.</p> <p>Complete evaluation of recharge area potential.</p>	High

Water Management Strategy	Relationship with Conjunctive Use and Groundwater Management	Project Opportunities	Constraints	Notes	Overall Potential for Upper Kings Basin
Other Water Management Strategies					
Import, Transfer, and Exchange	Medium to High	<p>Potential source for Region.</p> <p>Direct purchase of 215 floodwater, San Joaquin River Water, or CVP or SWP water via Delta-Mendota Canal and Mendota Pool.</p> <p>Reservoir reoperation - carryover water stored in groundwater aquifer.</p> <p>In-basin transfers with KRWA members through operational changes.</p> <p>In-lieu pumping of stored water and transferring surface water to a third party.</p> <p>Coordinate groundwater banking with CVP/SWP contractors seeking to store water.</p> <p>Crop idling, crop shifting, or water use efficiency measures.</p> <p>Reducing return flows and seepage that would not otherwise be recoverable for reuse.</p>	<p>Costs of water purchase and statewide competition. Requires contracts with external parties.</p> <p>No local history of import or banking, fear of loss of local control from banking, political acceptability.</p> <p>Water rights issues.</p> <p>Local resistance to outside influences.</p>		Medium to High
Wastewater Recycling*	Medium	<p>City of Clovis recycled water program.</p> <p>Expanded use of Fresno/Clovis regional wastewater treatment facility.</p> <p>Selma-Kingsburg-Fowler regional treatment plant.</p> <p>City of Dinuba wastewater reuse program.</p>	<p>Unquantified recycled water potentials.</p> <p>Treatment facilities not near potential place of municipal use.</p> <p>Very little wastewater currently flowing out of the Region.</p> <p>Regulatory uncertainty (DHS).</p> <p>Need substantial investments in additional infrastructure.</p> <p>Public opinion and acceptance.</p>	<p>Recycled water projects supported by the state. Cost effectiveness needs to be evaluated for both IRWMP and UWMPs. Not likely to be cost effective for smaller cities and facilities.</p>	Medium to Low
Water Conservation*	High	<p>Drought contingency and operations plans tied to water banking agreements.</p> <p>Increase water use efficiency for urban and agriculture through implementation of BMPs approved by Urban Water Conservation Council and Agricultural Water Management Council.</p> <p>Improve monitoring and measurement of water delivered and produced.</p>	<p>Requires private sector investments in technology and changes in management practices.</p> <p>Current programs are voluntary and may be underfunded; regulatory programs are not politically acceptable.</p>	<p>Should be a common element to all alternatives.</p> <p>Current cities with 3,000 service connections must update UWMP every 5 years.</p> <p>Agricultural water management plans not required but have been prepared by some districts.</p>	High

Water Management Strategy	Relationship with Conjunctive Use and Groundwater Management	Project Opportunities	Constraints	Notes	Overall Potential for Upper Kings Basin
Surface Water Storage	Medium to High	Additional surface storage would help regulate currently uncontrolled streamflow. Pine Flat Reservoir and upstream reservoirs - storage and operational modification. Prior project proposals: Rogers Crossing Reservoir, Dinkey Creek, Big Dry Creek, Mill Creek, Raise Pine Flat, and Pine Flat Afterbay Storage.	Building large-scale surface storage is difficult due to high costs and environmental constraints.	Could be part of long-term strategy involving multiple regional partners. Would help capture and manage flood flows. Eliminate from near- and mid-consideration. Keep as potential long-term strategy.	Low
Desalination	Low	No significant opportunities within the Region.	Cost effectiveness, no source of saline water.	Eliminate from further evaluation.	Low
Flood Plain Management					
Flood Plain Management*	High	Develop policies to mitigate flood impacts from urban development, tie to recharge program. Move water from Kings River during flood operations to combined groundwater recharge, storage, and retention facilities and reduce threat of downstream flooding. Obtain flood plain easements for recharge and spreading of Kings River floodwaters. Current funding and policy emphasis on floodplain	Interagency coordination required. Specific levy improvements not well identified or defined.	Fresno area provides good examples of policy concepts. The AID also has integrated some stormwater policies to facilities improvements to mitigate development impacts to agricultural distribution systems.	High
Stormwater Capture*	High	Kings River flood releases are available for capture and salvage. The FID, AID, CID provide stormwater benefits and integrate into existing canal operations to reduce downstream impacts of urban development. Develop combined recharge/retention facilities and acquire land for on- or off-site mitigations to stormwater impacts from new development. Develop stormwater facilities to incorporate open space elements.	Need funding mechanisms and interagency agreements. Need to acquire land through easement or purchase.		High
Water Quality					
Surface Water Treatment for Drinking Water	High	The AID UWMP and in-lieu surface water treatment program. Evaluate CID potential to provide surface water to urban uses in lieu of groundwater pumping. City of Fresno considering additional surface water treatment for future southeast area development. Work with disadvantaged communities to evaluate needs for drinking water treatment.	Feasibility and cost effectiveness need further study. Increased cost over current groundwater use.		High
Wastewater Treatment	Low	Groundwater recharge with treated wastewater (program integrated to reclamation and reuse potential).	Current plants disposing through land application or percolation of wastewater consistent with RWQCB permits and requirements.	Only one plant discharges to surface water in the region.	Low

Water Management Strategy	Relationship with Conjunctive Use and Groundwater Management	Project Opportunities	Constraints	Notes	Overall Potential for Upper Kings Basin
Water Quality Protection and Improvement*	Medium to High	Increase recharge of Kings River water into aquifers to improve water quality. Coordinate with existing programs.			Medium
NPS Pollution Control	Medium to High	The KRCD continues to implement Kings River agricultural waivers program. Seek to integrate and coordinate existing programs. Develop voluntary cooperative efforts to encourage implementation of BMPs.			Medium
Ecosystem					
Ecosystem Restoration*	High	Integrate ecosystem features into any planned groundwater recharge and banking program where feasible. Specific restoration project opportunities not defined. Continue to implement Kings River Fisheries Management Program.	High costs, available lands.	Continue to work with environmental stakeholders to define opportunities.	Medium
Environmental and Habitat Protection and Improvement*	High		Funding.	Existing program is well defined.	High
Wetlands Enhancement and Creation*	High	Ability to integrate design criteria into development of recharge facilities. May design wetland features into operational storage facilities. Wetlands creation with wastewater. Federal funding available via USDA Wetlands Reserve Program.	Could increase costs; create invasive species habitats; endangered species spill over onto adjacent lands.	All ecosystem elements in this section also could serve to increase open space and active/passive recreation opportunities.	High
Land Use and Recreation					
Land Use Planning	High	Integrate land and water supply plans where appropriate, meet current and future water needs, streamline subsequent project reviews, and avoid future legal challenges or project delays. Coordinate local stormwater planning with water districts to reduce and mitigate for increased urban runoff. Implement elements of the Kings River Conservancy vision for the Kings River Ribbon of Gems. Seek to include open space elements in recharge project facilities where feasible.	Timing to develop policies and gain consensus, political acceptability.		High
Recreation and Public Access*	Medium		Limited institutions and no master parks plan.	Kings River Conservancy has defined a plan for the reaches below Pine Flat to Highway 99.	Medium

Kings Conjunctive Use and Groundwater Management project categories are also reviewed. These include:

- Water Importation, Transfers, and Exchanges;
- Wastewater Recycling;
- Water Conservation;
- Drought Planning;
- Water Supply Reliability;
- Surface Storage; and
- Desalination.

7.1.1 CONJUNCTIVE USE

Discussion

Conjunctive use, also referred to as conjunctive management, is the coordinated and planned management of both surface and groundwater resources in order to maximize their efficient use. Conjunctive management is used to improve water supply reliability and environmental conditions, reduce groundwater overdraft and land subsidence, and protect water quality.

Primary components of a conjunctive use program include recharge, use modification, and monitoring. The first component is to recharge groundwater when surface water is available to increase groundwater storage in the underlying aquifer. Recharge can be accomplished in two ways: (1) direct recharge by allowing water to infiltrate through recharge ponds or by injecting water into the aquifer using wells, and (2) in-lieu, or indirect, recharge. In-lieu recharge is substituting groundwater pumping with surface water delivery or use of reclaimed wastewater. The second component of a conjunctive use program is groundwater use during dry periods when surface water is scarce. The third component is to have an ongoing monitoring program to evaluate and allow water managers to respond to changes in groundwater, surface water, or environmental conditions that could violate management objectives or impact other water users.

The Kings Region has a long history of conjunctive use by AID, CID, FID, and others in the Region, and the area has achieved significant benefits from the projects that have been implemented (KRCD, 1979). The history of success, familiarity with conjunctive use operations, and demonstrated benefits of such approaches should make it easier for the area to expand further the conjunctive use program. Expanding the IRWMP Region conjunctive use opportunities will involve engineering decisions that include defining:

- Surface water sources,
- Conveyance pipelines and canals,
- Land for spreading or recharge, and
- Stored water extraction and ultimate use.

In-Lieu Recharge for Fresno and Clovis

The Cities of Fresno and Clovis constructed surface water treatment plants in 2004 to use Kings River and CVP water in lieu of pumped groundwater. This action increases the overall reliability of the supplies for both cities.

A Regional Conjunctive Use Feasibility Study (WRIME, 2006f) was undertaken to evaluate the potential for expanding the existing programs; to provide a basis of design for additional facilities; and to evaluate the scientific and technical merit of proposed projects.

Surface water sources include unregulated Kings River flood releases and other local stormwater; Friant Unit of the CVP Class 1 and Class 2 contract water and unregulated floodwater (“215 floodwater”); and imported water obtained through purchase, exchange, or transfer.

The SWRCB has declared the Kings River to be fully appropriated. This means that there is no “new” surface water available for appropriation from the Kings River because the water already is committed through the complex systems of water rights and agreements existing among members of KRWA. Although the Kings River is fully appropriated, there is unregulated floodwater that flows out of the Region that can be captured and managed for groundwater recharge.

Among the members of the Water Forum, only the City of Fresno and FID have access to CVP Class 1 and Class 2 federal contract water from the San Joaquin River. The 215 floodwater historically has been imported into the Region through the Friant-Kern Canal where it crosses the Kings River.

There also may be opportunities to further develop facilities to allow access to sources of surface water from outside the Basin. The lower part of the Basin includes the Mendota Pool, the terminus of the Delta-Mendota Canal of the CVP that imports water from the Sacramento–San Joaquin Delta. The Mid-Valley Canal previously has been conceived as a project to allow for import of water into the Region, and a variant on the prior project could be developed to convey imported water. As discussed later, highly treated recycled wastewater may also be a “new” source of supply if this water is used in lieu of groundwater or is recharged to groundwater.

Available Surface Water and Groundwater Storage

Pine Flat Reservoir can store upwards of 1,000,000 AF of water. The Basin has an available storage capacity of 93,000,000 AF to a maximum depth of 1,000 feet (DWR, 2006 Bulletin 118 Basin Description). This volume of groundwater storage represents a valuable asset to develop and expand groundwater storage and banking.

Conveyance pipelines and canals within AID, CID, and FID can be used to deliver available surface water for in-lieu or direct recharge. The IRWMP Region has a well engineered as-built environment and these facilities are adequate to distribute the available surface water supply in all but the wettest years. Changes in current operations, expansion of existing conveyance facilities, or new facilities may be needed to fully realize the conjunctive use potential of the IRWMP Region and convey water from the sources identified above. Conveyance is discussed in more detail later in this document.

Access to additional **land for spreading or recharge** is needed through easement or purchase if conjunctive use and groundwater recharge operations are to be expanded. Review of the engineering and hydrogeologic conditions indicates that there are lands adjacent to or near existing conveyance facilities that are appropriate for development of additional recharge facilities. In general AID, CID, and FID all have potential for additional direct recharge facilities. In areas with high groundwater use and low recharge rates, in-lieu recharge is more suitable than direct recharge. Land acquisition and protection of recharge areas are discussed in more detail later in this document.

There are areas in the lower portion of the groundwater basin, but outside the Upper Kings Region, that are solely reliant on groundwater for agricultural irrigation. These lands overlay an area with extensive groundwater storage space and could be an important part of the conjunctive use program.

The **stored water extraction and ultimate use** includes defining facilities and operating guidelines for the Kings Basin. Extraction could include construction of new wells for redistributing the supply, but more likely water would be removed using existing wells during dry periods when surface water is not available. If water banking and inter- or intra-basin exchanges or transfers are part of the conjunctive use program, it is likely that existing facilities and contractual arrangements will be needed.

Constraints

There is a limited amount of unregulated, unallocated flood water within the IRWMP Region; this water comes as high flow over short durations. The water also comes at times when the existing conveyance facilities may be full and are being used for conveying stormwater, thus limiting the ability to convey additional water. The same is true of the 215 floodwater from the San Joaquin River, which is often available when it cannot be used. In relation to local Kings River supplies, 215 floodwater is more expensive and historically has not been purchased, even when made available by Reclamation. Often local agencies do not have ready cash reserve to acquire 215 floodwater. As discussed later in this section, imported water obtained through transfer may be constrained by regulatory, economic, or political circumstances. There are

conveyance capacity limits that reduce the ability to move surface water when it is available to areas where it could be recharged or used in lieu of groundwater pumping, and there are areas that may be used for both in-lieu or direct recharge that do not have any conveyance facilities.

Within the IRWMP Region, access to land, either through easement or purchase, has constrained the development of recharge basins and limited spreading operations. Land acquisition has been constrained by lack of ready cash for public agencies to respond when land is on the market and time delays associated with environmental review by public agencies when purchasing land for specific projects.

Some candidate areas for increasing in-lieu or direct recharge are outside of KRWA's place of use and/or lack conveyance facilities to transport water to areas with ample and available groundwater storage space. This includes the RCWD in the Lower Kings Basin where agricultural users rely exclusively on groundwater. This area could be encouraged to take "in-lieu" surface water in extremely wet years to reduce reliance on groundwater or participate in an expanded intentional recharge/banking program using imported water if institutional and engineering barriers can be overcome.

Institutional constraints to conjunctive use are related to economics and legal and political conditions (National Water Research Institute, 1998), including:

- Inability of local and regional water management governance entities to build trust, resolve internal and external differences, and share control;
- Inability to match benefits and funding burdens in ways that are acceptable to all parties, including third parties;
- Lack of sufficient federal, state, and regional financial incentives to encourage groundwater conjunctive use to meet statewide water needs;
- Legal constraints regarding storage rights, basin judgments, area of origin, water rights, and indemnification;
- Inability to address quality difference in "put" versus "take" water; standards for injection, export, and reclaimed water; and unforeseeable future groundwater degradation;
- Risk that water stored cannot be extracted when needed because of infrastructure, water quality or water level, politics, and institutional or contractual provisions;
- Lack of assurances to prevent third-party impacts and increase willingness of local citizens to participate;
- Lack of creativity in developing lasting "win-win" conjunctive use programs and agreements; and
- Different roles and expectations of supplemental suppliers and water managers in relation to conjunctive use.

Findings

- Conjunctive use and groundwater banking in the Kings Region can be expanded since there is available surface water; canal conveyance capacity; lands with appropriate recharge capabilities; and management, operational, and technical expertise within the existing irrigation districts.
- Substantial challenges exist, but none of the constraints provide fatal flaws that would eliminate the ability to expand current conjunctive use programs.
- An expanded conjunctive use program is a cost effective way to optimize available Kings River water and the combined storage in Pine Flat Reservoir and within the Kings Basin.
- The Water Forum should aggressively pursue development of additional facilities for conjunctive use and for groundwater storage.
- The Water Forum and Upper Kings Basin IRWMP should be used to establish priorities and develop regional conjunctive use facilities for groundwater storage and banking.

7.1.2 GROUNDWATER MANAGEMENT AND BANKING

Discussion

DWR has identified six methods of groundwater management in California (DWR, 2003), including identification of management authority and extent (see parenthesis) in the chronological order in which they have been developed:

- Overlying Property Rights (property owner);
- Statutory Authority (legislatively defined local agency or district);
- Groundwater Management Districts or Agencies (legislatively defined local agency or district);
- Groundwater Management Plan (GWMP) (local agency or district);
- Adjudicated Groundwater Basins (groundwater basin, water master, or court); and
- City and County Ordinances (city or county).

Each is discussed briefly below. It is apparent that there can be overlapping jurisdictions and multiple approaches to groundwater management. If groundwater management is not developed appropriately, the presence of multiple jurisdictions can lead to complicated and potentially conflicting groundwater management approaches within the Kings Region.

Groundwater management has been practiced primarily by the overlying property owners within the Kings Region. This is especially true outside of AID, CID, and FID in areas where

there is no organized water district that could develop a GWMP. GWMPs have been prepared by AID, CID, and FID. None of the overlying water districts has been granted specific statutory authority to manage groundwater by the legislature within the IRWMP Region. The Lower Basin has a GWMP that meets the most recent state requirements and includes RCWD. (WRIME, 2005a).

Adjudication is a complex and confrontational legal process that is used to define groundwater rights. The courts have not adjudicated the Kings Basin.

Local counties can use their police powers and authorities to adopt ordinances and regulate groundwater. Fresno County has adopted a groundwater ordinance to require permits for groundwater export, and the intent is to hold project proponents accountable for impacts that may occur as a result of proposed export projects. Neither Kings nor Tulare Counties have adopted a groundwater ordinance.

The IRWMP is an opportunity to further evaluate how to cooperatively manage the Basin. Within the IRWMP Region, there is no integrated system to manage groundwater to ensure equity, efficiently allocate resources, and solve overdraft. KRWA has mature surface water management and institutional arrangements, but there is no similar set of agreements to manage and protect groundwater locally. The IRWMP is an opportunity to solve overdraft, develop and implement projects, create the management system to increase the Basin's yield, share monitoring costs and data, avoid conflicts, and reduce the potential for litigation over groundwater. Integrating regional GWMPs that meet updated state requirements should be further considered, and their key features should be incorporated into the IRWMP.

Constraints

Institutional barriers and jurisdictional boundaries remain a constraint to integrated groundwater management in the Kings Basin. There are multiple groundwater management plans based on jurisdictional boundaries that do not reflect hydrologic boundaries or the realities of the physical conditions of the Kings Basin. KRWA does an excellent job managing the available surface water, but there is no similar group for groundwater management. The institutional constraints to improving groundwater management are similar to those for conjunctive use. Current institutional arrangements to manage surface water and groundwater do not provide incentives to improve groundwater recharge operations in wet years, and the cost of overdraft is not internalized into current rates for urban or agricultural users. Cities and other land owners overlying the groundwater basin do not have "ownership" of the overdraft problem and recognize the need for physical solutions.

Findings

The Water Forum's elected bodies adopted resolutions supporting Agreements in Principle, which contained the following solution principles for groundwater management.

- The Upper Kings Basin should be managed cooperatively and locally for the benefits of all water users. Agreements are needed for operating and managing the available groundwater storage space, groundwater banking, use of other agencies' facilities, joint use of shared facilities, funding for new facilities or improving existing facilities, and governing project implementation.
- Available groundwater storage space should be used and developed.
- The IRWMP should define how to capture and store surface water to help the Kings Region increase water supply reliability, respond to droughts and climatic variations (wet-year surface or groundwater storage to meet dry-year demands), and meet agricultural, urban, and environmental water demands now and in the future.
- Land needs to be acquired through purchase or easement to accommodate development of dedicated recharge facilities, spreading agreements with overlying land owners or construction of aquifer storage and recovery wells.
- For the long term, the Water Forum should seek opportunities for intra-regional conjunctive use programs that include water importation and groundwater banking involving third parties so long as such operations benefit the Kings Basin and appropriate safe guards are established.
- Persons or entities intentionally recharging surface water into the groundwater basin shall retain the right to extract and use the water.
- Recharge areas should be protected from development or mitigations should be defined.
- Recharge facilities should be located upgradient of existing municipal wells to provide a clean source of water to the groundwater basin and provide water for current and new demands.
- Recharge facilities should not cause migration of known contaminants that would affect municipal or domestic supplies.

Additional Water Forum findings include:

- Groundwater management is critical to the Kings Region and the success of any conjunctive use program, and each of the overlying water districts in the Kings Region need to continue to work with stakeholders in their respective jurisdictions to update and implement their individual groundwater management plans. Within one year of the adoption of the IRWMP, all of the irrigation districts should be in compliance with the Groundwater Management Plan (SB 1938) requirements.

- Adjudication is costly, contentious, and takes many years. Such proceedings should be avoided through the cooperative and collaborative approach used by the Water Forum. The Water Forum could be used to negotiate a consensus on physical solutions to groundwater issues.
- In the absence of an overarching and fully integrated institutional approach to management of the groundwater basin, the Water Forum will provide a way of working across boundaries for the betterment of the entire King Basin.
- Appropriate institutional and financial arrangements need to be developed to identify how to govern the groundwater basin, develop projects, make use of available groundwater storage, generate revenue, and overcome political resistance and legal impediments to conjunctive use.
- The Upper Kings and Lower Kings Regions are hydrologically and hydraulically connected and investments to improve groundwater management and conjunctive use in the Upper Kings Region will provide benefits to the Lower Kings Region. There needs to be continuous effort to involve all parties in the long-term plan and the Water Forum should seek to expand stakeholder participation in order to further develop programs that would benefit the entire Kings Region.
- Monitoring and data management are needed to track the conditions of the resource, define new problems, and document the benefits from existing or planned projects and programs.

7.1.3 CONVEYANCE FACILITIES

Discussion

Conveyance provides for the movement of water from the source to areas of need and includes natural channels and constructed facilities, such as canals, pipelines, pumping plants, and diversion structures. Within the Region, AID, FID, and CID all operate and maintain extensive infrastructure for conveying water from the Kings River to recharge facilities and current users. The Friant-Kern Canal of the CVP also is used to bring water from the San Joaquin River into the Region. The Region's groundwater aquifers also convey water from recharge areas to areas of pumping. Conveyance facilities range in size from small, local end-user distribution systems to large systems that deliver water within each of the irrigation districts. Specific objectives for natural and managed water conveyance activities include urban and agricultural water deliveries, flood management, consumptive and non-consumptive environmental uses, water quality improvement, and recreation.

There is a need to identify conveyance improvements to move water from the available sources to existing, improved, or new groundwater recharge facilities. Existing or improved

conveyance facilities also may be used in lieu of groundwater pumping to deliver water to expanded places of use for agriculture or to surface water treatment facilities for urban use.

The main benefits of conveyance to the urban, agricultural, and environmental water use sectors are maintaining or increasing water supply reliability, protecting water quality, augmenting current water supplies, and providing operational flexibility. For the environmental sector, benefits may include in-stream flows as well as appropriate temperatures and water quality for aquatic and riparian habitat. It is important to recognize that in some cases, improving water supply reliability through system flexibility is just as valuable as increasing overall supply. Indeed, conveyance capacity improvements can enhance reliability without augmenting supplies or reducing demand by increasing system operational flexibility.

Constraints

Flood waters are available but are relatively infrequent and hard to manage. Money is needed to procure other sources. There are some conveyance capacity limitations of existing canals and pipelines. If a regional groundwater bank is developed, wheeling agreements would need to be negotiated to allow for access or joint use of current facilities. The districts currently do not own land for additional recharge facilities and no funding is readily available to acquire land when on the market. In some instances, the irrigation systems distribution infrastructure is used by urban areas to convey storm water and this can limit the ability to divert and recharge flood water (See the Flood Control section). Use of irrigation systems for managing municipal storm water is in an uncompensated use of the irrigation system.

Findings

- There is water and conveyance capacity available to divert and distribute flood and other waters for purposes of improving conjunctive use and groundwater banking.
- There are specific conveyance opportunities that need to be further considered and include:
 - Using existing or expanded conveyance facilities to move surface water to existing or new recharge sites or agricultural areas not currently served,
 - Developing new conveyance facilities to increase operational flexibility and provide surface water in lieu of groundwater pumping to areas currently not receiving water,
 - Using existing or new conveyance facilities to move surface water to urban areas for treatment and use in lieu of groundwater, and
 - Developing conveyance facilities to connect the Mendota Pool to recharge facilities or irrigated areas in the Raisin City area.

- The irrigation districts have the engineering and management capacities to improve and operate facilities.
- Capital and ongoing revenue are needed to improve, operate, and maintain facilities to meet multiple purposes for conjunctive use and storm water conveyance. The cities and districts need to work together with the Districts to resolve funding and conveyance canal capacity issues.

7.1.4 LAND ACQUISITION AND PROTECTION OF RECHARGE AREAS

Discussion

Land is needed for development of conjunctive use facilities. Recharge of floodwater, locally controlled surface water, or imported water requires access to land through easement, lease, or purchase. Land acquired for recharge or storm water management can also provide multiple benefits for open space, recreation acquired, or habitat.

Development pressure in urbanizing areas can result in increased land values, loss of prime recharge areas to municipal land uses, increased runoff from impervious surfaces, and reduced recharge.

Municipal development in the IRWMP Region has typically relied on groundwater pumping, whereas prior agricultural uses relied primarily on surface water deliveries. The reduction in applied water upon conversion from agriculture to urban uses will reduce incidental groundwater recharge from

agricultural irrigation water. As part of the IRWMP feasibility analysis, favorable recharge areas have been mapped. A land acquisition program also can be designed and reviewed at a programmatic level pursuant to the CEQA. Land could be precertified for acquisition specifically for groundwater recharge purposes under this approach and the environmental review process can be expedited. This will facilitate public agency procurement of a specific property for recharge purposes. Easements or contractual arrangements could be used to work with private land owners to spread Kings River floodwater and provide recharge benefits.

Local city and county land use agencies can apply their land use authorities and develop policies to protect recharge areas or require mitigation for groundwater impacts associated with new development. Recharge areas can be protected to allow for natural recharge, development of groundwater recharge facilities, and mitigation of the effects of land conversion. Recharge areas in rural locations and natural stream corridors can provide multiple benefits for open space, flood control, and habitat in addition to the water supply benefits.

Recharge Area Protection

The Fresno General Plan has policies to protect recharge areas. The General Plan policies of the Cities of Clovis and Fresno also seek to preserve recharge areas for use as recharge/retention ponds. FMFCD purchases land in areas slated for development in order to build both recharge and retention ponds.

Constraints

Increasing land costs, lack of readily available capital, and inability to rapidly act when land is on the market from willing sellers are constraints to developing additional recharge facilities.

Findings

- A land acquisition program to obtain control of lands through purchase (for direct recharge facilities) or easement (for spreading) would help overcome constraints to expanding conjunctive use and would allow Water Forum participants to respond more quickly to opportunities when land comes onto the open real estate market.
- The water districts or Water Forum should seek to define a land acquisition program and generate cash reserves, grants, loans, or other mechanisms to option or acquire lands from willing sellers when such land is available on the market.
- Districts should also not be reluctant to use eminent domain when necessary to acquire property that may be critical for developing recharge facilities.
- Lands can be acquired for multiple flood control, recharge, open space, and recreation purposes and a land acquisition program would provide multiple benefits if adequately planning has occurred, funding is available, and programs are integrated.
- Specific opportunities for consideration by the Water Forum for integration into the IRWMP include:
 - Implementation of a rural land acquisition program to purchase land in areas with high recharge potential;
 - Development of groundwater recharge easements with private land owners to spread floodwaters on fallow lands; and
 - Protection of recharge areas and development of mitigation strategies using local land use policies.

7.1.5 WATER IMPORTATION, TRANSFERS, AND EXCHANGES

Discussion

The purpose of a program to import, transfer, or exchange water into the IRWMP Region is to obtain a new source of supply, increase supply reliability, and reduce or eliminate overdraft. Water transfers are defined in the California Water Code as a temporary or long-term change in the point of diversion, place of use, or purpose of use as a result of a transfer or exchange of water or water rights. Water transfers and exchanges are a business deal among willing

participants and have become part of the water management landscape, although they may be a source of much discussion and controversy and often are constrained by state and federal requirements.

Water transfers may increase the flexibility of the Kings River water management system and may be linked to other conjunctive management strategies, including surface water and groundwater storage and banking, conveyance efficiency, water-use efficiency, water-quality improvements, and planned crop shifting or crop idling. Multiple agencies could be involved, and transfers and exchanges can be quite complex.

Generally, water for transfer is made available for transfer by six major sources:

- Direct sale or transfer;
- Transfer from storage of water that otherwise would have been carried over to the following year, with the expectation that the reservoir will be refilled during the wet season coupled with a groundwater-banking program;
- Groundwater pumping in lieu of historically used surface water delivery and transfer of the surface water rights to a third party;
- Transfer of previously banked groundwater by either directly pumping and transferring groundwater or pumping groundwater for local use and transferring surface water rights;
- Reduction of existing consumptive use through crop idling or crop shifting or by implementing water use efficiency measures; and
- Reduction of return flows or seepage losses in conveyance systems that otherwise would not be recoverable for reuse.

Specific importation, transfer, or exchange opportunities have not been defined but could include a number of in-basin or inter-basin concepts.

In-Basin Water Transfers or Exchanges

In-basin transfers could involve operational changes to existing facilities or new facilities that seek to maximize conjunctive use opportunities and groundwater storage. In-basin transfers historically have occurred between KRWA member water districts. KRWA members could increase conjunctive use and reduce the amount of surface water that flows out of the Basin in wet years. Water held by KRWA members can be readily moved, transferred, and exchanged within the KRWA boundary (place-of-use [POU]), and SWRCB review is not required for such in-basin transfers as long as the water would be used in the KRWA POU. Agencies with surface water rights to Kings River could make water available to other KRWA members with limited water rights through willing buyer/seller agreements, and KRWA members could increase conjunctive use and reduce the amount of surface water that flows out of the Basin in wet years.

Water-rights issues would need to be resolved through KRWA and SWRCB, if required, to facilitate transfers or exchange outside of the POU. This includes projects in the Raisin City Water District. In-basin transfers to those outside of the POU that do not rely on Kings River water rights could be integrated into an in-lieu recharge program. Such transfers or exchanges may be subject to SWRCB review.

Inter-Basin Water Transfers or Exchanges

Inter-basin transfers could create a new source of water for the IRWMP Region to increase available water supplies, improve supply reliability, and make use of available groundwater storage. Inter-basin transfers and importation of water from the San Joaquin River via the Friant Unit of the CVP historically have occurred. Such arrangements also can reduce project and operating costs. Successful examples of inter-basin transfers, exchanges, and groundwater banking exist in the San Joaquin Valley and include the Kern, Arvin-Edison, and Semi-Tropic projects.

In the most basic case, water agencies and purveyors can make long- or short-term purchases and import water from willing sellers to supplement their local supplies, conveying water through existing facilities. One very specific opportunity for inter-basin transfer includes the purchase of additional 215 floodwater for groundwater storage when this water is available. There may be other opportunities for direct purchase and transfer of inter-basin water, but none have been specifically identified at this time.

Inter-basin water transfers or exchanges also could be part of an IRWMP Region groundwater banking program that involves importation of water from an outside source, groundwater banking in the IRWMP Region, and extraction (and export) or exchange of the imported water. Under such a program, a percentage of the imported water would be left behind for use within the IRWMP Region. If such water were to be exchanged for other sources, conditions favorable to both interests would need to be negotiated. Favorable financial arrangements could result in revenues to reduce costs to local participants while also increasing the water supply and improving reliability.

Constraints

There are a range of engineering and institutional constraints related to water transfer and exchange:

- Consistency with KRWA and other local policies;
- Local and state political acceptability;
- Complex regulatory compliance requirements;

- Price and competition;
- Settlement agreements associated with restoration of fisheries on the San Joaquin River;
- The need for facilities to connect to, or wheel water through, the major systems used to move water into the Region (Friant, Kern, and Delta-Mendota [the California Aqueduct]); and
- CVP/SWP contractor and operator issues in the Delta SWRCB, 1995).

Fresno-Clovis Recycled Water Use

The Cities of Fresno and Clovis jointly operate an 80 million gallon-per-day (MGD) capacity wastewater treatment plant (WWTP) that sends 10% of the effluent to irrigation and the remainder to percolation ponds, to be reclaimed by pumping wells for further irrigation of non-food crops. Through an agreement with FID, the cities receive 1 AF of surface water for every 2 AF of water pumped into FID’s canals.

Findings

- Both in-basin and inter-basin water transfer and exchanges are viable strategies in the Kings Region and present opportunities to increasing and better management of water supplies.
- Importation, transfer, or exchange would occur in the context of a complex and evolving statewide policy environment where there is increased competition between regions and between water users.
- In the near term, priority should be on transfers and exchanges within the KRWA area since these are less complex and controversial.
- In the longer term, the Kings Region should consider transfers and exchanges and water banking with interest outside of the area so long as there are tangible, measurable water supply benefits to the Kings Region.

7.1.6 WASTEWATER RECYCLING DISCUSSION

The state is supporting the use of reclaimed wastewater as documented in the State Water Plan and the recommendations of California’s Recycled Water Task Force (DWR, 2003b).

The DHS has produced “The Purple Book,” which contains health laws related to reuse of recycled water (DHS, 2001b). The DHS defines the appropriate legal uses based on the level of treatment (primary, secondary, or tertiary). Table 7-2 lists approved uses and level of treatment. Use of secondary treated wastewater is more limited than for tertiary treated wastewater. Tertiary treatment is the highest level of treatment and this water can be used for most non-potable municipal uses and groundwater recharge operations.

Groundwater recharge projects that use reclaimed wastewater require DHS and RWQCB approvals based on relevant aspects of the specific project, including effluent quality and

Table 7-2. Wastewater Reuse Options and Treatment Levels*

Use	Treatment level
Fodder fiber and seed irrigation	Undisinfected secondary
Orchard and vineyard surface irrigation	Undisinfected secondary
Food crops that undergo pathogen-destroying processing before human consumption	Undisinfected secondary
Ornamental nursery stock and non-food bearing trees where access is limited**	Undisinfected secondary
Pasture irrigation for milk stock	Disinfected secondary –23
Freeway landscaping	Disinfected secondary –23
Landscape irrigation with restricted public access and cemeteries	Disinfected secondary –23
Restricted access golf courses	Disinfected secondary –23
Ornamental nursery stock and sod farms with unrestricted access by the general public	Disinfected secondary –23
Industrial process water with no worker contact	Disinfected secondary –23
Source water for landscape impoundments without fountains	Disinfected secondary –23
Construction activities, such as concrete mixing, soil compaction, and dust control on roads and streets	Disinfected secondary –23
Surface irrigation of food crops where the edible portion is produced above ground and not contacted by the recycled water	Disinfected secondary –2.2
Restricted access recreational impoundments and publicly accessible fish hatcheries	Disinfected secondary –2.2
Commercial or industrial cooling without cooling tower, evaporative condenser, or spray/mist	Disinfected secondary –2.2
Food crops, including all edible root crops	Disinfected tertiary
Landscape irrigation with unrestricted public access (parks, playgrounds, school yards)	Disinfected tertiary
Residential landscaping and unrestricted access golf courses	Disinfected tertiary
Nonresidential recreational impoundment	Disinfected tertiary
Groundwater recharge for non-potable supply	Disinfected tertiary
Commercial or industrial cooling with cooling tower, evaporative condenser, or spray/mist	Disinfected tertiary
Groundwater recharge for potable supply	Case by case †
Live stream discharge for environmental enhancement	Disinfected tertiary plus advanced ††

* Taken from “The Purple Book”

** No irrigation may occur for 14 days prior to harvesting or allowing access to the general public

† See CCR, T. 22, Div. 7, Article 5.1, § 60320

†† Nutrient removal and dechlorination may be required, see NPDES case permit

quantity, spreading area operations, soil characteristics, hydrogeology, residence time, and distance to withdrawal. DHS and SWRCB regulations governing groundwater recharge are in a state of flux (DHS, 2006), resulting in regulatory uncertainty to WWTP operations and potential users of recycled water for groundwater recharge.

Because the Kings Basin groundwater aquifers serve as potable water sources, groundwater recharge with reclaimed water is considered an indirect potable reuse and the DHS could require tertiary treatment.

Clovis Recycled Water Project

In 2001, the Clovis City Council approved a sewage system Master Plan that required construction of a sewage treatment and water reuse facility to treat effluent generated by new growth areas to a level such that the water can be reclaimed for use within the city. The plant will produce Title 22 disinfected tertiary treated water with unrestricted use.

Use of recycled water in lieu of groundwater pumping would leave water in the Kings Basin and could free other water supplies and help meet a percentage of the municipal and agricultural water needs associated with projected population growth. To achieve that potential, the IRWMP Region would need to make substantial investments in additional treatment and distribution infrastructure. Some of the local general plans recognize the opportunity and encourage recycling of wastewater where proven to be cost effective. A number of the local UWMP also recognize recycled water as a component of the overall water portfolio.

Currently there is very little wastewater discharged directly to the Kings River, and therefore, very little wastewater currently is flowing out of the IRWMP Region. Wastewater currently is disposed of through land application under permit from the RWQCB. Land application includes irrigating non-food or fiber crops, evaporating, or percolating the treated water to groundwater. Historically, groundwater aquifers have received incidental recharge of secondary treated wastewater in the IRWMP Region.

Within the Kings Region there is more than 100,000 AF/year of wastewater that is treated and disposed. There is additional potential to recycle and reclaim wastewater, but the benefits and feasibility of such investments are not proven and require further evaluation. Most wastewater is the result of municipal pumping of groundwater that is then either applied to outdoor landscaping or sent to a wastewater treatment plant. Most cities and rural residential areas that do not rely on individual septic systems then treat the water to secondary levels and dispose of the water through land application consistent with the waste discharge requirements of the RWQCB, and the treated wastewater is typically percolated to the groundwater basin. Most of the wastewater originates and pumped groundwater is put to municipal use and then disposed. Since the water stays within the groundwater basin it is not lost to reuse and remains a part of the local water budget. This reduces the cost effectiveness and yield of recycling water in the

Kings Region. The feasibility, cost effectiveness, and levels of investment to recycle wastewater are determined by each city or district. With the exception of the City of Clovis, the UWMPs and capital improvement plans for the other cities have not found recycling to be cost effective or feasible.

The exception to this is the Cities of Clovis and Fresno, which import and treat Kings River surface water for drinking water purposes. This water when recycled and put to use would result in net increase to the regional water supply since it would truly be used in lieu of groundwater pumping, whether percolated into the groundwater basin, or treated to tertiary levels for direct reuse. These large cities also have greater economies of scale as compared to the smaller cities in the Kings Region.

Constraints

Critical issues include high cost for additional treatment; lack of defined water budget benefit in areas where most secondary treated water goes back into the aquifer; lack of local funding for water recycling infrastructure; limited research on emerging contaminants; public health concerns, regulatory compliance; and user acceptability and marketability of reclaimed water. The public has not been receptive to the concept of using recycled water to recharge groundwater basins that serve as drinking water supply sources. Marketability of crops irrigated with recycled water may be reduced. There are small disadvantaged communities in the Kings Region with limited rate base and funding capacities and many are having problems meeting current and planned needs and complying with existing regulations.

Findings

- Use of recycled water in lieu of groundwater pumping for non-potable uses, including agriculture, would benefit the Kings Basin by allowing more water to remain in groundwater storage.
- The water budget benefits and yield of recycled or reclaimed water projects only accrue where the sources of wastewater is originally from surface water, and not from pumped groundwater.
- Additional benefits of recycling wastewater are related to reduced groundwater loading of some contaminants (e.g.; nutrients).
- Wastewater treatment plant upgrades and 'purple' pipe distribution facilities are expensive and not cost effective when compared to currently permitted practices for disposal of wastewater in most areas of the Kings Region.
- Regulatory uncertainty limits the ability to develop cost effective recycled water projects in the Kings Region.

- The most cost effective way to reuse wastewater in the region is through pumping of the water that is currently percolated through existing wastewater operations.
- Matching treated water quality to appropriate uses (e.g., power generation, urban landscaping) as part of an In-Lieu program should be integrated into the IRWMP.
- There is a need to involve the public early in the decision-making process for use of reclaimed wastewater in order to increase public acceptability.
- Specific recycled water opportunities and benefits that should be reviewed in greater detail include:
 - The City of Clovis' recycled water program,
 - Expanded use of the Fresno/Clovis regional wastewater treatment facility,
 - The City of Dinuba's wastewater reuse program,
 - Water reuse by power generation facilities, and
 - The Selma-Kingsburg-Fowler regional treatment plant.
- The cities that are required to prepare UWMPs need to carefully consider the benefits and costs of reclaiming wastewater. The Water Forum and each of its members should identify opportunities to cooperatively fund and develop additional reclamation and reuse projects.

7.1.7 WATER CONSERVATION

This section evaluates water conservation. Within the Upper Kings Region, water conservation for agricultural and urban water users includes implementation of EWMPs for agriculture and BMPs for urban water users to ensure that water is put to beneficial use efficiently. The status of implementing these practices is the measure of how the Kings Region is conserving water. The goal is to reduce use where such use would have a negative effect on the environment, such as diversion from a stream course, impacts to riparian or fishery resources, or contribution to overdraft of a groundwater basin.

Discussion

Agricultural Water Management

At a regional level, the responsibility for water conservation rests on the water districts which seek to make best use of available natural runoff and to manage their Kings River water rights and CVP contract supplies as efficiently as possible. In the Kings Basin, district wide efficiency is measured by the amount of water diverted and delivered to either independent farming

operations or that is intentionally recharged to the groundwater basins. District wide efficiency within AID, FID, and CID is very high since there are virtually no return flows to the Kings River and very little water is lost within the system. Ultimately, the responsibility for efficient agricultural water management rests with the grower at the farm level. The irrigations districts seek to promote and provide services to increase both district wide and on- farm efficiency.

Each of the EWMPs is briefly discussed below. This includes a brief review of the status in implementing the EWMP in the Upper Kings Region and any constraints to implementation of the strategy. Conservation practices are many and quite varied, and each has unique constraints. Some items are costly, such as canal lining and canal automation; while others may meet resistance from growers whose operations may be impacted due to changes such as water measurement and pricing incentives. Net benefit analyses are critical to identify the best use of limited funds; surveys of growers may determine if potentially controversial conservation measures are considered viable options.

EWMPs Included in AWMPs

Preparing and adopting a water management plans

AID, FID, and KRCD are signatories to the Agricultural Water Management Council MOU. AID was one of the original members of the Agricultural Water Conservation Council and both AID and FID have adopted AWMPs (FID, 2000; AID 1999). The FID plan meets both the federal and state requirements since FID receives CVP water. CID does not have a current plan and since it is not a federal water contractor, it is not required to prepare a plan to meet federal requirements.

Designating a water conservation coordinator; supporting the availability of water management services to water users; evaluating and improving efficiencies of water suppliers' pumps

KRCD is designated as a water conservation coordinator and provides Mobile Irrigation Laboratory services to AID, FID, and CID. KRCD also provides pump efficiency testing as part of the integrated water and energy conservation program. All the water districts promote the availability of the water management services to their growers and all are participating in the Water Forum to improve communications and cooperation.

Improving communication and cooperation among water suppliers, water users, and other agencies

Both KRCD and KRWA work to improve communications and cooperation. The Water Forum, along with the existing KRCD and KRWA communications channels, will continue to be used.

Evaluating the need, if any, for changes in policies of the institutions to which the water supplier is subject

There is currently no perceived need to change policies or institutions. There is a strong need to improve upon what already exists.

Conditionally Applicable EWMPs (subject to net benefit analysis)

Facilitating alternative land use

Within the Kings Region, crop usage is the purview of the landowners, which decide the appropriate crop mix and type. Local government at the city and county level are responsible for general land use and zoning decisions. The IRWMP is seeking to define policies and actions to integrate land and water use plans and decision-making. Facilitating use of available recycled water that otherwise would not be used beneficially, meets all health and safety criteria, and does not cause harm to crops or soils.

The cost effectiveness of recycled water is evaluated in each UWMP. With the exceptions of projects proposed for inclusion in the IRWMP, no other programs were identified that proved cost effective. This does not imply that the Water Forum will not seek to develop projects or programs to utilize recycled wastewater when such supplies are proven cost effective for agriculture and when such facilities are supported by rate payers in a municipal service area.

Facilitating financing of capital improvements for on-farm irrigation systems

Currently there are no local programs to finance on-farm improvements. KRCD will work with the other water districts to evaluate a low interest loan program and seek grant funding for implementation.

Facilitating voluntary water transfers that do not unreasonably affect water users, water suppliers, the environment, or third parties

The irrigation districts work to facilitate voluntary water transfers that do not unreasonably affect water users in their districts or others in the KRWA. Transfers have historically occurred

with the KRWA family under the specific policies and procedures that govern transfers of Kings River water between KRWA members or other entities. These transfers have the potential to reduce groundwater use by providing “in lieu” surface water to local municipalities. Transfers between districts can also provide for additional groundwater storage in wet years, if a district with soils not well suited for percolation transfers their water to a district with highly permeable soils, that water may stay in the basin rather than being lost through the James Bypass. The County of Fresno also has policies to prevent any transfers of water that would have impacts to a third party and specifically prohibits the transfer of water out of the county. Finally, Reclamation has very specific rules and requirements for the transfer or exchange of CVP water.

Lining or piping ditches and canals

Lining and piping ditches within the Upper Kings Region to conserve water only makes sense in specific conditions. Water “lost” during conveyance from the point of diversion to the point of use is a “gain” to the groundwater basin and an important part of the conjunctive use and groundwater recharge program. Each district lines or pipes ditches when necessary to improve delivery efficiency to their customers or at times when new urban development would effect operations. Districts may also line canals due to high water tables or seepage areas that are impacting permanent crops. Otherwise, unlined canals and ditches are consciously used as part of the conjunctive use operations of existing facilities and provide additional groundwater recharge within the basin. Each of the AWMPs evaluated where lining or piping ditches is needed to improve delivery efficiency.

Increasing flexibility in water ordering by and delivery to water users within operational limits

AID, CID, and FID have a well-defined system for ordering and delivery.

Constructing and operating water supplier spill and tailwater recovery systems

Most of the connections to the Kings River that historically spilled agricultural return flows back to the river have been closed as part of the agricultural waivers program. Due to the high permeability of area soils, there is little tailwater available for recovery and the water that is not beneficially used for agricultural purposes is recharged to the groundwater basin. In some cases, district efficiency can be improved with additional operational storage or recharge ponds and this is factored into the projects being developed for inclusion in the Upper Kings Basin IRWMP.

Optimizing conjunctive use of surface water and groundwater

Developing and improving regional conjunctive use is a primary purpose of the Upper Kings Basin IRWMP.

Automating canal structures

The districts have varying levels of automation and monitoring. There are opportunities for further improvement to document groundwater recharge benefits and account for water within the systems. The irrigation districts are working to define improvements and are actively seeking grant funding.

Development of a regional groundwater model

Development of a regional water model is an important step towards identifying what the impacts of land use change, conservation, and hydrologic changes. The Upper Kings Water Forum is currently working with consultants on the development of the Kings IGSM. The ability of this model to predict hydrologic response to management decisions will aid the Water Forum in planning for the future of the basin.

Development of a plan for basinwide groundwater quality monitoring

The development of a basinwide groundwater quality monitoring program would assist in determining where potential sources of groundwater contamination are originating. The ability to isolate these potential plumes allows water managers the flexibility to find alternative water sources for impacted areas and rapidly ameliorate the problems.

Other Efficient Water Management Practices (subject to detailed net benefit analysis), include:

Providing water measurement and water use reports

The ability of water supply agencies to create detailed water measurement and water use reports enhances the overall efficiency of a basin. Those users who are disproportionately using water when it is in short supply can be notified of the situation and will be encouraged to increase their efficiency. Additionally, when applying for public funding it is much easier to demonstrate increased system efficiency and flexibility when water use reports are available. This will make acquisition of grant money easier.

Block pricing, recharge-based price reductions or other incentives

Block pricing is another form of encouraging the increase of on-farm water use efficiency. The system can also be used in reverse; when there is excess water, those who accept this water for recharge purposes can receive monetary compensation or reduced rates throughout the rest of the year.

Urban Water Management

Since 1983, the Urban Water Management Planning Act (CWC § 10610) has required urban water suppliers that serve more than 3,000 customers or that deliver more than 3,000 AF per year to prepare and adopt a UWMP. Chapter 3, Baseline Conditions and Setting, documented the status of the UWMPs. Within the Kings Basin, there are a few cities which have only recently passed the threshold requirements for having to produce an UWMP. Updated UWMPs were due to DWR in 2005. DWR will review the plans against its criteria and requirements and those of the California Urban Water Conservation Council. The cities of Kerman, Fowler, Orange Cove, and Traver are exempt from preparing UWMPs.

Constraints

The major constraint for developing AWMPs is related to funding and the perception that additional investments in water conservation are not cost effective since: 1) losses from surface water deliveries in the irrigation canals are gains to the groundwater basin and part of the recharge program; 2) there is no return flow the King River and no losses to the area; 3) on farm irrigation efficiencies are relatively high; and 4) the surface water that is applied is either consumptively used or percolates to the groundwater basin. The Cities generally recognize that UWMP area a required, though the smaller disadvantaged communities have financial capacity issues.

Findings

The Water Forum adopted solutions for conservation that were included in the Agreements in Principle adopted by the elected bodies of the stakeholders. These include:

- The IRWMP should promote water conservation.
- AWMPs and UWMPs should be developed to guide public agency investments in water conservation within the region and to help consolidate water resource data for purposes of regional water resource planning.
- UWMPs must be developed as required by state law. UWMPs should be consistent with the guidelines defined by the Urban Water Conservation Council

and approved or accepted by DWR. Within the region, UWMPs are required to obtain state funding and, as a result, are required for cities that are proposing projects for inclusion in the IRWMP. Those urban areas with fewer than 3,000 service connections should seek to implement BMPs for urban water conservation that is cost effective.

- AWMPs should be developed and maintained for each irrigation district, consistent with the guidelines and requirements of the Agricultural Water Conservation Council.

Additional findings made subsequent to the adoption of the solution principles include:

- Districtwide efficiencies are relatively high and any delivery systems losses are gains to the groundwater basin.
- On-farm efficiencies are high when the return flows to the groundwater basin from surface water applications are accounted for and recharge benefits are recognized.
- The benefits of conservation are primarily associated with the reductions in groundwater pumping that come with increased efficiency and result in water remaining in storage in the groundwater basin for use in a dry period.
- CID does not have an AWMP and should seek to update and adopt a plan to define needed investments, establish priorities, and document the benefits of their operations.
- There are opportunities to improve a number of programs and priorities should be established to seek grant funds and stable local funding in the following areas:
 - Automation canal structures and monitoring. Each district has unique needs as defined in AWMPs.
 - Regional water quality monitoring. The Water Forum should seek to design and implement a water quality monitoring network that includes capture of data from existing programs, identifying data gaps, monitoring in locations with no data, and management and reporting of results.
 - Facilitating and financing of on-farm water improvements. KRCD should work with the other irrigation districts and investigate the feasibility of developing a low interest loan program with grant funding from the state to assist growers in investing in water saving technologies.
- Most of the UWMPs are up to date or are in the process of being prepared. Each UWMP should carefully evaluate recycled water opportunities to define projects for inclusion in updates to the IRWMP.

7.1.8 DROUGHT PLANNING

Discussion

The DWR water management strategies did not include drought planning. In recognition of the reality that drought is a regular occurrence in the Kings Region, the Water Forum decided to include discussion of drought planning and response. The State of California experienced perhaps its worst recent drought in the mid 1970s and experienced a second severe drought from 1987 to 1992. Some portions of California have already declared 2007 to be a drought year. In the Kings Basin, the effects of drought are often not readily observed by the general public, largely because there has not been a real economic impact at the individual level. The Kings Basin is fortunate to have a large and productive groundwater basin on which agricultural and municipal users can rely to sustain the area and minimize the economic or quality of life impacts of drought.

Drought effects are observed as declining groundwater levels and increased pumping costs. Individuals on municipal systems are removed from this effect, but growers that rely on groundwater at a time when surface water is unavailable can experience greatly increased costs. Small rural water systems and individual well owners will also incur higher costs and may experience a loss of production at the well as water levels decline. In the worst case, wells may go dry, resulting in time and expense to drill the wells deeper. In some areas on the eastern fringe of the basin with limited saturated thickness, the effects of a drought would be felt more directly and sooner than the rest of the Kings Region.

Chapter 4 presented the water budget and documented how the water users are able to rely on groundwater in dry times when surface supplies are not available. It was also noted that the impacts of drought in terms of the depletion of groundwater from storage and overdraft have increased as water demands for agriculture and urban uses has increased. The water levels and groundwater storage also do not recover when the wet years return. This makes conservation and development of reliable supplies important to the Kings Region.

Statewide drought presents an opportunity for the Kings Region. The areas of the state that are located south of the Sacramento–San Joaquin River Delta are severely affected by drought since the amount of water diverted through the SWP and CVP is severely reduced. The state and other water agencies continue to look for water storage opportunities located south of the Delta. Groundwater banking provides such storage and is an opportunity for SWP and CVP users to store wet year water for use in dry years. This strategy is a critical part of many drought contingency plans for others outside of the Kings Region.

The need for storage south of the Delta is an opportunity for the Kings Region. As discussed in the water transfers and groundwater banking sections of this chapter, the available groundwater storage space could be leased to other third parties who would import water for storage in the Kings Basin. Under such an arrangement a percentage of the imported water would be dedicated to the Kings Region and left in storage for local needs. This approach to groundwater banking would provide both a new source of water and revenue for the Kings Region to develop additional facilities and keep local costs down. The banked water would be pumped out or exchanged in dry years. A maximum volume of dry year's extraction could also be established.

To develop an effective drought response and management program, a number of actions should be considered including:

- Identification of agencies and or individuals with the experience, jurisdiction, and authority to perform specific tasks and formation of a Drought Management Team (DMT),
- Development of a drought detection and monitoring program, and
- Development a drought response plan.

A DMT could be formed to develop a drought contingency plan. Such a group would be responsible for developing a plan; determining whether a drought is occurring and, if so, its severity; and implementing the proper response measures. The DMT could be a subgroup of the Water Forum and be composed of representatives from local water districts, KRWA, the state, water users, and citizens groups. The DMT would be overseen by the an Executive Committee comprised of a smaller group of technical advisors who would monitor weather reports, snow levels, water availability forecasts, and water usage patterns before the determination of drought. The Executive Committee would determine when it is appropriate to convene the entire DMT and what initial actions to take in the public notice process.

Drought is not one dry year, but is usually multiple dry years in a row. There is currently no adopted hydrologic index and no standard definition of a drought in the Kings Region. The development of drought index to characterize hydrologic year types and define drought conditions is a logical next step. The use of these values in conjunction with administrative knowledge of socioeconomic conditions will allow the best determination of drought status, severity, and response.

The drought response would vary with the severity and duration. Four stages of drought could be established to assist in measuring the appropriate level of response:

- Level 1 alert (pending or potential)
- Level 2 warning (moderate)

- Level 3 emergency (severe)
- Level 4 disaster (extreme)

The severity is a measure of moisture deficiency in the environment and is a combination of several factors that typically include precipitation, either as rainfall or snow accumulation; stream flow; soil moisture; groundwater levels; and reservoir levels. The duration of drought will have a direct and substantial effect on the overall impact to the groundwater basin and economy. For varying severity and durations, it is important that proactive measures be taken incrementally to acclimate the public to changing conditions and to avoid draconian last minute conservation measures.

Drought response is often difficult for officials to initiate and more difficult for the public to accept. One of the main problems is the false warning syndrome, whereby warnings are issued about imminent threats that never materialize. As conservation becomes a way of life, rather than as a means of responding to a drought, demand becomes “hardened” and the ability to respond to drought is decreased. No specific response measures are suggested at this time, but the community needs to be prepared for the inevitable dry years by planning for facilities to increase groundwater storage in the wet times.

Constraints

The economic effects of drought are not widely felt by members of the general public due to the history of successful conjunctive use and the large volume of groundwater in storage that can be relied upon in dry periods. There is a limited sense of imperative for developing a drought response plan in advance of a dry period.

Findings

- The most appropriate response to drought planning in the Kings Basin is to develop conjunctive use and groundwater banking projects that reduce overdraft, capture wet year water for storage in the groundwater basin, and promote water conservation so water is used most efficiently at all times, whether wet or dry.
- Drought in the state presents an opportunity for the Kings Regions since the groundwater basin has storage space available that could be used as part of a groundwater banking program.
- A drought response plan should be considered by the Water Forum and should be developed as part of the successor efforts and implementation of the Upper Kings Basin IRWMP.

7.1.9 WATER SUPPLY RELIABILITY

Discussion

DWR defines water supply reliability as the volume of water trusted to be delivered to a specific place at a specific time. Objectively, water supply reliability indicates a particular amount of water that can be delivered with a certain numeric frequency. A supply reliability analysis assesses such things as facilities, system operation, and weather projections. Subjectively, water supply reliability indicates an acceptable or desirable level of dependability of water deliveries to the people receiving the water.

Fresno–Clovis Recycled Water Use

The Cities of Fresno and Clovis jointly operate an 80 million gallon-per-day (MGD) capacity wastewater treatment plant (WWTP) that sends 10% of the effluent to irrigation and the remainder to percolation ponds, to be reclaimed by pumping wells for further irrigation of non-food crops. Through an agreement with the FID, the cities receive 1 AF of surface water for every 2 AF of water pumped into the FID's canals.

Efforts to increase water supply in the IRWMP Region will involve reducing stress on groundwater during normal or wet periods so that additional supplies can be pumped during dry times, and using the storage of groundwater to smooth out the natural supply variability due to hydrologic conditions. In its simplest terms, water supply reliability in the Kings Region depends on three general factors: availability of water from the source, availability of conveyance, and the level and pattern of water demand at the place of delivery.

Constraints

As discussed above, basin hydrologic conditions and institutional issues constrain the ability to achieve a reliable supply. Surface storage would improve reliability but is expensive and is subject to extensive regulatory and economic hurdles; further, surface supplies are not likely to be developed in the near future. Flood water arrives fast in large amounts and leaves the areas quickly. Institutional challenges are basically the same as those listed for groundwater and conjunctive use and are related primarily to gaining public acceptance, funding, and governance.

Findings

Improving water supply reliability is a primary purpose for the Upper Kings Basin IRWMP and should not be regarded as a unique or specific water management strategy. Instead, all of the proposed water management strategies are intended to increase the reliability in the Kings Region.

7.1.10 SURFACE STORAGE

Discussion

Surface storage is the use of on- or off-stream reservoirs to collect water for later release and use. Pine Flat Reservoir has played an important role in the Region where the pattern and timing of water use does not match the natural runoff pattern and it has provided historical benefits as part of the area's conjunctive management and flood control effort. KRCD, KRWA, and Corps manage Pine Flat Reservoir and upstream reservoirs to provide storage for KRWA members. Smaller storage projects include reservoirs on the Fresno Stream group that provide flood control and some storage benefits.

Prior project proposals include the Rogers Crossing Reservoir, Dinkey Creek, and Pine Flat Afterbay storage projects, all of which have been set aside due to regulatory compliance constraints and the limited probability of project development in a reasonable timeframe. As the California and regional water pictures change, these large-scale projects may be re-evaluated.

Constraints

Building large-scale surface storage in California and the nation as a whole is difficult because most of the prime sites already have been dammed and regulatory, political, and economic constraints make planning for and construction of dams extremely slow and difficult. Small-scale reservoir projects may hold more promise due to the significant expense of developing large-scale surface storage.

Findings

Specific surface storage projects currently are not identified for inclusion in the IRWMP. Large-scale surface water projects are not near-term strategies for inclusion in the Upper Kings Basin IRWMP, but surface storage should be further considered as part of the long-term approach to meeting IRWMP goals and objectives. In the future, if climate patterns change and global warming results in reduced snow pack and increased winter runoff, the priority for surface storage for water supply and flood control purposes could change.

7.1.11 DESALINATION

Discussion

Desalination is a water treatment process for the removal of salt from water for beneficial use. Desalination effectively is used not only on seawater, but also on low-salinity (brackish) water from groundwater or other sources. In California, the principal method for desalination is reverse osmosis. This process also can be used to remove other specific contaminants in water, such as trihalomethane precursors, volatile organic carbons, nitrates, and pathogens. The benefits of desalination include:

- Increased water supply,
- Reclamation and beneficial use of waters of impaired quality,
- Increased water supply reliability during drought periods,
- Diversified water supply sources,
- Improved water quality, and
- Public health protection.

Constraints

The constraints for desalination in the Kings Region include lack of saline water sources, cost for plant construction and operation, and brine disposal.

Findings

These constraints limit the applicability of desalination for the IRWMP Region. There are no opportunities for desalination and it is not recommended as part of the IRWMP.

7.2 FLOODPLAIN AND STORMWATER MANAGEMENT

7.2.1 FLOODPLAIN MANAGEMENT

Discussion

Floodplain management includes all structural and non-structural management measures to protect life and property while preserving natural ecosystem functions in the stream channels. In the past, many floodplain management projects were developed primarily to reduce

property damage. They did not consider the importance of floods in maintaining a healthy environment. Likewise, some ecosystem restoration was done without considering long-term floodway maintenance. Multi-objective projects are more effective than single-purpose projects. Government and the private sector are more likely to gain public support for projects with many benefits.

The California Floodplain Management Task Force issued the Final Recommendations Report in 2002, identifying local and state actions to improve floodplain management and reduce the risk to life and property. In January 2005, DWR released “Responding to California’s Flood Crisis,” outlining information and recommendations that provided a starting point for discussion and evaluation of local programs in the Kings Region. The recommendations from these reports were reviewed by the Water Forum along with the baseline information for the Kings Region to set priorities for Floodplain management. .

City and county planners in the Kings Region typically have recognized the value of floodplains by directing development away from them, avoiding or minimizing the need for major flood control structures. By encouraging wise land-use decisions along river corridors, floodplain management can save lives, improve ecosystems, reduce property and livestock losses, and provide more open space, including agricultural lands and native habitats.

Reconnecting rivers to floodplains helps ecosystems and increases groundwater recharge, benefiting groundwater supplies. Due to the highly developed nature of the Kings River in the IRWMP Region, there are limited opportunities to reconnect rivers to floodplains without significant effect on private property.

The existing levy system protects primarily rural agricultural lands, and the system is well maintained by KRCD.

**Local Example of Integrated
Floodplain Program**

The Fresno Metropolitan Flood Control District adopted a Service Plan in 2004 that integrates engineering and facilities development with land use planning and ecosystems management.

In lieu of major changes to the existing floodplain management approach, artificial systems of ponds could be used to manage floodwater, serving either to percolate water as part of a conjunctive use program or hold water as small-scale storage. There are both near-stream and off-stream areas where this type of project could be developed in the Kings Region. Small-scale surface storage could be a design element for any regional recharge facility or may be pursued by individual growers or water districts in the Kings Region. It is not expected that stand-alone levy improvement or floodplain management projects on the main stem of the Kings River, though additional floodplain management projects or policies may be identified in cooperation with the Water Forum and integrated as elements into the IRWMP were feasible.

Constraints

Stable funding for maintenance of regional facilities is always an issue, but currently there are no major near-term needs or constraints to the existing Floodplain management program in the Kings Region, though some findings are needed to preserve existing levels of protection.

Findings

The Water Forum used the State's reports to combine and synthesize recommendations and thereby developed sample actions, which serve as opportunities for the Kings Region's floodplain management strategy. The Upper Kings Basin IRWMP should be used to:

- Ensure the integrity of existing flood project infrastructure through improved maintenance programs that balance public safety and needed environmental protection;
- Evaluate the integrity and capability of existing flood control project facilities and prepare an economically viable rehabilitation plan that factors in any increased runoff and drainage from new development;
- Improve the effectiveness of emergency response programs where needed;
- Create sustainable funding to support flood management programs;
- Work with the state and federal agencies to update floodplain maps and provide better education on flood risks to the public and agencies that authorize development in floodplains;
- Implement multi-objective management approaches, where feasible, for floodplains that include, but are not limited to, increased flood protection, ecosystem restoration, and farmland protection; and
- Evaluate potential policies and procedures that may determine state and local capacity to fund levee maintenance, infrastructure improvements, and emergency response.

7.2.2 REGIONAL AND LOCAL STORMWATER CAPTURE AND MANAGEMENT

Discussion

Regional Stormwater Capture and Management

Regional flood operations include integrated and coordinated operations of available flood storage in upstream reservoirs and local retention and detention of stormwater. This also may include redirecting flood flows to regional conjunctive use facilities to help manage high flows,

provide recharge benefits, improve water quality, and provide incidental environmental benefits where possible.

Even with the efficient operation of Pine Flat Reservoir, there are wet years when the Corps must release water during flood operations. AID, CID, FID, and other KRWA members divert flood flows for direct use or groundwater recharge; but often there is little demand for the floodwater or existing conveyance facilities are already full since they are used to convey and manage local stormwater. Uncontrolled creeks within the Kings River system, notably Mill Creek, continue to challenge management of Pine Flat Dam and Kings River flood control during consecutive large-storm events. In the event of a major release from Pine Flat Dam, downstream flooding could occur over agricultural lands near the riverbanks and possibly within the Cities of Reedley and Kingsburg.

Stormwater and flood releases cannot be managed adequately with existing facilities as most of the water leaves the Kings Region in wet years. The Upper Kings Basin IRWMP defines opportunities for capture and management of the water that flows out of the Kings Region by identifying opportunities to integrate regional flood operations with enhanced or expanded groundwater recharge. This includes evaluating improvements to existing facilities, new conveyance and recharge facilities, stable funding, current flood operations at the regional and district level, and consistency with the KRWA 1992 Floodwater Agreement.

The Floodwater Agreement documents that when flood releases from Pine Flat Reservoir exceed the total demand of all KRWA members within the Kings River POU, permitted uses of otherwise unused water is prioritized as follows:

- By KRWA members for use outside the Kings River POU but within Fresno, Kings, or Tulare Counties to facilities owned by KRWA members;
- By KRWA members for use outside the Kings River POU but within Fresno, Kings, or Tulare Counties to facilities not owned by KRWA members; and
- By anyone else with the written consent of all KRWA members.

Local Example of Small Scale Storage and Wetlands Project

On a 6,000-acre parcel of private property in the Lower Basin, an integrated wetlands/flood storage project was constructed using the U.S. Department of Agriculture's (USDA's) Wetlands Reserve Program funding. Through conservation easements, a seasonal wetland was constructed that provides habitat and 12,000–18,000 AF of floodwater storage that is subsequently used for agriculture.

The floodwater that flows out of the Kings Region is either:

- Entitlement water released as part of the flood operations but not diverted by the entity with an entitlement ("refused water"), or

- Uncontrolled and unallocated flood flows that are beyond any entitlement or any organization’s ability to make claim to the flow.

As described in the Surface Storage section above, a number of large-scale surface-water storage projects have been evaluated but have not been developed due to economic and institutional constraints, and additional large scale surface storage for supply and flood control is not a near- or mid-term water management strategy to be included in the Upper Kings Basin IRWMP.

Multiple Use and Multiple Objective Flood/Recharge Facilities

The Cities of Fresno and Clovis, through FMFCD and with the assistance of FID, capture stormwater through joint use facilities designed for both flood control and groundwater recharge purposes. Some recharge/retention ponds also provide recreational and open space benefits. The Fresno and Clovis General Plans, FMFCD Service Plan, and FID policies provide good examples of how recharge/retention ponds and canal facilities can be integrated to meet multiple objectives.

Small-scale storage ponds may be constructed for purposes of regulating deliveries, retaining floodwaters, providing habitat, and improving conjunctive use opportunities. The concept is to use low-lying areas in the Kings Region along the Kings River floodway or other major conveyance to construct temporary storage in areas where recharge may be limited. This does not include ponds that are constructed specifically for purposes of recharge, but would include ponds in areas where the presence of clays or other impermeable strata would limit recharge, and allows for short-term water storage before spreading or percolating into other facilities more appropriately designed for recharge. Such short-term flood storage could be accomplished and would provide multiple benefits related to habitat creation, sediment settling, detention storage, and regulatory storage to optimize water delivery infrastructures. When not fully used for water storage, the property could be used for specific types of farming operations. These are viable water management strategies that should be carried forward and considered by the Water Forum for integration into the IRWMP.

There are also times when 215 floodwater is available for purchase from Reclamation. Floodwater from the Friant Unit is routed down the Friant-Kern Canal where the water can be released to the Kings River. Opportunities exist to purchase water from Reclamation and this water management strategy is to be carried over for further consideration and integration with other IRWMP elements.

Local Stormwater Capture and Management

The majority of flood problems in the Kings Region have been associated with small local watersheds and unregulated local streams. Increased urbanization also may result in increased paved areas and runoff. This serves to change the local conditions and may affect groundwater

recharge of natural precipitation. Combined local recharge and stormwater retention facilities could mitigate both flood and groundwater impacts of new development.

Small, localized projects for capture of local runoff from small watershed and the urbanized areas could be developed to provide both flood control retention and detention storage and recharge to meet multiple objectives.

Advanced planning, the development review process, acquisition of land, and coordination between the flood control, water supply, and land use agencies would serve to mitigate both flood runoff and the lost recharge from urbanization. The IRWMP provides the opportunity to review and/or adopt policies for this purpose.

Local irrigation district facilities in AID, CID, and FID are used to convey stormwater around or away from urbanized areas during flood events, but funding for flood control uses for the facilities is not always part of the recognized benefits or local funding equation. Flood-related impact fees and benefits assessments could provide funding for improved capital facilities to convey floodwater. Integrated local projects for stormwater and recharge are water management strategies that should be integrated into the Upper Kings Basin IRWMP.

Constraints

Flood control and stormwater regulation previously were viewed as separate activities from those related to water supply reliability. Land use planning does not always integrate flood control and stormwater management with conjunctive use and groundwater banking, and cities are not well integrated into regional plans.

Reconnecting rivers to floodplains would involve significant expense to realign levees and infrastructure, take land out of production, or purchase flood easements. These constraints limit the applicability of this Floodplain management strategy in the Kings Region.

The technical engineering constraints to develop floodwaters vary by location in the Kings Region and are associated primarily with limitations of conveyance systems to move water to recharge areas and with insufficient recharge and spreading facilities.

Existing irrigation infrastructure has lower capacities further down into the watershed since these systems are for water delivery. Flood control systems increase in size in the downstream direction to capture and convey floodwater. This contrary design and purpose needs to be reconciled. Some, but not all, local areas have policies that require system improvements at the time of development (e.g., piping open canals). This provides a local solution but may not recognize regional flood or water supply impacts. Localized flood control operations for stormwater management can limit the ability for these systems to capture regional flood

releases from Pine Flat Reservoir or to import and convey 215 floodwater for groundwater recharge operations.

Institutional issues also may provide constraints on development of available floodwater as a source of surface supply for recharge. Constraints to stormwater capture and management are also related to land acquisition and include high cost, lack of capital to acquire land when available, and/or lack of policies or institutional arrangements that require mitigation on new development for flood control and recharge facilities.

Competition for available floodwater could delay project development. In addition, unless locally developed, water leaving the area could be subject to claim by downstream interests. Developing cost-effective engineering solutions to capture and store floodwater is challenging because of the intensity and infrequency of major storm/runoff events.

Existing canal facilities often cannot be used because 215 floodwater is usually available at times when the Kings River is already flowing; existing AID, FID, and CID facilities are full of local storm runoff or diversion from the Kings River; or conveyance losses down the Kings River dissuade lower Kings River water users from purchasing available water because only a percentage of what they purchase reaches their point of diversion. Each district makes independent decisions on acquisition of 215 floodwater and there is no formula for acquisition or funding of this water for regional, groundwater recharge purposes. KRCD has purchased 215 floodwater for water and irrigation districts in the past. The districts have requested the purchase of water and paid for it.

Findings

The Water Forum also adopted the following solution principles for local and regional stormwater capture and management.

- Flood flows that currently flow out of the IRWMP area (down the North Fork of the Kings River or into the Tulare Basin) should be captured for recharge purposes when consistent with existing agreements.
- The irrigation districts shall work with local flood control agencies, the counties, and the cities to mitigate impacts to downstream irrigation conveyance system that result from increased runoff from new urban development.
- Opportunities to use flood control retention/detention facilities for recharge operations shall be identified. Long-term solutions developed to manage uncontrollable flood flows, such as additional surface storage in the Kings River watershed, shall continue to be supported.
- Other regional flood control priorities shall be identified and funding should be sought from state and federal grants or low-interest loans.

Additional findings of the Water Forum include:

- New development in urban areas must fully mitigate for flood impacts to water district irrigation systems.
- Land acquisition for purposes of flood retention and detention, recharge, recreation, open space, and habitat needs to be funded.
- Diverting flood water from the Kings River and integrating projects for purposes of recharge will provide multiple benefits to all stakeholders in terms of water supply reliability, improved water quality, and reduced risk to flooding of low lying areas.
- Local districts need to continue to work with cities to improve and preserve conveyance capacities in and around the developing areas.

Dinuba's Integrated Project

The City of Dinuba has proposed an integrated project that includes irrigating a golf course with reclaimed wastewater, and constructing wetlands to further polish the treated wastewater and provide habitat and educational and recreational opportunities.

7.3 WATER QUALITY

Water quality projects include those structural solutions needed for stakeholders to provide safe drinking water that meets standards or to ensure that wastewater is treated to the level consistent with state laws and regulations. It also includes discussion of non-structural management programs intended to protect and preserve the surface and groundwater quality. Water quality standards, baseline conditions, and constraints were documented in a technical memorandum to the Water Forum (WRIME, 2007c).

7.3.1 WATER AND WASTEWATER TREATMENT

Discussion

Water and wastewater treatment include infrastructure necessary to protect water quality and comply with state and federal requirements designed to protect public health and safety and the environment. This includes treating drinking water to meet potable water standards and treating wastewater such that it can be safely discharged without impairing other water users, groundwater, or the environment.

There are opportunities to build additional drinking water treatment plants that would increase the use of surface water in lieu of groundwater pumping, thus leaving water in groundwater storage for use at times when surface water supplies are not available. Such systems also may

be needed to respond to water quality issues that currently affect groundwater supply reliability.

The Planning Framework includes a project definition process to work with the incorporated cities and unincorporated communities to identify both the drinking water and wastewater treatment facility needs and priorities. Each municipal purveyor is responsible for its capital facilities plan and priorities and for defining these priorities in the context of the Upper Kings Basin IRWMP.

The Upper Kings Region has made tremendous progress toward achieving national water quality goals since the passage of the Clean Water Act in 1972 and the related California and local laws. High levels of wastewater and drinking water treatment are the norm throughout the Upper Kings Region and the area enjoys high levels of water quality, even though water pollution still persists and there is the potential for impairment of surface and groundwater water quality due to a variety of contaminant sources, including inadequately treated wastewater and urban or agricultural runoff. One of the most critical issues facing the Kings Region is how to improve and maintain water and wastewater infrastructure to ensure that the area can fully enjoy the health, economic, and social benefits that clean and safe water provide. Infrastructure problems associated with aging pipes, out-dated systems, and inadequate capacity to meet growing population demands are requiring many communities in the Kings Region to make huge investments in water and wastewater infrastructure systems.

Most cities in the Kings Region rely on groundwater to meet municipal needs. Aging infrastructure, urban growth, more strict water quality standards and rising treatment costs pose challenges. The Cities of Clovis and Fresno have constructed surface water treatment facilities to reduce reliance on overdrafted groundwater and to make use of surface water supplies that are available. Use of surface water in lieu of groundwater helps reduce overdraft and leaves water in storage in the groundwater basin for use in dry years when surface supplies are less available. Other areas in the basin will likely follow this trend.

Most of the wastewater treatment plants are in compliance with existing permits and regulatory standards, though they rely on secondary treatment and disposal of water through percolation to the groundwater basin. Groundwater is the primary or exclusive source of municipal supplies throughout the Region. Increased regulatory requirements for higher levels of treatment could require substantial investments in wastewater treatment facilities and increased cost to rate payers. At the same time, groundwater overdraft indicates that the Kings Region needs to consider use of reclaimed wastewater for municipal and agricultural uses and as a viable source of supply “in lieu” of groundwater where such use would represent a new supply of water.

The Kings Region funding gap has not been estimated and additional work is needed to define the investments that will be needed annually over the next 25 years to replace aging and failing pipes, provide for growth, and meet mandates of the Clean Water Act and Safe Drinking Water Act. The Upper Kings Water Forum recognizes that no single solution addresses the full range of clean water infrastructure and related challenges. All levels of government and the private sector must share responsibility for effective, efficient, and fair solutions to protecting our nation's waters.

Constraints

The primary constraints are related to the costs and the financial feasibility of upgrading existing facilities, construction, operation, and maintenance of capital facilities; increasing federal mandates for clean water and safe drinking water; increasing unit costs of attaining these requirements using more complex technology and increased use of chemicals and energy; and historical under-recognition of the cost to replace aging and failing water and wastewater pipes. Disadvantaged communities are especially affected due to a lack of technical, management, and financial capacity to independently solve water and wastewater issues.

Many projects are single-purpose and are intended to serve an individual community and, though they provide water quality benefits within the region, many do not provide multiple benefits, partners, or water management strategies and, unless a community is economically disadvantaged, these types of projects are not well suited to the regional funding under Propositions 50 and 84. Other sources of funding are available and successor efforts are needed to match these projects with available funding.

Findings

The findings below were originally presented in a briefing (Forum, 2006) to the Planning and Steering Committee and then the full Water Forum in the fall of 2006. A Water Forum again considered the water quality position statements in the spring of 2007. The water quality position statement was then included as an agenda item at a Water Forum-sponsored workshop with city and county public works staff on May 15, 2007. The findings in the water quality position statements are listed below.

Local publicly owned and investor-owned utilities need to quantify the amount of investments needed to support current and planned levels of development: Specifically, the Upper Kings Water Forum supports:

- Defining and quantifying the core infrastructure and financing needs so that Regional funding priorities can be defined. The following types of core investments are needed:
 - Drinking water supply systems—including water treatment facilities, finished water storage, finished water distribution systems, source water development, water supply management and inter-connection, source water protection, demand management, and rehabilitation of raw water conveyance and water storage infrastructure;
 - Domestic wastewater management systems—including wastewater collection and pumping infrastructure, wastewater treatment plants, wastewater reclamation and reuse facilities, biosolids (sludge) management, and discharge infrastructure; and
 - Wet weather runoff control systems and management practices—including pollution prevention and/or reduction practices as well as runoff collection, conveyance, and treatment facilities
- Needs will vary within the Kings Region from one system the next, it is recommended that that states set the following broad priorities for project-level investments under the IRWMP program to:
 - Repair, rehabilitate, or replace treatment, collection, or distribution systems;
 - Attain compliance with applicable federal or state regulatory requirements;
 - Meet applicable local service levels and future requirements consistent with the general plans;
 - Address public health or environmental emergencies; and
 - Address non-point source problems where such investments by local water or wastewater systems are cost effective relative to other core infrastructure solutions.
- Local rates and assessments should be used to maintain and operate infrastructure and to meet any local matching funds requirements for state or federal grants.
- Regional political capital needs to be used to minimize local competition, establish regional priorities, and define integration opportunities and approaches to generating local funds to leverage state and federal monies and invest in needed infrastructure.
- Cost effective reclamation of wastewater is needed to reduce reliance on groundwater, expand available supplies, and meet regional agricultural uses, consistent with water quality requirements.
- Consolidation of facilities to achieve regional cost effectiveness in drinking water treatment and wastewater treatment.

- Regular update and adoption of UWMPs every five years (in years ending in zero or five) and use of UWMPs to achieve plan integration and consistency. UWMPs should seek to: achieve consistency between water supply and land use planning, be incorporated by reference or integrated into the local general plans, be used to meet requirements for Municipal Service Reviews pursuant to laws governing the Local Agency Formation Commissions, and support update of a Kings Regional Water and Wastewater Capital Requirements list.

Utilities must be well managed locally to ensure long-term sustainability of collection, treatment, and distribution systems: The second line of defense in ensuring the Upper Kings Region enjoys the benefits of clean and safe water is ensuring that our local water and wastewater utilities are well maintained and operated with sufficient local support.

Specifically, the Upper Kings Water Forum supports:

- Strong professional staff that are viewed as advocates for clean and safe water in the community and on the state and federal levels. In addition, utilities must have employee development and training programs that ensure that utility staff possess the skills needed to manage, operate, and maintain the utility using BMPs;
- Full cost-of-service pricing systems that encourage local communities to establish rates that reflect, to the maximum extent practicable, the system's true life-cycle costs, including debt service, and that can support long-term management needs;
- Sustainable management approaches, including asset management and environmental management systems, that proactively ensure long-term viability of each component of the system while simultaneously ensuring compliance with local, state, and federal environmental regulations; and
- A culture of constant innovation and research into new technologies and management approaches that support BMPs—including conservation, efficiency, and reuse—and a system to ensure transparency and public participation so the utility remains accountable to ratepayers and the general public.

There must be a significant and continuing State and Federal investment: The Upper Kings Water Forum recognizes that even if local utilities do all of the above and are managing their systems using best practices, federal assistance in financing infrastructure costs will continue to be essential for many communities. Congress and the state legislature must make a significant renewed commitment to help communities and regional watershed partnerships meet their obligations under the Clean Water Act and the Safe Drinking Water Act. Specifically, the Upper Kings Water Forum supports:

Strengthening State and Federal Funding: All Upper Kings Water Forum members and the State of California should support reauthorization of the Clean Water and Safe Drinking Water State Revolving Fund (SRF) Programs with a significant increase in appropriations to more closely reflect financing needs that exist;

- Improved administration of SRFs that (1) streamlines the application process; (2) provides increased flexibility to the state to determine with public input project eligibility and environmental compliance standards, (3) encourage innovative partnerships that bring diverse stakeholders together for more effective broad-based solutions; and (4) reduces paperwork burdens on communities;
- Flexible forms of need-based financing, made available by states, to assist communities that do not have the rate base to support conventional or SRF loan financing costs. These include extended loan terms, loan forgiveness programs and grants. Needy communities in the Upper Kings Region include low-income communities and small communities or those facing costly environmental challenges and expenses to correct existing problems or meeting new TMDL and security requirements. More comprehensive affordability criteria should be developed for the state to use in allocating SRF financing; and
- A dedicated revenue source for the SRF could ensure that federal investment in water infrastructure is consistent and no longer solely depends on annual discretionary appropriations. Upper Kings Water Forum believes that any dedicated SRF revenue source identified should be broad-based, related to clean and safe water, and should not impose a national tax on local water and wastewater ratepayers.

Support for State Programs, Small Communities, Research, Asset Management, and Public Education

- In addition to increased funding for the SRF, assuring infrastructure sustainability will require increased federal support for California to administer clean water programs, including support for watershed based approaches; federal support for technical assistance to small communities; increased federal investment for research and development of treatment and infrastructure technologies and asset management strategies that improve the life-cycle of wastewater treatment systems; and federal support for the development of a national program to educate the public about the benefits and economic importance of water and wastewater infrastructure.

The general public and the business community must play a larger role in ensuring clean and safe water. The Upper Kings Water Forum supports strategies that encourage greater participation by the general public and the business community in maintaining the healthy operation of community water and wastewater treatment facilities. The Upper Kings Water Forum believes that to ensure long-term environmental stewardship of our water resources, all parts of society must be involved. Specifically, Upper Kings Water Forum supports:

- Entering into partnerships and cooperative relationships with the business community to develop innovative, cost-effective solutions to infrastructure sustainability. Public-private partnerships should not be restricted or hindered by tax laws, grant conditions, or other federal requirements. Public-private partnership decisions should be made locally based on what local officials

determine is most appropriate for preserving and enhancing the water environment;

- Elected officials and non-governmental organizations, including public health organizations, advocacy groups, business associations and other civic organizations, playing a leadership role in highlighting the importance of water infrastructure and continued investment in it; and
- A continued commitment from Upper Kings Water Forum to continue public outreach among all stakeholders to increase the public's support for investment in infrastructure for clean, safe water.

7.3.2 WATER QUALITY PROTECTION

DWR's California Water Plan Update 2005 describes water quality protection and improvement as pollution prevention, matching water quality to water use, and groundwater remediation/aquifer remediation.

Pollution Prevention

For the vast majority of contaminants, it is generally accepted that a pollution prevention approach to water quality often is more cost-effective than end-of-the-pipe treatment of wastes or advanced domestic water treatment for drinking water. Pollution prevention measures usually are more cost-effective because they have lower initial capital costs, as well as less ongoing operations and maintenance costs, than traditionally engineered treatment systems. However, because of the nature and sources of some contaminants, a pollution prevention approach may not be possible, cost-effective, or even desirable in some instances.

Matching Water Quality to Water Use

In the Kings Region, providing treated surface water for municipal uses in lieu of groundwater is a strategy for matching water quality to use since groundwater underlying many municipal areas is of reduced quality and may require treatment. This approach also provides groundwater storage benefits. The groundwater of diminished quality can continue to be applied to non-potable municipal uses, such as landscape irrigation.

In addition, pumping and reuse of secondary treated wastewater that is percolated to the groundwater basin for purposes of non-potable uses (e.g., turf grass, agriculture) is a practice that should be widely supported.

Groundwater Remediation/Aquifer Remediation

Groundwater remediation involves extracting contaminated groundwater from the aquifer, treating it, and discharging it to a water course or using it for some other purpose, or injecting it back into the aquifer. Contaminated groundwater can result from a multitude of both naturally occurring and anthropogenic sources. Remediation results in an additional water source that would not be available without remediation, but groundwater treatment is expensive and years or decades may be required to remediate contaminated groundwater sites. There is a wide array of local and state regulatory programs in the Kings Region whose purpose is to prevent pollution of surface water and groundwater as documented in the Water Quality Standards, Conditions and Constraints (WRIME, 2007c). It is not anticipated that additional regulatory programs would be recommended for inclusion in the IRWMP; instead, the IRWMP will identify opportunities to integrate and better coordinate the existing non-regulatory programs where feasible.

Voluntary Rangeland and Foothill Water Quality Guidelines

KRCD, working with the Sierra Resource Conservation District (RCD), Westside RCD, and Navelencia RCD, adopted the “Voluntary Rangeland and Foothill Water Quality Guidelines” in 2000, and the RCDs continue to promote the effort and provide technical support to private land owners.

7.3.3 WATER QUALITY MONITORING

There are opportunities to improve water quality monitoring in the Kings Region, including enhancing the existing monitoring network; sharing and integrating data from existing monitoring programs; and document priority water quality problems so that regional and local solutions can be developed and prioritized. The improved network would help to identify water quality problems and document the water quality benefits of the IRWMP programs. The section on monitoring provides additional detail.

7.3.4 CONTROL OF NONPOINT SOURCES OF POLLUTION

Non-point sources of pollution originate from otherwise legal uses of land and are contributed to a waterway from widely dispersed sources as a result of generally accepted societal practices and situations where individual liability and responsibility are hard to determine. Existing local NPS pollution control programs were described in the Baseline Inventory Report (WRIME, 2006) and documented in the Water Quality Baseline Report (WRIME, 2007). Existing programs include the incorporated cities’ efforts to improve urban runoff consistent with the NPS pollution stormwater program and the agricultural waivers program managed by KRCD to

reduce runoff to surface water from farming operations in the IRWMP Region. No additional programs for NPS pollution control at the local level have been identified for inclusion in the IRWMP at this time. Additional actions to better integrate existing programs or to expand local or regional programs to control NPS pollution may be identified as the IRWMP program is implemented and these would be addressed through the adaptive management strategy.

7.3.5 WATERSHED PLANNING

Watershed management is the process of evaluating, planning, managing, restoring, and organizing land and other resource uses within an area of land that has a single common drainage point. Watershed management tries to provide sustainable human benefits while maintaining a sustainable ecosystem. Watershed management seeks to balance changes in community needs with these evolving ecological conditions. Most of the Kings Region is highly developed. Outside of the Kings Region in the upper part of the Kings River watershed above Pine Flat Reservoir, there are a number of watershed planning efforts occurring through the RCDs under existing state and local processes. The Kings River corridor is discussed in the ecology sections of the Upper Kings Basin IRWMP. The IRWMP will acknowledge the existing programs and seek opportunities to coordinate efforts.

Constraints

Within the Kings Region, watershed management concepts are being integrated into the conjunctive use/groundwater management, water quality, and ecosystem project categories where feasible. Constraints to developing new water quality protection and improvement projects are related to funding and funding capacity of existing agencies, political acceptability, and interagency coordination. There currently is no specific structural or non-structural watershed management actions anticipated in this area beyond those actions which are already proposed for integration into other project categories.

Findings

The Water Forum, through the elected bodies of each stakeholder, adopted the following solution principles:

- The IRWMP should facilitate and encourage the appropriate use of recycled water, including conjunctive use and recharge programs, where feasible and cost effective.
- The IRWMP water quality program should identify capital facility priorities for drinking water treatment plants and wastewater treatment plants.

- The IRWMP should actively address water quality and contamination issues, promote appropriate remediation measures and rely primarily on voluntary, cooperative programs to reduce and prevent degradation of water quality.
- A priority of the IRWMP should be to identify and integrate programs in the region intended to prevent pollution from all sources (agricultural irrigation and storm water discharge, urban wastewater and storm water discharge, point sources and other nonpoint sources).
- Management programs preventing contamination are more cost effective than remediation, treatment, and cleanup. Allowing water quality to be degraded reduces the available supply or increases the cost of treatment prior to use.
- Within two years of the adoption of the IRWMP, an integrated depth-to-groundwater map shall be prepared and circulated for public use.
- Within two years of the adoption of the IRWMP, the means to test for, and map, problematic water quality constituents (e.g., nitrates and DBCP) shall be developed.

Additional findings include:

- Protecting existing water quality is a way of ensuring reliable supply. Existing water quality needs to be protected since degrading water quality beyond its ability to be used for municipal and agricultural purposes limits the available supply or increases the treatment cost.
- The existing programs for pollution prevention programs targeted at urban runoff, agricultural drainage, and from natural sources are strongly supported by the Water Forum and should be continued.
- The Water Forum supports non-regulatory, voluntary programs to protect water quality through community outreach and education intended to provide information that will reduce polluting activities.
- Matching water quality to appropriate use is needed to put treated wastewater to beneficial use.
- In-lieu efforts to provide treated surface water for municipal uses are needed to increase reliability and deliver high quality treated drinking water.
- Improvements to the water quality monitoring would help define problems and document the benefits of IRWMP programs.

7.4 LAND USE

7.4.1 LAND USE PLANNING

Discussion

Under California law, the management of land use is the responsibility of local government. City and county general plans and the associated goals, policies, objectives, and programs define land use planning requirements for each jurisdiction. By law, general plans guide land use decisions at the city and county level and, by their very nature, are comprehensive and integrated across the full spectrum of land, water, and natural resources management elements. The breadth of the general plans may result in less detailed or comprehensive review of regional water issues. The city and county general plans and the land use planning process also provide local government with an opportunity to integrate land use and water supply decisions and meet the goals of the cities and counties and the IRWMP.

In general, past informational requirements for water management planning were minimal and largely avoidable. Most city general plans addressed water in the public service and utilities sections with minimal regard to regional water supply issues. County general plans usually acknowledged regional issues, such as overdraft, but county policies do not apply to lands upon annexation to a city. Each local planning agency carries a responsibility to coordinate its general plan with regional planning efforts, but historically there have been limited mandates for water supply analysis or integration of the general plan with a water supply plan. In the past 10 years there have been changes in the legal requirements for coordination of land use and water supply plans. The need for close coordination between land use and water supply plans has received the attention of both the legislature and courts. In 2000 the legislature passed SB 221 and SB 610 that made significant changes to the requirements for land use and water planning. Both sought to improve the integration of water and land use decisions and required detailed analysis of water supply for large-scale projects before the projects could be approved. Over the past 10 years, the courts have interpreted CEQA in ways that place more requirements on agencies to integrate land and water use decisions¹ and further require substantial evidence of a sufficient water supply prior to project approval.

Previously, planning for land use and water supplies was conducted by different agencies, at different times, for different planning horizons to meet widely varied objectives, often using

¹ See *Stanislaus Natural Heritage Project v. County of Stanislaus*, 48 Cal. App. 4th 182 (1996); *County of Amador v. El Dorado County Water Agency*, 76 Cal. App. 4th 931 (1999); and *Santa Clarita Org. for Planning the Env't (SCOPE) v. County of Los Angeles*, 106 Cal. App. 4th 715 (2003).

different methodologies, assumptions, and data. This resulted in inconsistencies in the plans and poor coordination of public investments and subjected agencies to legal challenges.

The Water Forum and IRWMP process provide an opportunity to integrate land and water supply plans, where appropriate, in order to meet current and future water needs, streamline subsequent project reviews, and avoid potential legal challenges and project delays.

Creating a consistent planning horizon and set of demand-and-supply assumptions between land use and water supply plans will help to avoid conflicts and make both types of plans more defensible and less subject to legal challenge. The future land use and planning horizon assumptions will provide the basis for calculation of future water demands. The future water demands will provide the basis for planning and design of new supplies and requirements for conservation. The future water demand scenarios for alternatives analysis will be created using city and county growth projections and land use changes and for development of the no action or no project alternative. Creating common assumptions for both the land use and water supply plans will provide benefits to cities because their growth projections and long-term water needs will be included in the IRWMP technical information and analysis, and the IRWMP results can be used to expedite and support future updates to the land use and general plans and project reviews.

The approach for the Upper Kings Basin IRWMP analysis of land use and water supply integration opportunities was to evaluate how the IRWMP could serve as a tool to further support the city and county general plans. A briefing was prepared and presented to the Land Use and Water Supply Work Group, the Water Forum, and at a special workshop involving the city and county land use agencies (WRIME, 2007a). The evaluation was also conducted to identify areas where the general plans could be complimented by the greater detail and emphasis on regional water resources issues available through the IRWMP. This analysis also provided an opportunity to identify:

- How or if the general plans are using water management strategies contained in the IRWMP and as recommended by DWR;
- Where city or county general plans do not recognize regional water management issues; and
- Where general plan goals and objectives are different or not fully consistent with IRWMP goals and objectives.

Three areas were specifically evaluated and compared.

1. Issues: Do the city or county general plans recognize or place priority on the issues that have been identified in the IRWMP?
2. Regional Goals and Objectives: Are the IRWMP goals consistent and compatible with existing county or city general plan goals and objectives?

3. Water Management Strategies: Does the city or county general plan recommend goals, policies, or objectives that serve to integrate or make use of the water management strategies recommended for inclusion in the IRWMP?

The state policy “drivers” that influence how water and land use planning can be integrated were also evaluated. Court precedence² and legislative decisions have changed the requirements on land use and water agencies. Changes to the Government Code and the Water Code require local governments to determine whether there will be enough water to supply a proposed development project before it can be approved, and regional water management is becoming the norm.

A higher standard of evidence is now needed to make critical land and water resources decisions and the trend is toward resolving land and water management issues at a regional scale, whether through shared projects or shared decision making. The state’s criteria for obtaining bond funding also requires that an IRWMP evaluate how land use and water supply planning can be better integrated. The state, through the Office of Planning and Research (OPR), also has provided guidelines related to how cities and counties could develop a water element to their general plan. The CEQA requirements for evaluating water supply availability and water supply projects are also in a state of flux and increasingly more rigorous analysis is needed to demonstrate that there is a reliable and sustainable water supply for new development.

A number of statewide trends in water and land use policy can be observed and include:

- Emphasis on integrated land use and water supply planning process and plans supported by case law and legislation.
- Changing emphasis from developing new water to managing existing supplies through complex arrangements that include conservation, recycling, off stream reservoir storage, conjunctive use of surface and groundwater, groundwater banking, and water transfers.
- Change from single purpose entities, such as water purveyors and districts, to multi-agency, multi-level (local, state, federal), and multi-stakeholder solutions.
- Recognition that water for environmental purposes is integral to the system and ecological interests must be represented during planning for projects to succeed.

² Several major court decisions have interpreted CEQA in way that place more requirements on land use and water planners. See *Planning and Conservation League v. Dep’t. of Water Resources*, 83 Cal. App. 4th 892 (2000) (disapproving contract reformation between DWR and SWP contractors; *Santa Clarita Org. for Planning and the Environment (SCOPE) v. Count of Los Angeles*, 106 Cal. App. 4th 715 (2003) (finding that CEQA prohibits reliance on “paper water,” specifically water from the SWP; recent California Supreme Court ruling, *Vineyard Area Citizens For Responsible Growth, Inc. v. City of Rancho Cordova, Sunrise Douglas Property Owner Assn.*, Super. Ct. No. 02CS01214., Cal. App. 3rd C044653 (2007).

Constraints

Long-term plans and strategies to mitigate overdraft are generally not recognized in city general plans. City plans focus on capacity of water and wastewater utilities and capital facility needs, and generally do not recognize regional overdraft. As a result, impacts of new development or existing use are generally not recognized and strategies to resolve the regional issues are not incorporated into many of the city general plans. The exceptions are the larger cities of Fresno and Clovis because the impacts of groundwater extractions are more readily observed at existing levels of development and the effects are happening today rather than out somewhere on the planning horizon.

Most general plans seek to ensure that new development has a safe and sustainable water supply and that there are no impacts to existing users of the resources, but city general plans some times lack specifics and assurances on how this is to be accomplished.

Findings

The Water Forum, through the elected bodies of each stakeholder, adopted the following solution principles:

- Cities and counties are responsible for land use planning and new development approval, whereas the overlying water districts are responsible for planning, development, and management of water supplies. The IRWMP and state law dictate that the land use and water supply agencies work together to address regional problems that are not within the power or ability of any one jurisdiction to solve.
- All parties acknowledge that the region will continue to experience residential, commercial, and industrial growth and that existing water production and service systems will need to be expanded to meet this increase in demand. The IRWMP shall serve to provide a clear planning process to assist the affected public agencies in meeting their projected growth needs.
- New development contributes to the water supply problem and has impacts that must be mitigated at the time of project approval. Cities must recognize their contribution to regional problems and work with the water districts and counties to provide mitigation for water supply and flood-related impacts.
- Water and land use planning must be closely coordinated and consistent with state law. New development must work with the cities and water districts to demonstrate that there is a long-term, sustainable water supply.
- The IRWMP must propose water supply solutions that ensure a sustainable supply for current or proposed development and include strategies that mitigate water supply and flood impacts of new development. Water supply and flood

mitigations/solutions must be implemented through the land use planning and decision process as conditions or requirements for new development.

- Within one year of the adoption of the IRWMP, a groundwater impact fee on urban development shall be considered by the local irrigation districts and incorporated entities as one of the mechanisms to mitigate the effects of new development on groundwater resources. Such a fee would be assessed on a per-acre basis only upon completion of appropriate studies and findings by the cities and districts. The fee would be dedicated solely and exclusively to acquire new water supplies or fund conjunctive use capital facilities or improvements.

The finding related to integration of land use and water supply plans that resulted from the review of the general plans are listed below.

- County general plans take a more regional view than the city plans and tend to recognize and seek to resolve regional water resources, water quality, flood, and environmental resources issues.
- Localized impacts to regional water distribution infrastructure as a result of new development are an issue for the irrigation districts both in terms of protecting existing distribution infrastructure, and from use of the irrigation canals by cities for conveyance of floodwater.
- Cities and counties need to ensure that water supply- and water resources-related impacts are mitigated during the development review process and policies could be strengthened to that end. Cities also need to recognize the contribution to overdraft from existing and planned levels of development.
- Cities need help in mitigating impacts from city use of groundwater. Cities, counties, and water districts need to work together to develop new supplies and manage existing supplies to ensure that groundwater is managed properly and long-term water supply plans are in place to ensure reliability in all types of hydrologic conditions.
- There is a need for collaboration and cooperation in developing regional policy solutions and infrastructure.

7.5 ECOSYSTEMS MANAGEMENT AND RECREATION

This section discusses both the ecosystems management and recreation strategies because they are closely linked. The Environmental Baseline Report (KRCD, 2006b) documented existing environmental conditions and the ecosystem management programs currently operating in the Kings Region. This section describes how the programs and projects can be integrated to meet the IRWMP goals for ecosystem enhancement. The constraints and findings for ecosystem restoration, ecosystems protection, and wetlands protection are combined in this section.

7.5.1 ECOSYSTEM RESTORATION

Discussion

The Kings Region is a highly developed environment where most of the land is in private ownership and there is a limited amount of remaining pristine ecosystems with significant habitat value. Where these public assets or private lands have habitat value, it is desirable to create opportunities to preserve these areas through cooperative, non-regulatory programs that respect property rights. Many of the Kings Region's ecosystems cannot be easily restored to their natural states, nor is that degree of restoration desirable. Instead, ecosystem restoration focuses on rehabilitating ecosystems so that they supply important elements of their original structure and function in a sustainable manner. Ecosystem restoration and protection can be viewed as the proper maintenance of the IRWMP Region's natural infrastructure. Ecosystem restoration typically involves integration with other water management strategies to reduce conflicts, expedite permitting, and provide a more cost-effective solution. The Kings River Fisheries Management Program, which provides fisheries and recreation benefits, is a prime example of a beneficial ecosystem restoration program. Continuation of this program is a foundational action for the IRWMP. The efforts to restore the San Joaquin River are also acknowledged and regarded as a foundation for future restoration efforts in the Kings Region.

The San Joaquin River will be subject to a fisheries restoration program pursuant to settlement agreements resolving long-standing litigation (*NRDC v. Rogers*). This will affect future flow conditions, fishery conditions, and recharge rates. The changes to the San Joaquin River flows under the proposed settlement will be factored into the assumptions for the future, no-project conditions in the Kings Region.

7.5.2 ENVIRONMENTAL AND HABITAT PROTECTION AND IMPROVEMENT

Discussion

Whereas environmental restoration is to recreate habitat, environmental and habitat protection and improvement are intended to preserve existing conditions or make marginal enhancements to the current conditions, respectively.

7.5.3 WETLANDS ENHANCEMENT AND CREATION

Discussion

Wetlands enhancement and creation is a subset of ecosystem restoration and floodplain management and is related to enhancement or creation of specific wetlands habitats. Wetlands habitat is unique and provides important ecosystems benefits to local and migratory species. Much of the ancestral wetlands habitat in the San Joaquin Valley and IRWMP Region has been lost.

The planning area has been highly modified and extensively developed and there are limited natural habitats or lands to protect and enhance. This makes protection of that which remains all the more important. Much of the valuable habitat is in private ownership. It is difficult to demonstrate and quantify economic benefits of restoration and protection projects.

Within the Basin, there may be opportunities to restore wetlands or provide wetlands habitat incidental to other IRWMP projects. The USDA's Wetlands Reserve Program has provided funding for projects in the region and helped develop projects that provide an example of a multiple benefits. The IRWMP will seek to integrate ecosystem benefits into direct recharge and conjunctive use projects that may be developed.

Specific land areas (project sites), water supply sources, and operational regimes for the proposed recharge projects need to be defined prior to identifying specific environmental concepts that could be incorporated into the design to provide habitat/ecosystem benefits. Once the engineering project concepts are further developed, it would then be appropriate to work with the CDFG, the Natural Resources Conservation Service, California Native Plant Society, and other entities to refine design element, seek additional funding, and work to avoid environmental impacts. Incorporating ecosystem or "green" concepts into the project design will increase the likelihood of funding and permit approval.

Constraints

The Environmental Baseline (KRCD, 2006b) report documented current conditions and identified that there are limited areas where there are opportunities to protect or restore habitats and ecosystem functions. Most of the land in the Kings Region is private property and already highly developed for agriculture and municipal uses. There are currently a limited number of local agencies and organizations evaluating opportunities for ecosystem restoration and protection. There is no habitat conservation plan or natural communities' conservation plan for the Kings Region. Local land use plans recognize the value and need for open space, but the

mechanisms for preserving open space for purposes of habitat and human enjoyment are not well developed.

Constraints include costs of land or easements, funding for restoration projects, feasibility for integration of restoration elements into proposed projects, regulatory constraints, and political acceptance.

Other constraints to integrating habitat into recharge pond designs and providing habitat benefits include:

- Maintaining habitat stability (e.g., ensuring a facility will not go dry after creating a habitat for and attracting nesting birds),
- Addressing growers' concerns for spillover of endangered species onto adjoining lands,
- Controlling weeds at the project site,
- Creating habitat for and attracting invasive species, and
- Providing mosquito abatement.

Findings

The Water Forum, through the elected bodies of each stakeholder, adopted the following solution principles.

- The IRWMP should include ecosystems management strategies where cost effective and appropriate:
 - Improve or provide incidental habitat value or restoration benefits for migratory or resident species;
 - Include measures to avoid, minimize, or mitigate impacts early in the design process to avoid project delays; and
 - Investigate the potential for integrating flood storage, habitat, and conjunctive use project elements.
- Ecosystems restoration design concepts will be incorporated into the design of groundwater storage and banking facilities to improve or provide habitat. Projects will seek to create partnership opportunities with state and federal resource agencies and other nongovernmental organizations.
- The Kings River Fisheries Management Program is incorporated into the IRWMP by reference.
- Developing or protecting open space and increasing recreational opportunities should be a priority for the IRWMP to provide multiple benefits, as encouraged by the state through its grant funding programs.

- The goals and objectives of the Kings River Conservancy pertaining to river access and habitat improvement should be supported by the Water Forum.

Additional findings include:

- The Upper Kings Basin IRWMP has identified a number of opportunities that may be feasible and would serve to enhance or restore habitat function, but which require further study, including:
 - The City of Dinuba’s proposed program to develop wetlands with reclaimed wastewater in order to provide habitat and water quality benefits;
 - Capture of Kings River Fisheries Management Program flows for direct or in-lieu recharge;
 - The King River Conservancy “The Kings Ribbon of Gems, A Vision for the Lower Kings River”;
 - Dedicated regional and local recharge facilities that could provide valuable seasonal wetlands habitat;
 - Wetlands reserve-type programs that could provide water storage and additional recharge benefits in the lower part of the IRWMP Region.
- The work of the Environmental Stakeholders Work Group should be used to guide and direct final designs of any recharge ponds.
- The Water Forum should seek further to engage the counties, land use planning agencies, and water districts to work closely with the public to identify environmental enhancement and protection opportunities, preserve and protect open space, and design programs to protect what habitat remains in the Kings Region for the enjoyment and use of future generations.
- The Forum should promote the preservation, protection, and restoration of appropriate, local California native plants wherever possible.
- The Kings River Fisheries Management Program is a foundational action for the Upper Kings Basin IRWMP and is strongly supported by the Water Forum.
- Priorities for developing or protecting open space and increasing recreational opportunities will be included in the IRWMP to provide multiple benefits and define priorities for seeking grant funding from the state.
- The goals and objectives of the Kings River Conservancy pertaining to river access and habitat improvement should be supported by the Water Forum.

Local Example of Ecosystem Protection

FMFCD’s rural streams program seeks to preserve, restore, and maintain rural stream channels. This, in conjunction with an MOU with the CDFG, helps provide long-term net benefits for fish, wildlife, water quality, native plants, and stream habitat, while maintaining or improving regional flood protection.

- The Water Forum should seek opportunities to work with the NRCS and willing land owners to find funding from the Wetlands Reserve Program and obtain funding for integrated projects that restore wetlands, provide water supply and recharge benefits, and improve operational flexibility of existing irrigation systems.

7.5.4 RECREATION AND PUBLIC ACCESS

Discussion

Recreation and public access include the management of lands and water resources by local, state, and federal public agencies under an implied principle of public trust responsibility. State or federal agencies managing lands and water resources are required to uphold public trust in the planning, management, use, and protection of resource values. As trustee to public resources, the state and federal agencies must consider the benefit and use of land and water resources for recreational opportunities. Natural resource values often define the character and aesthetic appeal of water-dependent recreation, making it desirable and interesting to visitors. Poorly planned use, misuse, or overuse of any recreation resource can degrade natural resource values and recreational experiences.

Water management can affect the amount or timing of stream flow. This may have a positive or negative effect on recreation. The Upper Kings Basin IRWMP will consider the effects of all proposed actions on resource values, including recreation and ecosystem health. The Kings River Fishery Management Program is a prime example of the benefits of cooperation between stakeholders in the Kings Region, is a foundational action of this IRWMP, and should be widely promoted and supported.

There are opportunities to protect or develop recreational features in the Kings Region. The Kings River Conservancy Vision for the Lower Kings River provides a good starting point for discussing recreation opportunities in the riparian corridor from Pine Flat Dam to Highway 99. A number of gravel mining operations are proposed for the area covered by the Kings River Sub Regional Plan of the Fresno General Plan. An update of the plan to accommodate additional gravel mining is being discussed at the county level and one concept being promoted by environmental interests is to generate revenue for open space access and land acquisition through an assessment on the gravel mined from areas along the Kings River.

Providing public recreation benefits and planning to integrate benefits into projects may increase the cost effectiveness and political acceptability of projects and increase the probability of voter approval for needed benefits assessments. The IRWMP project definition, feasibility analysis, and alternatives evaluation will seek to define additional opportunities to provide active and passive recreational benefits.

Constraints

Cost, timing, liability, and other issues may constrain the ability to integrate recreational benefits into the Upper Kings Basin IRWMP. There is no region-wide parks district to coordinate open space and parks planning and neither the Fresno County nor Tulare County park master plans have been identified. The 1981 Kings River Sub-regional Plan is part of the Fresno General Plan, but it has not been updated.

The existing conservancy for the Kings River lacks adequate staff, technical and management support, and financial resources to move forward to implement the vision for the Kings River. Also, there is no regional plan for open space or recreation, and there are limited institutions or agencies with a firm clear charge for developing recreation areas, planning for open space that meets multiple objectives, or which can pursue funding and provide technical and management support.

Findings

Many of the findings related to the ecosystem and wetlands protection and restoration apply to the open space and recreation element as well. Additional findings include:

- Resources are needed to support development of open space plans and recreation areas and to integrate these needs into other planning efforts and processes, including this IRWMP. Additional resources and energy are needed in the Kings Region to preserve and enhance the quality of life in the Kings Region.
- Where cost effective and feasible, recreational elements should be included in any recharge and banking facilities or projects in order to provide multiple benefits.

7.6 WATER MANAGEMENT STRATEGIES NOT CURRENTLY APPLICABLE TO THE KINGS REGION

Based on the above review, Surface Storage and Desalination were not considered strategies that were applicable to the Kings Region at this time. This does not imply that these strategies would not become relevant in the future as circumstances change, but that these are not to receive further attention at this time due to excessive constraints, including costs, lack of political support, and regulatory barriers. An adaptive management strategy is being designed into the Upper Kings Basin IRWMP to respond to change and allow for modification and updates.

7.7 PRIORITIES AND LINKAGES FOR THE WATER MANAGEMENT STRATEGIES

Priorities are established for purposes of setting the time frame for implementation and for allocation of the area's limited resources. The planning framework and approach discussed how the water management strategies were integrated into five project categories. The evaluation of the water management strategies in this chapter further confirms the basis for the Water Forum to prioritize the regional conjunctive use and groundwater banking.

A Regional Conjunctive Use Program (RCUP) is proposed as a first priority, unifying concept and integration strategy. Project design concepts and development guidelines were used to help shape how projects in other categories may be integrated; how multiple IRWMP objectives will be fulfilled; and how multiple benefits will be provided to stakeholders. The RCUP development guidelines were also formulated to help identify projects that would meet the goals and objectives of city and county general plans and to direct the design of projects so that impacts and benefits can be evaluated for purposes of environmental and economic review. RCUP development concepts and design guidelines were used to help define projects. The design guidelines are listed below.

- At least three sponsors; provide benefit to at least three participants; and/or integrate at least three of the recommended water management strategies.
- All projects considered must have a tangible, measurable yield in terms of reducing overdraft, increasing regional water supplies, and contributing to overall reliability and the basins ability to withstand drought.
- Recharge, flood retention, recreation, and habitat benefits should be integrated as project features where feasible and cost effective.
- Recharge facilities should be located above urban areas in order to percolate clean Kings River or imported waters into the groundwater basin above municipal well fields.
- Recharge ponds should be located down gradient of developing areas to allow for multipurpose storm water and recharge ponds. Such designs could include artificial wetlands to help mitigate urban storm water quality effects.
- Combined recharge and operational/regulatory storage must be designed into existing irrigation distribution facilities to optimize delivery, manage agricultural runoff, improve and protect water quality, and provide environmental benefits where cost effective.
- Incorporate environmental design concepts as recommended by the Environmental Work Group.
- Land in critical recharge zones needs to be managed, protected, or acquired.

- Urban expansion should mitigate for loss of recharge areas that result from land conversion from agricultural to urban uses and as a result of the loss of applied surface water for irrigation.
- Water stored and banked in the groundwater basin must be recoverable.
- Recharge operations must not result in migration of any known contaminant plume such that they would impair water quality for municipal or agricultural uses.
- Groundwater levels will not be allowed to rise to the point where they would affect crops or agriculture productivity.
- The export of native groundwater is prohibited.
- Third party and environmental impacts must be mitigated.
- Those who receive benefits from the project should pay a proportionate share of the costs.
- The benefits of any groundwater banking operation must be clearly identified and measured.
- Any groundwater banking program using imported water will be required to leave a portion of the water in the groundwater basin to benefit the Kings Basin.

The next highest priority is the Water Quality project category due to the critical needs in this area, especially for the disadvantaged communities. The other water management strategies and project categories are still important, but emphasis is placed on these first two areas. The linkages to conjunctive use and groundwater banking and water quality project categories have been described herein. It is important to note that the ability to meet the goals and objectives of the Upper Kings Basin IRWMP are also closely related to integration of the land use and water plans and use of the land use planning process.

Protection and preservation of the ecosystem must be assured, and the Water Forum will continue to work with local, state, and federal agencies to further develop plans in this area, but no projects have been specifically identified for immediate- or near-term implementation. Mid-term needs are further discussed in the next chapters. The same is true for regional Floodplain management and projects in this category. The Water Forum acknowledges the importance of regional flood control efforts but it is generally recognized that the existing program and projects in place are meeting the needs within the Kings Region. As such, regional flood control efforts are receiving a lower priority relative to the other program categories. Regional flood control benefits are still designed into RCUP programs since floodwaters are to be diverted and percolated and this will provide tangible flood control benefits.

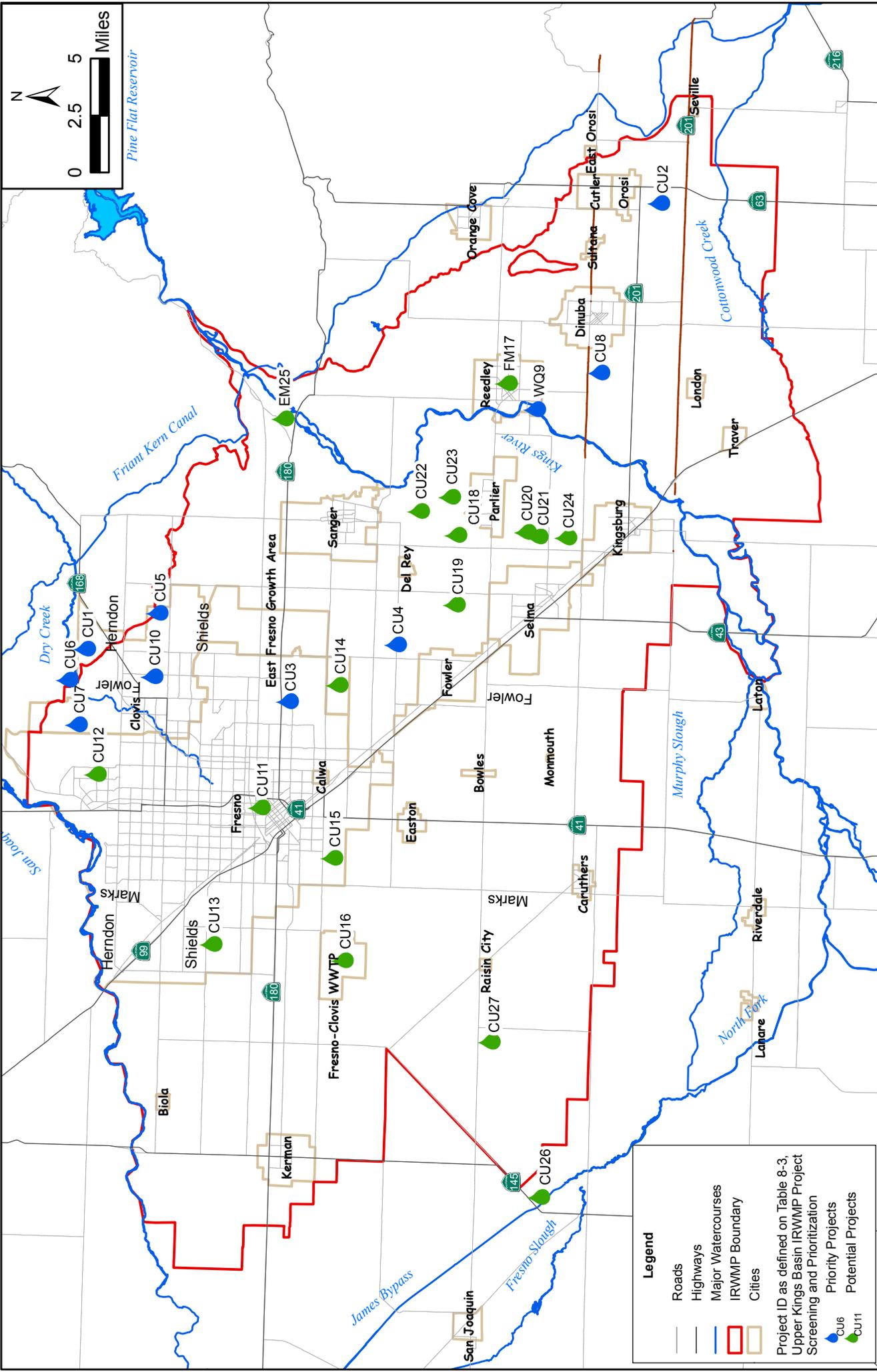
This chapter provides a summary of the prioritized projects and presents the results of the project identification process and the ranking of projects using the criteria established by the Water Forum (Appendix C). The Water Forum website was used by project sponsors to enter information on individual or cooperative projects proposed by each stakeholder or group of stakeholders. Figure 8-1 shows the general location for each of the proposed projects. The summary includes a brief description and expected quantitative benefits of the 27 projects, which were each assigned to one of the project categories: Conjunctive Use (CU), Water Quality (WQ), Flood Management (FM), or Environmental Management (EM).

8.1 PROJECT SCREENING AND PRIORITIZATION

Two levels of screening were conducted. The first-level screening was conducted to identify whether a project had any fatal flaw in terms of meeting the DWR standards and to determine if the project proponents provided enough information to be fully evaluated using the ranking and prioritization criteria adopted by the Water Forum.

The first criterion of the first-level screening was to determine if the project information was complete; if the project proponent had an UWMP; and if the project was ready to proceed and would help the Kings Region to be competitive for funding. The second criterion was to determine if two or more water management strategies were integrated and to evaluate if the project would meet at least one of the IRWMP goals. Table 8-1 shows how the individual projects are related to the IRWMP goals and which of the DWR water management strategies are integrated into the project. The third criterion was to determine if the project cost and schedule were completely defined. The screening was conducted to distinguish the immediate-term, near-term, and “ready to proceed” projects.

It is important to note that no projects have been eliminated from inclusion in the Upper Kings Basin IRWMP. Even if a project did not pass the first screening and received a lower priority rating, still it may be important to the long-term success of Kings Region and for meeting the IRWMP goals and objectives. The assignment of lower priority indicates that the project proponents need to develop the project concepts further, conduct needed feasibility evaluations, develop project designs, identify additional sponsors, or perfect local funding. As indicated in Table 8-2, 10 projects passed the first level of screening.



Upper Kings Basin IRWMP Proposed Project Locations

June 2007

Figure 8-1

Upper Kings Basin IRWMP



Legend

- Roads
- Highways
- Major Watercourses
- IRWMP Boundary
- Cities

Project ID as defined on Table 8-3, Upper Kings Basin IRWMP Project Screening and Prioritization

- CU6
- CU11



Pine Flat Reservoir

Table 8-2. IRWMP Project Screening and Prioritization

Priority/Project ID	1st Pass Screening			Sponsor, Lead Agency	Project Title	Project Description							Project Cost & Schedule			
	Budget & Schedule (Readiness to Proceed)	IRWMP Goals & Objectives	Complete Project Description			Project Description	Purpose	Project Goals and Objectives	Work Plan	DAC	Project Benefits	Regional Goals and Strategies Check list	Cost Summary & Funding Sources	Funding Committed	Budget	Schedule
CU14		Y	Y	City of Fresno Water Division	Tertiary Treatment at Fresno/Clovis Regional Water reclamation facility	✓	✓	✓	✓	✓	✓	✓	✓			
CU15		Y		City of Fresno Water Division	NE Fresno Recycled Water Transmission Pipeline	✓						✓				
C3A				Consolidated Irrigation District	Recharge Pond at Kingsburg / Selma Branch Canal Divide (10)	✓		✓								
CU3B				Consolidated Irrigation District	Recharge Pond off Fowler Switch between Sumner and South Avenues (14)	✓		✓								
CU3C				Consolidated Irrigation District	Recharge Pond off Kingsburg Branch Canal north of Huntsman Avenue (11)	✓		✓								
CU3D				Consolidated Irrigation District	Recharge Pond off Ward Drainage Canal north of Floral Avenue Alignment (13)	✓		✓								
CU3E				Consolidated Irrigation District	Recharge Ponds off Cole Slough Canal between Jefferson & Lincoln Avenues (8)	✓		✓								
CU3F				Consolidated Irrigation District	Santa Fe Pond Enlargement (9)	✓		✓								
CU3G				Consolidated Irrigation District	Ward Drainage Canal Capacity Enlargement (12)	✓		✓								
CU16				Raisin City Water District/McMullin Groundwater Recharge Group	McMullin Recharge Ponds	✓		✓								
CU17				Raisin City Water District	Raisin City Recharge Pond	✓		✓								
FM1		Y	Y	City of Reedley	Storm water interceptors at 10 City outfalls	✓		✓		✓					✓	✓
EM1				Kings River Conservancy	Kings River Park	✓			✓							

The second level of screening involved applying the Water Forum project ranking and prioritization criteria. The purpose was to define firmly the immediate and near-term projects that were ready to proceed and would help the Kings Region compete for the available grant funding. Table 8-2 also lists the 10 projects by priority.

Priority will be given to projects that seek to maximize outcomes and benefits by incorporating multiple water management strategies. As part of the first screening process, only those with 2 or more water management strategies will be considered. Due to the cumulative benefits of incorporating multiple water management strategies, compared to a single strategy alternative, additional scoring and consideration will be possible in the project ranking for the project that include more water management strategies. Thus, those projects with multiple water management strategies will be given priority consideration when seeking funding for implementation.

The rest of this chapter provides project summaries for each of the projects by project categories. The next chapter (Chapter 9) presents how the individual projects have been integrated into the proposed RCUP and the project implementation plan. The rolled up project costs and schedules are also provided in Chapter 9.

8.2 CONJUNCTIVE USE AND GROUNDWATER BANKING PROJECTS

Each project identified in Table 8-2 is listed by priority under its assigned project category. Each project description includes:

- Project sponsor and partners;
- Project overview, including maps of the locations;
- Purpose/need/problem being addressed;
- Cost and schedule;
- Qualitative and quantitative benefits;
- Relationship to existing plans; and
- Qualification as a disadvantaged community.

This section describes each of the direct or in-lieu recharge projects that have been proposed by stakeholders in the region. Subsequent sections describe the projects in other categories.

8.2.1 PROJECT CU1 FLOOD CONTROL BASIN (BASIN BT) PIPELINE

Project Sponsor: City of Clovis

Project Cost: \$250,000

Project Dates: 11/1/2007 to 1/1/2008

Project Overview

Contract a 36-inch reinforced concrete pipeline from the pump station located at Basin BT into the existing turn out structure at Big Dry Creek Canal.

Purpose/Need/Problem

The inability of maintaining active recharge in the Marion recharge facility is the result of a shared pipeline that services both the dewatering and recharge functions of the Basin BT. The project purpose is to allow for flood water management and dewatering of the Basin BT, which services the rural areas north and east of Clovis.

Benefits

Quantitative: During storm season, the Marion Recharge Facility can recharge from 250 to 700 AF per month.

Qualitative: If the facility doesn't have to share the pipeline that is utilized to fill the recharge basins with the Flood Control District, which uses the pipeline to drain the storm water basin, then recharge activities can be uninterrupted. It will reduce the coordination required between the city and the Flood Control District, increase the flood protection for the community, and allow for additional recharge.

Impacts of the No-Project Conditions: Recharge activities will continue to be interrupted during winter and spring months when the storm water basin needs to be dewatered.

Relationship to Existing Plans

General Plan: This project is consistent with the goals and policies of the 1993 City of Clovis General Plan, Public Facilities Element. The General Plan Chapter 5 Goal 1 is to maintain and improve Clovis' infrastructure in order to protect Clovis' health and safety. Specific policies and actions require the city to provide adequate public infrastructure and services to meet the needs of existing and future development; to implement the construction of the stormwater drainage system, water system, and sewer system master plans (Policy 1.1); and to utilize existing infrastructure and public service capacities to the maximum extent possible (Policy 1.2). Goal 4 requires a comprehensive water source, distribution, and treatment infrastructure system in Clovis. Specific policies and actions require the city to ensure that adequate water supply can be provided within the city's service area, concurrent with service expansion and population growth. Such actions

include implementing the full use of Clovis surface water allocations and continuing to work with other water agencies within the Fresno/Clovis metropolitan area to ensure that adequate water supply and distribution facilities can be developed to meet the area's growth (Policy 4.1). The primary goal of such coordination shall be the development of individual agency—or joint agency—programs, and facilities that will meet the water supply needs of the current and future metropolitan area while protecting the area's valuable natural resource by maintaining a water balance between the extraction of groundwater and recharge to the groundwater aquifer.

Facilities Plan: See City of Clovis Annual Community Investment Program above.

Urban Water Management Plan: This project is consistent with the City of Clovis 2005 Urban Water Management Plan. Essential component for the delivery of surface water into the Marion Recharge facility for groundwater recharge.

Groundwater Management Plan: This project builds toward meeting the goals found in the Fresno Area Regional Groundwater Management Plan, 2006. Per Section 8.1 Groundwater Recharge — Existing Activities. Increase groundwater recharge capabilities within the plan area.

Disadvantaged Community: No

8.2.2 PROJECT CU2 EASTSIDE WATER QUALITY AND URBAN RELIABILITY PROJECT

Project Sponsor: Alta Irrigation District

Project Cost: \$20,000,000

Project Dates: 1/1/2008 to 1/2/2012

Project Overview

The project includes both a direct groundwater recharge elements (Traver Groundwater Bank) and a surface water treatment plant which will provide a reliable supply of high quality water to the current and future residents in the Cutler and Orosi Communities and surrounding unincorporated communities. All of the areas to be served are disadvantaged communities. The direct recharge elements of the project will also capture and recharge storm water and integrate flood retention benefits; enhance environmental wildlife habitat; and provide flexibility in operation, water control, and utilization.

Purpose/Need/Problem

Water quality in the area to be served by treated wastewater has been impaired. Overdraft in the Kings Basin resulted in declining water levels. The local communities have limited management, technical, and financial capacity to implement projects without outside support. The project purpose is to increase yield through percolation of high quality Kings River water and to provide a sustainable potable water supply to overcome existing groundwater quality issues experienced by these severely disadvantaged communities. A second purpose of this project is to integrate water supply and stormwater capture, and more efficiently use available surface and groundwater storage for beneficial purposes.

Benefits

Quantitative: Two million gallons per day of treated peak demand water; and 1,500 AF of average annual water yield for Traver Banking project element.

Qualitative: Twenty percent (20%) of the Traver Water Bank area will be primarily used for environmental wildlife habitat enhancement; assistance to disadvantaged communities; capture of unregulated stormwater; and enhancement of statewide priorities through utilization of unused existing local supplies for beneficial uses.

Impacts of the No-Project Conditions: Disadvantaged communities will be subject to deteriorating water supplies and continued issues with conforming to DHS standards for potable water; continued overdraft of groundwater; and continued degradation of the environment.

Relationship to Existing Plans

General Plan: The project is consistent with the Tulare County General Plan Water Element. The Tulare County Water Element is being updated and will look to ensure that adequate water supplies are available to sustain existing and future development within the local communities.

Groundwater Management Plan: The project is consistent with the AID Groundwater Management Plan since it provides for enhancement of conjunctive use, water quality enhancement, and monitoring and enhancement of water balance.

Disadvantaged Community: Yes

8.2.3 PROJECT CU3 CID GROUNDWATER MITIGATION AND BANKING PROGRAM

Project Sponsor: Consolidated Irrigation District

Project Cost: \$16,200,000

Project Dates: 3/5/2007 to 1/1/2010

Project Overview

The CID program includes multiple recharge projects and facilities located on individual properties generally in the area east of Highway 99. The program includes acquiring as many as 350 acres of land to develop direct recharge facilities (percolation ponds); development of necessary easements and rights of way; improvements to existing canal facilities and conveyance; development of secondary connector canals, pipelines, and related facilities; installation of measuring equipment; and percolation of Kings River and other waters at the new facilities or existing recharge sites. The CID will develop, own, operate, and maintain the groundwater banking facilities and manage the banked groundwater on behalf of co-sponsors or subscribers in the bank.

Purpose/Need/Problem

The average annual overdraft within the CID area during 1964 to 2004 period was in the order of 20,000 AF per year. The approval of future urban growth needs to demonstrate proof of long-term sustainable water supplies. The projects will seek to reduce overdraft that results from current and future levels of development. The CID has historically reduced the amount of overdraft by diverting Kings River water into the District's system of canals and ponds for the purpose of direct groundwater recharge. The majority of the CID's total water delivery capacity is divided between the Fowler Switch and C&K Canals. Most of the CID's recharge ponds are located in the westerly part of the District, along the Fowler Switch Canal or laterals off the Fowler Switch. This essentially limits the total recharge deliveries to the capacity of the Fowler Switch Canal. There are several ponds that can be served through the C&K Canal, but only a small portion of the C&K's flow capacity is ever used for recharge deliveries. In general, the west side ponds served through the Fowler Switch Canal have the capacity to percolate more water than can be delivered. The addition of new recharge ponds that could be served through the C&K or Lone Tree systems would increase the overall capacity for recharge deliveries.

Benefits

Quantitative: New yields from capture of flood flows averaging 14,000 AF/year. Recapture of 10,000–12,000 AF of water released to the Kings River under Schedules C and D of the Kings River Fishery Management program.

Qualitative: Improved water levels in the area of recharge and reduce pumping costs. Recharge of clean Kings River water into the groundwater basin and preservation of ambient water quality conditions. Ability of the cities to mitigate for impacts of new development. Ability to mitigate other projects that represent new consumptive use of water (e.g., KRCD Parlier Power Plant).

Impacts of the No-Project Conditions: Continued declines in water levels, increased pumping costs; potential for reduced economic activity for both urban development and agricultural sectors; and increased conflicts between the water district, overlying land owners in the groundwater, development interests, and the cities.

Relationship to Existing Plans

General Plan: The CID program is consistent with the Fresno County General Plan. The county is working to ensure the timely development of public facilities and to maintain an adequate level of service to meet the needs of existing and future development (Goal PF-A); and to ensure the availability of an adequate and safe water supply for domestic and agricultural consumption (Goal PF-C). County policies include actively engaging in efforts and supporting the efforts of others to retain existing water supplies (PF-C.1); supporting the efforts of others to import flood, surplus, and other available waters (PF-C.2); reducing demand on the county's groundwater resources and encouraging the use of surface water (PF-C.3); supporting efforts to expand groundwater and/or surface water storage (PF-C.4) and supporting water banking (PF-C.6).

Groundwater Management Plan: The CID's groundwater management plan defines efforts to manage the areas resources through conjunctive use and operations of facilities and ponds.

Disadvantaged Communities: Selma, Fowler, Parlier, and Sanger

The following are individual project components of the CID Groundwater Banking Program (CU 2). The reader is referred to the description of the overall CID Groundwater Banking Program above for the information on the purpose/need/problem, benefits, and relationship to the existing plan for each of the individual project components described below.

Project CU3A CID Recharge Pond at Kingsburg / Selma Branch Canal Divide**Project Cost:** \$6,048,000**Project Dates:** 3/5/2007 to 1/1/2010**Project Overview**

A new recharge pond at the divide of the Kingsburg and Selma Branch Canals, between Adams and Sumner Avenues, would provide recharge benefits upslope of Selma, Parlier, and Kingsburg. The area of the proposed site is approximately 150 acres. To implement the project, the CID would need to purchase the property and construct levees and a turnout structure. The pond would provide a secondary benefit of capturing spills during irrigation operations. This would be particularly helpful to the operations of the Kingsburg Branch Canal, which currently has no available spills, and would reduce the risk of canal breaches in Kingsburg.

Project CU3B CID Recharge Pond off Fowler Switch between Sumner and South Avenues**Project Cost:** \$1,820,000**Project Dates:** 3/5/2007 to 1/1/2010**Project Overview**

A new recharge pond at the right bank of the Fowler Switch Canal, between the Sumner Avenue alignment and South Avenue, would provide recharge benefits upslope of Selma and Fowler. The East Kirby Ditch is diverted from the C&K Canal and spills into the McCall Ditch one and a half miles east of the pond site. The McCall Ditch, which is diverted from the Lone Tree Channel, continues west from the Kirby spill and spills into the Fowler Switch Canal at the south end of the pond site. If Fowler Switch recharge deliveries were diverted into the new pond, it would free up additional capacity in the Fowler Switch, downstream of South Avenue. Recharge supplies delivered through the C&K Canal and Lone Tree Channel could be added to the Fowler Switch at South Avenue via the Kirby and McCall spills. The net result would be creation of up to 50 cfs of additional recharge flow capacity and an additional recharge site upslope of Selma and Fowler. The area of the proposed site is approximately 40 acres. To implement the project, the CID would need to purchase the property and construct levees and a turnout structure.

Project CU3C Recharge Pond off Kingsburg Branch Canal north of Huntsman Avenue**Project Cost:** \$574,000**Project Dates:** 3/5/2007 to 1/1/2010**Project Overview**

A new recharge pond at the right bank of the Kingsburg Branch Canal, north of Huntsman Avenue would provide recharge benefits upslope of Selma and Kingsburg. The area of the proposed site is 10 acres. There is an existing depression at the site, but development of a pond would still require land acquisition, grading, and levee construction. A pond at this site would also provide a secondary benefit of capturing operational spills from the Kingsburg Branch Canal.

Project CU3D Recharge Pond off Ward Drainage Canal north of Floral Avenue Alignment**Project Cost:** \$2,909,000**Project Dates:** 3/5/2007 to 1/1/2010**Project Overview**

At the headworks of the Ward Drainage Canal, there is an existing winery along the south side of Huntsman Avenue. South of this property there are approximately 60 acres of vacant land on each side of the Drain. A new recharge pond at this location would provide recharge benefits upslope of Selma and Kingsburg. If the first 650 feet of the Drain were piped, it would allow the Drain to flow into the new pond at the north end and spill into the existing Drain at the south end. Development of the pond would also require land acquisition, grading, and levee construction. A check structure at the pond outlet would control spills into the downstream portion of the Drain. The upstream piping would need to be 60-inch diameter RGRCP.

Project CU3E Recharge Ponds off Cole Slough Canal between Jefferson & Lincoln Avenues**Project Cost:** \$1,743,000**Project Dates:** 3/5/2007 to 1/1/2010

Project Overview

New recharge ponds at the left and right banks of the Cole Slough Canal, between Jefferson and Lincoln Avenues, would provide recharge benefits in the region between Sanger and Parlier. The sites are far enough from the bluff of the Kings River that the groundwater gradient does not run toward the river. The area off the right bank is approximately 7 acres, the area off the left bank is approximately 30 acres, and the soils for both sites are very sandy. To implement the project, CID would need to purchase the property and construct levees and turnout structures from the Cole Slough Canal.

Project CU3F CID Santa Fe Pond Enlargement**Project Cost:** \$2,590,000**Project Dates:** 3/5/2007 to 1/1/2010**Project Overview**

The District's Santa Fe Pond is located at the headworks of the Santa Fe Ditch, between Adams and Sumner Avenues. The pond could be expanded to the south by an additional 60 acres. To implement the project, the CID would need to purchase the property and construct levees.

Project CU3G CID Ward Drainage Canal Capacity Enlargement**Project Cost:** \$231,000**Project Dates:** 3/5/2007 to 1/1/2010**Project Overview**

The Ward Drainage Canal begins at Huntsman Avenue, east of Selma, and ends near the Cole Slough branch of the Kings River in Kings County. The canal is located within a natural depression that collects surface drainage and it is not utilized for irrigation deliveries. Recharge deliveries can be made to the Ward Drain through the Kingsburg Branch of the C&K Canal. Some portions of the Ward Drain are piped and others are open canal. The portions that are open canal are very sandy and able to percolate rapidly the drainage that is collected. The recharge capacity of the Drain is limited by a series of east-west road crossings east of Selma. Enlarging these road crossings and constructing check structures at three specific locations (above and below Nebraska Avenue and above Mt. View Avenue) would increase both the flow capacity and the volume of water

that can be diverted to the Drain for recharge. It is estimated that an additional four acres of the drain could be wetted with these improvements.

8.2.4 PROJECT CU4 FID JOINT CONJUNCTIVE USE PROJECT

Project Sponsor: Fresno Irrigation District

Project Cost: \$10,000,000 **Project Dates:** 11/2/2007 to 6/30/2009

Project Overview

The FID Joint Conjunctive Use Project is a cooperative effort between the Fresno Irrigation District, a second undisclosed district, and other local and state agencies. This project intends to utilize resources that are available to the District that may not currently be maximized and to supplement the FID water supplies. The project is an agricultural project that may ultimately provide water to urban and agricultural suppliers and facilitate the environmental benefits of improving the Kings River fishery. The project consists of expanding the recharge and banking facilities along the Kings River in Fresno and Kings Counties in the vicinity of the Peoples Weir for diversion of unregulated Kings River flood flows, CVP contract water, 215 CVP flood waters, and potentially other sources. Recovery wells will be installed to allow for a portion of the stored groundwater to be extracted. The project is a conjunctive use project, as the available water supply will be diverted to the expanded facilities for recharge and storage in the groundwater reservoir. The water supply is typically available during the early and non-irrigation season months of September through April. Water stored in the groundwater reservoir will be pumped by newly constructed recovery wells and delivered to growers downstream of the project through existing and modified facilities. Delivery of the stored water will allow for surface supplies to be stored in upstream reservoirs to be made available for overdrafted areas of the District, delivery to entities that purchase water by agreement from the District, or retained to extend the irrigation season. Construction of the project is envisioned to include purchase of 200 acres of land and construction of a number of recharge basins, eight recovery wells, five monitor wells, canal delivery system improvements, and diversion pipelines and structures.

Purpose/Need/Problem

Historic monitoring and application of the Kings IGSM model show that the groundwater levels beneath the FID will continue to decline and the associated overdraft may increase with time and future development. This is especially evident on the

eastern portions of the FID where levels have been declining as much as five feet per year. Additional supplies and recharge are needed within the FID. The project purpose is to (1) recharge and recover water supplies in similar function as the Waldron Conjunctive Use project and (2) develop additional irrigation distribution facilities in key areas in order to allow for delivery of additional surface deliveries in years of excess, resulting in turning off groundwater pumps that would normally be operating.

Benefits

Quantitative: The project is estimated to divert an average of approximately 10,000 AF/year for recharge and to extract an average of 9,000 AF/year, with the balance of the diverted/recharged water to provide local recharge. The project also envisions leaving 10% of the recovered water within the project area to benefit the local area.

Qualitative: Sustain the water demands of the FID's constituents and project partners. Maintain the high quality water supply of the FID and partners. Provide more options in flood operations in conjunction with Pine Flat Dam. Expand the potential of a riparian corridor along remnant portions of the Kings River. Enhance the educational experience through cooperation with others in establishment of a planned regional science learning laboratory. Facilitate and enhance the improvement of a fishery in the Kings River. Create a water body that will benefit waterfowl and habitat.

Impacts of the No-Project Conditions: The above mentioned project benefits will not be realized; overdraft will continue; declining groundwater levels could result in migration of poor quality water and impacts to agricultural and municipal wells; future economic activity will be reduced; conflicts between water users will increase.

Relationship to Existing Plans

General Plan: The proposed project is consistent with the Fresno County General Plan (See CID discussion above). A portion of the project will be in Kings County and there are no perceived conflicts with the Kings County General Plan.

Groundwater Management Plan: The FID Groundwater Management Plan requires the District to develop additional recharge to (1) negate overdraft, (2) provide for recharge opportunities, (3) provide for conjunctive use, and (4) collaborate with other agencies to achieve multiple benefits.

Disadvantaged Community: Yes, portions of the FID are DACs.

8.2.5 PROJECT CU5 SURFACE WATER TREATMENT PLANT EXPANSION

Project Sponsor: City of Clovis

Project Cost: \$3,600,000

Project Dates: 7/1/2008 to 6/30/2010

Project Overview

The proposed project would incrementally expand the City of Clovis' existing Surface Water Treatment Plant from 15 MGD to 22.5 MGD. The expansion requires adding an additional membrane filtration system and feed pump, four filter racks, an electrical metering station, and minor piping to the existing plant operations.

Purpose/Need/Problem

The City of Clovis' Surface Water Treatment Plant is part of Clovis' strategy to ensure a consistent and dependable water supply for the city's customers. By expanding the existing plant, the city can treat more surface water from the Kings River (via the Enterprise Canal) for high quality drinking water purposes, while reducing the amount of groundwater pumped, providing in-lieu recharge. Historically, Clovis produced all of its potable water from municipal wells. Unfortunately, the City has almost fully developed the available well field, leaving limited opportunities to construct new viable municipal wells without additional contributions to overdraft. Due to continued overdraft in the area, the nominal water level in Clovis' existing wells continues to fall. The proposed project addresses the groundwater overdraft, by reducing reliance and usage of groundwater, and the further degradation of groundwater levels.

Benefits

Quantitative: The proposed project allows the city the ability to treat and distribute an additional 7.5 MGD of drinking water to its customers.

Qualitative: The project serves to preserve groundwater levels and protect the quality of groundwater through the efficient utilization of available resources. With the continued decline of the area's groundwater levels and the limited availability of new well sites within the city, it will be difficult for the City of Clovis to meet its projected potable water demand needs. The current treatment capabilities of the Surface Water Treatment Plant are limited to 15 MGD.

Impacts of the No-Project Conditions: Since 2000, new connections to the water system have been added at an annual rate of 4.9% with an overall increase in water demand at 5.2% per year. The city has also continued to increase the amount of landscaped areas,

all of which has contributed to an overall increase in per capita water consumption. With the growing city population, this level of treatment capability will eventually have a negative effect on groundwater levels.

Relationship to Existing Plans

General Plan: This project is consistent with the 1993 City of Clovis General Plan, Public Facilities elements and contains goals and objectives for use of surface water. Goal 4 — A Comprehensive Water Source, Distribution, and Treatment Infrastructure System in Clovis. Policy 4.1 — Ensure that adequate water supply can be provided within the city’s service area, concurrent with service expansion and population growth. Policy 4.2 — Provide better water quality for city residents while increasing water system reliability and protecting the groundwater basin from overdraft.

Facilities Plan: This project is identified in the City of Clovis Annual Community Investment Program. The city’s Community Investment Program represents a major portion of the city’s total recommended budget and is devoted to improvements to the physical infrastructure that supports and sustains continued community development.

Urban Water Management Plan: This project builds toward meeting the goals of increasing the water supply reliability for projected growth in the City of Clovis 2005 UWMP. The 2005 UWMP provides the city with an overall view of the water demands and supply for the expanding Clovis service area. Based on projected growth rates, it identifies how long the city’s current and potential water supplies will sustain growth and at what point additional supplies will need to be identified. The plant is expected to expand over the next 30 years (2030), in order to meet projected water balance needs.

Groundwater Management Plan: Fresno Area Regional Groundwater Management Plan (Fresno Area RGWMP), 2006. The proposed City of Clovis Surface Water Treatment Plant Expansion project is a planned activity under the current Fresno Area RGWMP—Conjunctive Use of Water Resources. Conjunctive use of water is defined as the coordinated use of both underground and surface water sources so that the combination will result in optimum benefits. Conjunctive use is one method to provide more water to users while conserving groundwater resources. By expanding the city’s Surface Water Treatment Plant for treatment of surface water entitlements, the city can help reduce groundwater pumping and slow the declining groundwater levels. The Fresno Area RGWMP supports water supply projects that better utilize surface water supplies. More specifically, the plan supports the construction of additional surface treatment plant capacity for the Cities of Fresno and Clovis.

Disadvantaged Community: No

8.2.6 PROJECT CU6 WATER INTERTIE (NORTH)

Project Sponsor: City of Clovis

Project Cost: \$890,000

Project Dates: 1/1/2007 to 12/31/2008

Project Overview

The purpose of this project is to design and construct a pipeline intertie connection between the City of Clovis water system and the City of Fresno water system to allow for better distribution of treated surface water and to increase the yield, reliability, and operational flexibility for both cities.

Purpose/Need/Problem

The project will primarily be used to provide system reliability during disasters and other emergencies but will also be used to provide supply to the City of Clovis during peak hours. In addition, the City of Fresno, which has excess surface water capacity during some months of the year, could provide excess surface water to the City of Clovis. This will reduce the need for groundwater pumping, which will assist in reducing overdraft in the region.

Benefits

Quantitative: The intertie connection will provide up to 3,000 gpm capacity during peak hours.

Qualitative: The project will enhance the city's supply reliability and will provide for better management of water supply in the metropolitan area.

Impacts of the No-Project Conditions: If this project is not implemented it will have impact on the reliability of two cities' water supplies that make up the majority of the populus in the region.

Relationship to Existing Plans

General Plan: This project is consistent with the goals of the 1993 City of Clovis General Plan, Public Facilities. Goal 4 — A comprehensive Water Source. Distribution and Treatment Infrastructure System in Clovis. Policy 4.1 — Ensure that adequate water supply can be provided within the city's service area, concurrent with service expansion

and population growth. Provide better water quality for city residents while increasing water system reliability and protecting the groundwater basin from overdraft.

Facilities Plan: The city's Community Investment Program represents a major portion of the city's total recommended budget and is devoted to improvements to the physical infrastructure that supports and sustains continued community development.

Urban Water Management Plan: This project builds toward meeting the goals found within the City of Clovis 2005 UWMP, which addresses supply reliability and describes the frequency and causes of interruptions in supply.

Groundwater Management Plan: The project is consistent with the water resources section found in the Fresno Area RGWMP. In Section 8.4 Conjunctive Use of Water Resources, the plan refers to the Cities of Fresno and Clovis having constructed water treatment plants for treating their surface water supplies. This will ultimately result in a reduction in groundwater pumping within the plan area and should slow declining groundwater levels. The plan participants support these efforts. Planned activities in support of this include expanding conveyance systems to provide surface water to additional land.

Disadvantaged Community: No

8.2.7 PROJECT CU7 RECYCLED WATER MASTER PLAN

Project Sponsor: City of Clovis

Project Cost: \$35,000,000

Project Dates: 5/1/2004 to 7/1/2012

Project Overview

This is an in-lieu recharge project to decrease pumping and increase the use of recycled water. The project includes matching water quality to appropriate uses; design and construction of recycled water transmission mains that will carry disinfected tertiary treated water to green belts, median islands, parks, trails and paseos, State Route 168, California State University of Fresno (CSUF), and agricultural operations throughout the City of Clovis for irrigation purposes.

Purpose/Need/Problem

Clovis has embarked on a very important project that will accommodate growth and development in its community with continued beneficial impacts to its groundwater aquifer. By 2009, the city will be operating its own state-of-the-art wastewater treatment plant and water recycling distribution system. In light of projected water balance needs, Clovis recognizes the importance of recycled water as a much needed water source. The wastewater treatment plant will ultimately produce 9,400 AF of "disinfected tertiary treated recycled water" annually. The Recycled Water Master Plan will then carry this treated water to irrigate green belts, median islands, parks, trails and paseos, CSUF, State Route 168, and agricultural operations throughout the City of Clovis. By capturing a source of water that has historically been lost to the metropolitan area, Clovis can help offset our regional groundwater overdraft problems.

Benefits

Quantitative: The wastewater treatment plant will ultimately produce 9,400 AF of disinfected tertiary treated recycled water annually. As a result of this project, the city anticipates that 1,000 acres of landscaped area will be irrigated annually with the recycled water; 3,950 AF of potable water will be conserved annually; and 5,460 AF of surface water will be conserved annually.

Qualitative: The beneficial reuse of recycled water allows for the recharge of our regional groundwater aquifer.

Impacts of the No-Project Conditions: Continued overdraft of our regional groundwater aquifer.

Relationship to Existing Plans

General Plan: This project is consistent with the Land Use and Public Facilities Elements found in the 1993 City of Clovis General Plan, Public Facilities. The General Plan Objectives include:

- Create a self-sustaining community with a full range of land uses and related amenities (Land Use Element Goal 1);
- Develop future land uses of high quality design that are compatible with existing development and are sensitive to existing natural resources (Land Use Element Goal 2);
- Control the development of lands within Clovis' project area (Land Use Element Goal 9);

- Provide adequate wastewater collection and treatment capacity for planned development in Clovis (Public Facilities Element Policy 3.1);
- New water facilities that are developed and operated by the city and use reclaimed water to reduce nonpotable water demands wherever practical (Public Facilities Element Policy 3.2);
- Preparation of a Reclaimed Water Master Plan based on the results of the reclaimed water market study that evaluates the facilities and costs required to serve potential users, determines required capacities of facilities, and presents an implementation plan (Public Facilities Element Policy 3.2 Action Item);
- Create market opportunities for reclaimed water (Public Facilities Policy 3.3);
- Provide better water quality for city residents while increasing water system reliability and protecting the groundwater basin from overdraft (Public Facilities Policy 4.2); and
- Promote the use of reclaimed water (Open Space/Conservation Element Policy 2.2); and use of reclaimed water whenever feasible to achieve a water balance (Southeast Urban Center Specific Plan Public Facilities Policy) (Clovis, 2003).

Facilities Plan: The city's Community Investment Program represents a major portion of the city's total recommended budget and is devoted to improvements to the physical infrastructure that supports and sustains continued community development.

Urban Water Management Plan: The 2005 UWMP provides the city with an overall view of the water demands and supply for the expanding Clovis service area. Based on projected growth rates, it identifies how long the city's current and potential water supplies will sustain growth and at what point additional supplies will need to be identified.

Groundwater Management Plan: The Recycled Water Master plan project is integral to the success of the Fresno Area RGWMP. The proposed project was identified as a method to reduce the amount of groundwater and surface water needed for landscape and irrigation purposes.

Disadvantaged Community: No

8.2.8 PROJECT CU8 DINUBA RCR

Project Sponsor: City of Dinuba

Project Cost: \$62,576,066

Project Dates: 6/1/2005 to 7/2/2008

Project Overview

The City of Dinuba seeks to construct an innovative, environmentally sound and cost-efficient project that will serve the community's needs for water reclamation, environmental conservation, and enhanced recreational opportunities. The RCR project will make beneficial use of water resources in the area in and around Dinuba, California. The RCR acronym stands for Reclamation, Conservation, and Recreation.

RECLAMATION: The heart of the project is the beneficial reuse of the rising water table (water mound) under the municipal Wastewater Reclamation Facility's (WWRF's) evaporation/percolation disposal ponds. A series of extraction wells will be installed in the vicinity of the water mound that has occurred due to percolation of effluent through the soil profile. Water from the extraction wells will be tested and disinfected for compliance with Title 22 requirements before it is pumped to a lined storage pond. A non-potable water system will be installed to distribute the reclaimed water that may also be nitrate-rich and put to beneficial uses on adjacent property owned by the city. The beneficial uses include irrigation of about 300 acres of turf and other vegetation, groundwater recharge, and possible water supply to the AID system.

CONSERVATION: The second aspect of the project is to create approximately 100 acres of environmental conservation areas for wildlife and water fowl habitat, native grass restoration, and seasonal wetlands. A portion of the conservation area will include a golf course. The courses will have groomed tee boxes, landing areas, and putting greens, but will have rough areas that support planned conservation uses instead of landscaped fairways. This layout will allow the intermingling of the conservation and recreational areas. The golf course is expected to get an Audubon Society recognition. The project will also create several permanent water features, one that is surrounded by a housing development and one that will be used for stormwater catchment and recharge basin, and several seasonal lakes that will also redistribute groundwater resources and provide migratory water fowl habitat. The recreation lake would provide an aesthetic amenity to the residential subdivision and the natural conservation theme is expected to extend throughout the subdivisions.

RECREATION: The project will create a championship quality 18-hole golf course on approximately 200 acres of land. The recreational aspect of the project will include provisions for a perimeter walking trail, picnic areas, wildlife viewing areas, and nature trails.

Purpose/Need/Problem

The City of Dinuba uses on-site wastewater disposal ponds at its WWRF to dispose of up to 3.14 million gallons of effluent per day, which has created a hydraulic mound under the ponds. The groundwater surface under these ponds frequently comes up to 25 feet below the surface while it is 50 to 60 feet below the surface on adjacent properties. The groundwater also has elevated levels of nitrates and chlorides. The purposes of the project are to:

1. Reduce the existing hydraulic mound localized at the WWRF;
2. Provide future disposal capacity in the soil profile beneath the disposal ponds;
3. Reduce nitrate levels in the area groundwater;
4. Distribute groundwater recharge over a large area;
5. Convey excess reclaimed water to the AID's canal system for beneficial use outside the project limits;
6. Manage storm water during flood events by diverting excess storm water in the AID canal system for beneficial use in the project;
7. Provide areas for native grass restoration;
8. Create seasonal wetlands;
9. Enhance recreational opportunities; and
10. Reduce demand for potable water supply by substitution of reclaimed water for ornamental irrigation.

Benefits

Quantitative: The project will create approximately 300 acres of turf and other vegetation. This will include approximately 100 acres of conservation areas for wildlife, water fowl habitat, native grass restoration, and seasonal wetlands. The project's first phase would produce up to 1.0 MGD of reclaimed water, increasing to an ultimate rate of 4.0 MGD.

Qualitative: The project would produce disinfected tertiary-treated water, which is the highest grade of recycled water. The project would reuse or percolate the wastewater generated by the Dinuba Wastewater Reclamation Facility. The City of Dinuba intends to use reclaimed water to irrigate public facility landscaping, median island landscaping and open space, public golf course irrigation, residential landscaping irrigation, and environmental mitigation areas on the RCR property. Reclaimed water conveyed to the AID's canal system would enable AID to deliver water to its agricultural water customers and to impoundments for recharge. Local farmers can deliver water for irrigation of up to 300 acres of local farm land located to the north, south, and west of the

RCR project site. During flood events, storm water in the AID's canal system can be diverted on-site for beneficial uses.

Impacts of the No-Project Condition: If the project is not implemented, the hydraulic mound under the WWRF would continue to rise. The concentration and mounding of the wastewater may potentially increase nitrates in groundwater. Advanced Secondary and Mechanical Tertiary Treatment, which would be required to deal with the potential groundwater degradation, may need to be implemented. This option carries with it a significant cost to treat the city WWRF's current effluent on the order of \$25 million. This would tremendously increase sewer service rates for the city's utility customers, which would be an extreme economic hardship on the city's residents, half of whom are at the low to moderate income level. Alternatively, lined evaporation ponds may need to be constructed on 800 to 1,000 acres of productive farmland.

Relationship to Existing Plans

General Plan: This project is consistent with the City of Dinuba General Plan, Land Use, Circulation, and Open Space Elements as follows:

1. Enhance and maintain the quality of life for city residents.
2. Provide social, educational and recreational opportunities to city residents.
3. Prevent degradation of the natural and man-made environment and offset degradation that may have already occurred.
4. Foster economic growth and provision of employment opportunities for all residents.
5. Provide a choice of housing locations in the community for all persons, regardless of race, sex, cultural origin, marital status, or physical ability in conformance with federal, state, and local laws.
6. Reduce land use conflicts.
7. Provide adequate streets, transportation facilities, and public services to accommodate existing and future populations.

Facilities Plan: The 2006–2010 Capital Investment Program includes WWRF improvements to improve secondary treatment processes that will benefit the recommended reclamation disposal plan.

Disadvantaged Community: Yes

8.2.9 PROJECT CU9 ENTERPRISE CANAL IMPROVEMENTS

Project Sponsor: City of Clovis

Project Cost: \$845,000

Project Dates: 5/1/2008 to 6/30/2010

Project Overview

In order to meet the Fresno Metropolitan Flood Control District's flow design parameters for Big Dry Creek and the Enterprise Canal, the existing siphon at the confluence of the two waterways needs to be replaced with a similar type of structure. The new structure will have enhanced flow measurement and control for both the Big Dry Creek and the Enterprise Canal and would incorporate a walkway to accommodate a path along Big Dry Creek for the City of Clovis.

Purpose/Need/Problem

The primary purpose of the project is to provide for the long-term integrity of the siphon to pass Big Dry Creek and Enterprise Canal flows. The existing structure on the Enterprise Canal (located beneath Dry Creek) was constructed around 1915. The replacement of this structure is essential to the reliable delivery of water over the long term. The existing structure consists of a box culvert approximately 80-feet long by 13-feet, 6-inches wide and has a weir constructed integrally with it. Material strength testing was conducted at the siphon, including two concrete cores and rebar mapping on the top slab. It was determined that the concrete compressive strength was a minimum of 4,300 psi. Several large cracks were found in the center culvert wall approximately 1/4-inch wide by 10 feet long. The cut off wall located at the end of the apron extending from the weir structure had significant damage where rebar has been exposed and pieces of concrete have broken off.

Benefits

Quantitative: Stabilize the ability of the Big Dry Creek and Enterprise Canal siphon to pass 250 cubic feet per second of flow.

Qualitative: Manage and reduce the risk of structural failure and flooding along the Big Dry Creek and Enterprise Canal alignments.

Impacts of the No-Project Conditions: Structure failure causing an impact of flow along the Big Dry Creek and Enterprise Canal alignments.

Relationship to Existing Plans

General Plan: This project is consistent with the Public Facilities Element of the 1993 City of Clovis General Plan. In 1991, the City of Clovis prepared its Water System Master Plan to provide a blueprint for the water system necessary to meet the City's projected water demands for complete buildout of the City's existing sphere of influence boundaries. The essential objective of the plan is to ensure a provision for the safe, reliable, and economical water supply that can accommodate current and future land use decisions. The plan calls for maximizing the use of groundwater as the primary water source for the area, continuing with an active groundwater recharge program throughout the community in order to insure that there is no overdraft of the groundwater reservoir, and continuing with appropriate water conservation measures to ensure responsible use of the water supply provided.

Urban Water Management Plan: This project is consistent in meeting the goals to increase water supply reliability found in the City of Clovis 2005 UWMP. The essential component for the delivery of surface water into the Marion Recharge facility for groundwater recharge.

Groundwater Management Plan: The Fresno Area RGWMP supports water supply projects that better utilize surface water supplies. The proposed Enterprise Canal Improvements aid in meeting the goals and objectives of the Fresno Area RGWMP. The project is part of the conjunctive use efforts. By improving the delivery of surface water to the Marion Recharge Facility, the city can help reduce groundwater pumping and slow the declining groundwater levels.

Disadvantaged Community: No

8.2.10 PROJECT CU10 RESIDENTIAL METER RETROFIT PROJECT

Project Sponsor: City of Fresno Water Division

Project Cost: \$37,000,000

Project Dates: 1/1/2007 to 1/1/2013

Project Overview

This project is for the installation of approximately 80,000 residential water meters citywide.

Purpose/Need/Problem

The City of Fresno presently has water meters on all commercial, industrial, and multi-family services. To be in compliance with the recent state laws and the CVP contract renewal terms, the city is to install approximately 80,000 single-family residential water services and be charging water on a volumetric basis by 2013.

Benefits

Quantitative: Various reports suggest that the city will realize a 15–20% decrease of single-family residential water use once the meters have been installed and water is billed on a volumetric basis.

Impacts of the No-Project Conditions: If the project is not completed, the city will be in violation of state law and contract requirements. Consequences could include loss of CVP water and other state-imposed penalties.

Relationship to Existing Plans

General Plan: This project is consistent with the goals of water conservation found in the City of Fresno General Plan.

Facilities Plan: The meter retrofit project was identified in the earlier identified Fresno Metropolitan Water Resources Management Plan, Phase III Report, Implementation Plan, 1994.

Disadvantaged Community: Yes

8.2.11 PROJECT CU11 NW FRESNO REGIONAL RECHARGE FACILITY

Project Sponsor: City of Fresno Water Division

Project Cost: \$17,127,000.00

Project Dates: 2008 to 2010

Project Overview

This project is for the construction of a 40-acre regional recharge facility in the northwest portion of the City of Fresno.

Purpose/Need/Problem

The City of Fresno is one of the largest water utility systems in the country that, until two years ago, relied entirely on groundwater for its municipal water supply. Although the city now has a 30 MGD surface water treatment plant in the northeast area of town, groundwater remains the city's dominant source of potable water. The city's reliance on the groundwater system has resulted in the long-term overdraft of this resource. Recent data shows groundwater levels have declined on the average of 1.5 feet per year citywide from 1990 to 2006, and the Kings IGSM demonstrates that overdraft will increase with future development and additional urban water demand.

Benefits

Quantitative: It is anticipated that this facility may be capable of providing nearly 6,000 AF/year of recharge.

Qualitative: The construction of this facility will ensure that groundwater will be a sustainable resource for decades to come. By applying surface water for recharge purposes, the groundwater will be available during drought years to provide water for the city.

Impacts of the No-Project Conditions: If the recharge project is not pursued, the city risks further lowering of groundwater levels and the potential for groundwater quality degradation.

Relationship to Existing Plans

General Plan: This project is consistent with the Fresno 2025 General Plan. The General Plan requires the city to manage and develop the City of Fresno water facilities to ensure a safe and reliable water supply for existing and planned urban development and economic diversification (GE-22). The city General Plan also has policies that require implementing the Fresno Metropolitan Water Resources Management Plan to ensure adequate water supplies are available for both short- and long-term needs (GE-22-K) and that development of peripheral areas, including the planned North Growth and Southeast Growth Areas and the other areas outside the city's adopted sphere of influence, will not adversely affect efforts to balance water demand with water supply. The city is also working to manage, use, and replenish water resources to maintain a balanced "water budget" in the Fresno area (G-4); to preserve the city's surface water entitlements to the fullest extent possible and augment surface water supplies as may be necessary; to use surface water, as necessary, to balance the aquifer's long-term sustainable yield with projected demand; to use surface water, as necessary, to maintain

the overall high quality of Fresno's underground reservoir; and to protect, develop, and maintain areas and facilities necessary for groundwater recharge, including in-lieu recharge achieved through use of a surface water treatment plant. Additionally, the city is addressing localized groundwater deficiencies and groundwater quality problems that exist or may arise (G-4-c).

Groundwater Management Plan: The Fresno Area RGWMP recognizes the need to "increase groundwater recharge capabilities within the Plan Area." This is noted as an existing activity within the GWMP area. The project supports the continued effort to increase regional groundwater recharge.

Disadvantaged Community: Yes

8.2.12 PROJECT CU12 SW FRESNO REGIONAL RECHARGE FACILITY

Project Sponsor: City of Fresno Water Division

Project Cost: \$17,127,000.00

Project Dates: 2008 to 2010

Project Overview

This project is for the construction of a 40-acre regional recharge facility in the southwest portion of the City of Fresno.

Purpose/Need/Problem

See Section 8.2.11.

Benefits

Quantitative: It is anticipated that this facility may be capable of providing nearly 6,000 AF/year of recharge.

Qualitative: The construction of this facility will ensure that groundwater will be a sustainable resource for decades to come. By applying surface water for recharge purposes, the groundwater will be available during drought years to provide water for the city.

Impacts of the No-Project Conditions: If the recharge project is not pursued, the city risks further lowering of groundwater levels and the potential of water quality degradation.

Relationship to Existing Plans

General Plan: This project is consistent with the goals and objectives of the Fresno County General Plan. See Project CU 12. **Groundwater Management Plan:** This project is consistent with the Fresno Area RGWMP which recognizes the need to "increase groundwater recharge capabilities within the Plan Area."

Disadvantaged Community: Yes

8.2.13 PROJECT CU13 SOUTHEAST FRESNO SWTP

Project Sponsor: City of Fresno Water Division

Project Cost: \$124,800,000.00

Project Dates: 2010 to 2015

Project Overview

This project is for the construction of a 30-MGD surface water treatment plant and large diameter transmission mains in the southeastern quadrant of the City of Fresno.

Purpose/Need/Problem

The purpose of the proposed project is to provide a long-term and sustainable supply of high quality water to growth areas in the developing southeast part of the city and to increase the use of the city's surface water supplies in-lieu of groundwater. The City of Fresno is one of the largest water utility systems in the country that, until two years ago, relied entirely on groundwater for its municipal water supply. The city's reliance on groundwater, however, has resulted in the aquifer being in a state of overdraft for many decades. In June 2004, the city commenced operations of a 30-MGD SWTP in the northeastern quadrant of the city. This plant represents a significant milestone for the city in that it began reducing its dependence on the groundwater resource and, for the first time, allowed the city to directly utilize its surface water contracts to provide potable drinking water. Although this first plant is a significant accomplishment, it provides just 10% of the city's overall water demand during peak summer periods. The southeastern quadrant of the city has a multitude of water quality and yield-related

problems. Much of this area has significant clay deposits which yield little or no water and water-bearing formations are typically very thin and have marginal yields. Much of the shallow and intermediate water-bearing formations have water quality issues, such as contamination from the pesticide DBCP and/or nitrates from residential septic tanks and industrial discharges. The combination of poor water-bearing formations and impacts to water quality severely restricts the city's ability to develop sustainable water supplies in this area of Fresno.

Benefits

Quantitative: It is anticipated the SWTP will produce about 30,000 AF/year of potable water.

Qualitative: With the construction of this facility, the city will be able to reduce its dependence on a groundwater system that has been in state of overdraft for several decades. By reducing and eventually eliminating overdraft of the groundwater system, this resource will be less likely to become impacted by lower quality waters beneath the presently utilized high quality waters.

Impacts of the No-Project Conditions: If this project is not constructed, the city will have to continue overdraft pumping of the groundwater system, which not only reduces water storage but also jeopardizing water quality should the water table be drawn down into the deep, poor quality groundwaters.

Relationship to Existing Plans

General Plan: This project is consistent with the Fresno 2025 General Plan. The General Plan includes objectives to manage and develop the City of Fresno's water facilities to ensure a safe, economical, and reliable water supply for existing and planned urban development and economic diversification (E-22); and to implement appropriate measures consistent with water system policies, including the removal of pump stations from active use, installation of well-head treatment facilities, construction of above-ground storage and surface water treatment facilities, and enhancement of transmission grid mains to ensure adequate water quality and quantity (E-22-h).

Facilities Plan: This project was identified in this plan for construction in the Fresno Metropolitan Water Resources Management Plan, Phase III Report, Implementation Plan.

Disadvantaged Community: Yes

8.2.14 PROJECT CU14 TERTIARY TREATMENT AT FRESNO/CLOVIS REGIONAL WATER RECLAMATION FACILITY

Project Sponsor: City of Fresno Water Division

Project Cost: \$20,000,000.00

Project Dates: 2015

Project Overview

This project is for the construction of a 36-MGD tertiary level treatment system at the Fresno/Clovis Regional Water Reclamation Facility, including transmission pipelines to service areas for beneficial reuse of the recycled water.

Purpose/Need/Problem

The present operations at the Regional Water Resources Facility (RWRF) treats on average about 68 MGD of wastewater to secondary levels and discharges the treated effluent to 1,660 acres of ponds for disposal. A small portion of the reclaimed wastewater is supplied to nearby farms to irrigate fodder and fiber crops, such as alfalfa and cotton. The Kings Basin is in overdraft. Appropriate use of recycled, highly treated municipal wastewater in lieu of groundwater is one of the water management strategies in the King IRWMP.

Benefits

Quantitative: This project will produce 36 MGD of tertiary level treated water or the equivalent of 40,300 AF/year.

Qualitative: With the construction of this facility the city will be able to expand the use of reclaimed water, which reduces the reliance on high quality potable groundwater and treated surface water.

Impacts of the No-Project Conditions: Without this project, treated water from the RWRF is lost for city use as it percolates into the groundwater system and becomes a groundwater outflow from the city's sphere.

Relationship to Existing Plans

General Plan: This project is consistent with the City of Fresno General Plan since the project will protect water resources in the area from further degradation in quality. Related goals and policies require the city to continue programs to collect and treat sewage to enhance water quality and reclaim water resources in a manner that protects

the Fresno Sole Source Aquifer (E-22-h); to manage, use, and replenish water resources to maintain a balanced "water budget" in the Fresno area (G-1); and to explore methods of using treated and reclaimed wastewater for irrigating crops and landscaping, while ensuring that there will be no negative impacts on groundwater quality (G-4).

Groundwater Management Plan: This project is consistent with the goals of the Fresno Area Regional GWMP which recognizes "the recycling or reclamation of treated wastewater will extend the overall water supply within the Plan Area." Listed as "Planned Activities" in the plan, the goals include exploring opportunities to optimize re-use of reclaimed water from the Fresno-Clovis Regional Water Reclamation Facility, encouraging higher level treatment facilities to facilitate less restricted use of recycled water, and encouraging new developments to incorporate dual water systems.

Disadvantaged Community: Yes

8.2.15 PROJECT CU15 NE FRESNO RECYCLED WATER TRANSMISSION PIPELINE

Project Sponsor: City of Fresno Water Division

Project Cost: \$1,209,000

Project Dates: unknown

Project Overview

This project is for the construction of a recycled water transmission pipeline to convey tertiary level treated water for irrigation uses, such as landscaped median islands, an elementary school, and a golf course.

Benefits

Quantitative: As part of the development of a new residential tract, a satellite WWTP will be constructed to address constraints to the city's sanitary sewer system. The WWTP will treat the wastewater to tertiary levels for use in the area. When full development of the tract has occurred, about 1.4 MGD of reclaimed water will be produced. This pipeline will provide transmission services to users.

Qualitative: The pipeline will allow for the use of recycled water, which will reduce demands on other potable water sources and provide the best use of this reclaimed source.

Impacts of the No-Project Conditions: If the pipeline and associated connections for use are not made, the water might be discharged to other facilities and lost for best use in the immediate area.

Relationship to Existing Plans:

General Plan: This project is consistent with the objectives and policies in the Water Resources Element in the Fresno 2025 General Plan as follows: Water Resources Goal-3 includes objectives to protect water resources in the area from further degradation in quality and policies are in place to continue the programs to collect and treat sewage to enhance water quality and reclaim water resources in a manner that protects the Fresno Sole Source Aquifer. Also, the city is to manage, use, and replenish water resources to maintain a balanced "water budget" in the Fresno area (G-4. Objective), and to explore methods of using treated and reclaimed wastewater for irrigating crops and landscaping, while ensuring that there will be no negative impacts on groundwater quality (G-4-d. Policy: E).

Groundwater Management Plan: The Fresno Area RGWMP recognizes that "recycling or reclamation of treated wastewater will extend the overall water supply within the Plan Area." "Planned Activities" listed in the plan include: exploring opportunities to optimize re-use of reclaimed water from the Fresno-Clovis Regional Water Reclamation Facility; encouraging higher level treatment facilities to facilitate less restricted use of recycled water; and encouraging new developments to incorporate dual water systems. The proposed secondary water system would use recycled water or groundwater of marginal quality for landscape irrigation.

Disadvantaged Community: Yes

8.2.16 PROJECT CU16 McMULLIN RECHARGE PONDS

Project Sponsor: Raisin City Water District/McMullin Groundwater Recharge Group

Project Cost: \$ 1.5 to \$2.0 Million

Project Dates: 2010 to 2015

Project Overview

The proposed McMullin Group recharge project would use flood flows to recharge the groundwater system. The project, which includes a series of ponds and canals, was investigated and a preliminary feasibility study was completed in April 2000 (KRCD,

2000). At that time, two sites in the McMullin Recharge Project area were considered. Site 1 consists of two phases. Phase 1, a 75-acre parcel of land that will provide approximately 67 acres of recharge area, is located on the southeast side of McMullin Road, approximately 1 mile northeast of the Kings River. Phase 2 consists of two 80-acre basins approximately ¼ mile east of the Phase 1 site. These additional basins provide approximately 138 acres of recharge area. A turnout structure on James Bypass, a road crossing, approximately 300 feet of pipeline, 4,300 feet of canal, and a pumping plant will be constructed to convey water from James Bypass to the recharge basins. Site 2 includes a channel and regulation basin to be constructed within the James Bypass. The canal will be constructed along the east side of the channel and from Manning Avenue to Adams Avenue, a distance of approximately 14,500 feet, terminating in a regulating basin constructed on 20 acres of land. The basin will include a check structure and an overflow structure. In addition to serving as direct recharge facilities, both sites have the capability to deliver in-lieu recharge water.

Purpose/Need/Problem

The area in the Lower Kings Basin has the lowest groundwater levels in the Kings Basin. The area is totally dependant on groundwater. Most of the area has limited or no surface water rights to the Kings River and there are limited conveyance systems. The purpose of the proposed projects is to directly recharge Kings flood water or purchased CVP 215 waters when available to reduce area overdraft. In addition to serving as direct recharge facilities, both sites would develop facilities to deliver in-lieu recharge water to agriculture.

Benefits

Quantitative: Up to 25,000 acre-feet of annual recharge.

Qualitative: The benefits of the project would extend basinwide since the recharge ponds would help replenish the groundwater in this area and reduce the water level decline and cone of depression, thus reducing the underflow.

Impacts of the No-Project Conditions: If nothing is done in the Lower Kings area, water levels will decline, overdraft will continue, and underflow from upgradient areas be needed to balance the demands. This could increase the potential for conflicts with other overlying users. The benefits of the investments in groundwater recharge by others in the Upper Kings would be partially realized by overlying land owners in the Lower Kings area, potentially resulting in disequity and unequal distribution of costs.

Relationship to Existing Plans

General Plan: The proposed projects would be consistent with the Fresno County General Plan. The County is working to ensure the timely development of public facilities and to maintain an adequate level of service to meet the needs of existing and future development (Goal PF-A), and to ensure the availability of an adequate and safe water supply for domestic and agricultural consumption (Goal PF-C). County policies include actively engaging in efforts and supporting the efforts of others to retain existing water supplies (PF-C.1); supporting the efforts of others to import flood, surplus, and other available waters (PF-C.2); reducing demand on the county's groundwater resources and encouraging the use of surface water (PF-C.3); and supporting efforts to expand groundwater and/or surface water storage (PF-C.4) and supporting water banking (PF-C.6).

Groundwater Management Plan: This project is identified in the Lower Kings GWMP.

Disadvantaged Community: Yes

8.2.17 PROJECT CU17 RAISIN CITY RECHARGE POND

Project Sponsor: Raisin City Water District

Project Cost: \$800,000.00 to \$1.2 Million **Project Dates:** 2010 to 2015

Project Overview

For the Raisin City Recharge Project, CVP 215 and other flood flow-related water would be routed through the FID canal system to Dry Creek Canal. Water in the Dry Creek Canal would then be piped to the FID/RCWD border and be discharged into a canal. The canal delivers the water to an 80-acre groundwater-recharge basin constructed on land owned by the RCWD. Water stored in the reservoir could be delivered to area growers for consumptive purposes or could remain in the reservoir to recharge the groundwater system.

Purpose/Need/Problem

The Raisin City Water District is completely dependant on groundwater as the source of water for crop irrigation. The Kings Basin is in overdraft and directly impacts the FID's availability of water. The project will aid in replenishing the groundwater supply in

times when flood water may be available. The recharge ponds will increase water supply reliability.

Benefits

Quantitative: Up to 15,000 acre-feet of annual recharge.

Qualitative: The benefits of the project would extend basinwide since the recharge ponds would help replenish the groundwater in this area and reduce the water level decline and cone of depression, thus reducing the underflow. This would reduce the potential for conflicts with other overlying users.

Impacts of the No-Project Conditions: If nothing is done in the Lower Kings area, water levels will decline, overdraft will continue, and underflow from upgradient areas will be needed to balance the demands. This could increase the potential for conflicts with other overlying users. The benefits of the investments in groundwater recharge by others in the Upper Kings would be partially realized by overlying land owners in the Lower Kings area, potentially resulting in disequity and unequal distribution of costs.

Relationship to Existing Plans

Groundwater Management Plan: This project is identified and consistent with the goals found within the SB1938 Coordinated GWMP.

Disadvantaged Community: Yes

8.3 WATER QUALITY PROJECTS

8.3.1 PROJECT WQ1 5 MGD WASTEWATER TREATMENT PLANT UPGRADE

Project Sponsor: City of Reedley

Project Cost: \$30,000,000

Project Dates: 3/1/2007 to 7/31/2009

Project Overview

The implementation of this project will increase capacity of the current plant from 3 MGD to 5 MGD to provide for increased capacities projected through 2022. The wastewater treatment plant upgrade will improve wastewater quality to address anticipated regulations and protect underlying groundwater by adding a new oxidation

ditch and rehabilitating and equipping the existing oxidation ditch with an anoxic basin to provide effluent total nitrogen concentrations less than 10 mg/L.

Purpose/Need/Problem

The existing wastewater treatment plant is near capacity and will not be able to adequately serve projected growth for the area.

Benefits

Quantitative: The upgrade plant will allow for expanded treatment capacity from 2.4 to 5 MGD.

Qualitative: The increased treatment capacity will produce additional and more effectively treated reclaimed water for potential recharge and re-use projects.

Impacts of the No-Project Conditions: The potential impacts of doing nothing will produce higher concentration of nitrate levels, lower quality sludge, overall lower quality effluent, and poorer air quality, and will limit urban development.

Relationship to Existing Plans

General Plan: This project is consistent with the City of Reedley General Plan.

Facilities Plan: The WWTP Facilities Master Plan identifies this project as Phase 1 of a two-phase project expanding the plant's capacity to 5 MGD and ultimately to 7 MGD.

Urban Water Management Plan: This project is consistent with the planning and goals found within the City of Reedley UWMP. It provides for current recharge of the groundwater basin and future reuse.

Groundwater Management Plan: This project is consistent with the goals of providing recharge to the groundwater basin by use of reclaimed water in-lieu of groundwater pumping.

Disadvantaged Community: No

Project WQ 2- Disadvantage Community Water Quality Program

Water quality and supply problems are an ongoing challenge in disadvantaged communities. The process of identifying the water quality, water supply and wastewater treatment issues of DAC required additional and unique outreach efforts. The Water Forum worked with Self Help

Enterprises to define drinking water and wastewater treatment needs of the DACs in the Kings Region. Table 8-3 lists some of the identified water supply and wastewater issues for the disadvantaged communities. Figure 8-2 shows the location of water and wastewater needs in the DAC within the IRWMP. This is not a comprehensive list and further work is needed to define needs and set priorities. Underrepresented communities have unique needs, knowledge and water concerns that often go unrecognized. The DACs have limited or no resources and many do not have the management, technical, staffing or financial capacities needed to conduct investigative studies or develop engineering solution. In addition, the DACs often experience water related problems that are beyond what the individual communities are able to address. It is often challenging for these communities just to maintain the existing systems. Some communities are in need of upgraded or new supply or treatment systems to meet drinking water standards.

The Water Forum, through its community affairs and outreach program will need to more actively reach out to the DACs and be creative in the approach to helping these communities. Through educational efforts, outlined in the outreach plan, the Forum intends to further involve and actively seek participation in refining goals and objectives to meet the needs of the DACs in the region.

A number of the disadvantaged communities within the area are currently experiencing groundwater contamination issues (pesticides, nitrates, and bacteria), leading to the shutdown of municipal wells and creating the need to drill new wells. Observed contaminants include DBCP, nitrate, arsenic, and coliform in the communities of Biola and Caruthers in Fresno County, and in Culter, East Orosi, Monson, Sultana, and Yettem in Tulare. Sultana has only one operational well due to two others being shut down due to DPBP contamination. Yettem currently has only one operational well that is in compliance with the nitrate objective. Water quality sampling in the community of Raisin City in Fresno County in 2000 revealed contamination of individual wells with gross alpha radiation, uranium, DBCP, nitrates, and coliform bacteria. Facility improvement needs are currently being investigated.

Many of the same communities are also facing costs to maintain, upgrade treatment, or expand wastewater treatment facilities and comply with RWQCB requirements.

It is generally acknowledged that the types of DAC projects that require financial and technical support are independent stand alone projects that do not fit well into the regional planning context of the IRWMP, and many of the needed projects would be hard pressed to document regional benefits or demonstrate integration of water management strategies. The Kings IGSM seeks to better define and quantify the needs, and define ways for working with the DACs to obtain funding, provide safe drinking water, and treat wastewater to comply with standards and protect public health and safety. The Water Forum will work to support the DACs; match

Table 8-3. Water Related Issues Identified for the Disadvantaged Communities within the IRWMP Area

Disadvantaged Communities	Water			Wastewater			
	Issues	Solutions	Estimated Cost	Issues	Solutions	Capacity (gpd)	Estimated Cost
Biola				near capacity	Build additional aerated lagoon	200,000	TBD
Cutler	DBCP, Nitrates, Water capacity	Regional surface water treatment as Proposed by AID.	included in Orosi estimate below	Near capacity for Inflow & Infiltration	replace/reline collection system to prevent infiltration	Near Maximum Capacity	TBD
Delft Colony	Iron in well #1	TBD	TBD				
Del Rey				Capacity committed to development	expand capacity	TBD	TBD
Easton	Private wells with DBCP/ nitrate/ bacteria. School on bottled water.	New community water system, but lacks community support.	TBD				
East Orosi	Both wells at times exceed nitrate MCL	Drill new wells. Investigate connection to Cutler-Orosi Program of AID	TBD	near capacity	Build additional capacity at Cutler-Orosi plant	TBD	TBD
Laton						65% of capacity	
London	Inadequate supply, storage, distribution	New well, storage, replace and loop undersized pipelines	\$2,500,000	Aeration system inadequate; low DO	Replace aeration system at treatment plant	300,000	\$250,000
Monson	Contaminated private wells	Determine community and County support. Organize and build new	TBD				

Disadvantaged Communities	Water			Wastewater			
	Issues	Solutions	Estimated Cost	Issues	Solutions	Capacity (gpd)	Estimated Cost
		community water system.					
Orosi	Nitrates, Water capacity	Regional surface water treatment as Proposed by AID.	\$17,000,000	At capacity for Inflow & Infiltration	replace/reline collection system to prevent infiltration	Currently at Maximum Capacity	\$2,000,000
Raisin City	New system needs 2nd well and storage	Drill 2nd well and/or install storage tank	TBD	Unsewered			
Seville	Old leaky pipelines, Shallow well (125'), nitrate just below MCL	Reorganize ownership, purchase and replace water system	TBD	At capacity; sewer lines too shallow	Build additional capacity at Cutler-Orosi plant/	Currently at Maximum Capacity	TBD
Sultana	1 active well, DBCP over MCL for backup well	Need Feasibility Study to determine best options	TBD	Near capacity	Build additional capacity at Cutler-Orosi plant	80,000	TBD
Traver				Currently at Maximum Capacity	Build additional capacity	TBD	TBD
Yettem	Well #1 exceeds nitrate MCL and is blended in 150,000gal tank with well #2 water.	TBD	TBD	Currently at Maximum Capacity	Build additional capacity at Cutler-Orosi plant	Currently at Maximum Capacity	TBD

the needs with available funding, and integrate DACs into the plan. Many of the large regional projects proposed will benefit DACs very directly (e.g.; AID SWTP for Culter and Orosi) and somewhat less directly in terms of ensuring a long term water supply to the Region. This being said, the DACs needs are very community and project specific, additional work is needed, and the Kings IRWMP will not completely resolve the DAC problems. The Water Forum will continue to integrate DAC needs into the Kings IRWMP, help set priorities, find funding, and coordinate these needs with other regional efforts like the San Joaquin Valley Partnership and Blueprint.

8.4 FLOODPLAIN MANAGEMENT

8.4.1 PROJECT FM1 STORM WATER INTERCEPTERS AT 10 CITY OUTFALLS

Project Sponsor: City of Reedley

Project Cost: \$945,000

Project Dates: unknown

Project Overview

The goal of this project is to treat stormwater runoff to minimize the impact to the Kings River. The project will furnish and install the Vortech Stormwater Treatment System, Model No. 11000 or its equal, at all City stormwater outfalls draining directly to the Kings River.

Purpose/Need/Problem

The purpose of installing the vortech stormwater treatment systems would be to provide a higher quality effluent from storm water runoff into the river by reducing pollutants such as TSS, nitrogen from nitrates, BOD, phosphates, trash, oils, and silts.

Benefits

Quantitative: The full amount of treated water will depend on the magnitude of the storms. Each unit can treat roughly 17.5 cfs or 7,800 gallons per minute of runoff and remove approximately 87% of TSS, nitrogen from nitrates, phosphates, oils and other constituents.

Impacts of the No-Project Conditions: Continued high loadings in the river that could potentially reduce the ecological and wildlife habitat.

Relationship to Existing Plans

General Plan: This project is consistent with the City of Reedley General Plan under Section 215 Public and Institutional Use; 215-02 Objectives; 215-03 Policies; and 215-04 Sewage Disposal.

Disadvantaged Community: No

8.5 ECOSYSTEM AND RECREATION

8.5.1 PROJECT EM1 KINGS RIVER PARK

Project Sponsor: Kings River Conservancy

Project Cost: \$100,000 to \$250,000 **Project Dates:** 2008

Project Overview

This project will improve a 7.39-acre parcel owned by the County of Fresno to provide access to the Kings River for recreation. This project includes a \$50,000 State Boating and Waterways grant already awarded for raft/kayak/canoe launching and fishing access. The goal is to cooperate with other stakeholders in a conjunctive use project and increase opportunity for funding and implementation.

8.6 LINKAGES AND INTERDEPENDENCE BETWEEN PROJECTS

The priority projects will lead the way to meet the goals and objects of the IRWMP. These projects set the foundation that will make regional and interregional projects possible. The projects will aid in establishing a secure water supply for future multiple participant projects. The projects are interdependent with one another in that they share common goals of addressing the overdraft of the groundwater basin by enhancing groundwater recharge, banking and cooperative exchanges; also build upon existing projects and programs that support future project development and cooperative programs with multiple stakeholders.

The foundation of recharge and banking facilities programs are the keystone to the successful integration and interdependence of other priority projects. The groundwater banking facilities proposed by AID will ensure an adequate and consistent water supply to support a secondary phase project of constructing a surface water treatment plant to serve four disadvantaged communities in AID. The conjunctive use banking facility proposed by FID will continue to

support existing cooperative agreements with the city of Clovis and extend the capacity of its banking program to potentially include interregional participants. The collective recharge strategies of the proposed projects proposed by CID will produce quantifiable results to the groundwater storage that will meet the need and support future cooperative project development with the local cities.

All IRWMP projects discussed above contribute to meeting the goals and objectives of the IRWMP by applying multiple water management strategies. The collective and cooperative planning efforts initiated by the priority projects are poised to decrease groundwater overdraft and increase opportunities for long term regional projects.

8.7 ECONOMIC AND TECHNICAL FEASIBILITY OF PROJECTS

As part of the project prioritization criteria, the selected projects underwent a “ready to proceed” review, which include the determination of the project being economically and technically feasible. The priority projects selected have technical studies and research supporting the project concepts, goals, and expected outcomes. The project sponsors are experienced in implementation of similar projects with successful outcomes. These previous projects and technical studies are used to evaluate the likelihood of successful implementation but also to show awareness of the economic and technical challenges of implementing the priority projects. A list of some of the studies conducted by project sponsors is provided below:

- Groundwater Recharge Investigation Phase I Final Report 1997;
- Preliminary Report & Investigation of Soil Conditions and Assessment of Recharge Potential North Groundwater Recharge Site Expansion 1995;
- Apex Ranch Hydrogeologic and Water Supply Investigation November 2001;
- Apex Ranch Groundwater Storage Project;
- Apex Ranch Conjunctive use project Annual operation reports 2004, 2005, 2006;
- Joint Conjunctive Use Project Feasibility Study (Pending);
- Engineer's Report, Summers Engineering, April 2007;
- Regional Conjunctive Use Feasibility Study, WRIME 2006;
- Technical Memorandum on Flood Water Availability from the Kings River, WRIME 2007;
- CID Groundwater Impact Analysis, WRIME 2007; and
- Kings Basin Integrated Groundwater Surface Water Model Calibration Report, WRIME, 2007.

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9.1 SECTION INTRODUCTION

The IRWMP Planning Framework aggregated the DWR water management strategies into five project categories (Chapter 6). Each water management strategy was then evaluated by the Forum for how would address the identified regional issues and help to meet the IRWMP goals and objectives (Chapter 7). The review of the water management strategies, along with the knowledge of the baseline conditions, helped the Water Forum to identify the foundational actions. The foundational actions are the existing programs, which provide a solid basis for building the Upper Kings Basin IRWMP, and integrating the individual projects that have been ranked and prioritized (Chapter 8).

This chapter presents the results of the project ranking and evaluation and defines the Upper Kings Regional Conjunctive Use Program (RCUP). RCUP provides a strategy to implement the water management actions into a coherent whole. Water management actions include programs, projects, and policies that can be integrated into the IRWMP implementation plan.

To achieve the desired level of regional integration, a concerted and ongoing effort, founded on the advances made to date, will be needed to develop additional working relationships and trust among participating entities and to foster confidence that the Upper Kings Basin IRWMP will serve the interests of these entities. In addition, the participating entities must continue to recognize and support the concept that regional integration will further their ability to manage their operations and collective resources, will increase their water supply reliability, and will provide a framework to improve water management across the basin. More importantly, all participating entities should be assured that by participating in a regional integrated water management program, they will not lose opportunities to control their own futures, nor will they lose their autonomy.

Regional integration does not seek to diminish the individual purveyor's decision-making power or a local government's power to exercise its rights, but it would enhance the local entities' collective power and ability to manage their resources. The local entities would also participate in addressing water management issues on a much larger scale. This vision of integration and regionalization would:

- Provide opportunities to formulate broad water management objectives at the regional and statewide levels.

- Encourage regional responsibility for the management of the region’s resources.
- Pool regional resources, political wills, and local agencies’ talents and expertise to develop creative solutions.
- Create a powerful voice for protecting and enhancing regional interests.
- Promote collaboration and cooperation for regional and subbasin-level initiatives.

It is important to note that regional planning in the Kings Region is not and, more likely, will not be a top-down plan; rather, it is a grass-roots, bottom-up program composed of many projects, plans, and partnerships with common objectives and a long-term vision. As time passes, the integration of these partnerships and plans will further grow and mature.

9.2 FOUNDATIONAL ACTIONS

The foundation of the Upper Kings Basin IRWMP is existing programs and management actions of the stakeholders in the Water Forum. These “Foundational Actions” were identified during the evaluation of baseline conditions and through discussion with the Water Forum. Table 9-1 lists the Foundational Actions, connects them to the project categories in the Upper Kings Basin IRWMP, provides a brief description, and describes the geographic area covered.

9.3 RCUP INTEGRATION STRATEGY AND APPROACH

RCUP integrates engineering and structural projects, with non- structural programmatic actions. The non-structural programmatic actions can be related to existing programs that can be enhanced and better integrated (e.g. water conservation; data collection) or to new programs identified by the Water Forum for development (e.g.; shared data management system). The RCUP strategy and approach is to integrating existing or proposed programs and projects based on:

- The Planning Framework;
- Project timing and life cycle;
- Geographic scale;
- Relationship to Existing Plans; and
- Institutional and Political Integration.

Table 9-1. Foundational Actions in the Kings IRWMP Region

ID	Title	Project Categories	Description	Geographic Area
FA1	AID, FID, CID Groundwater Recharge and Conjunctive Use Program	CU, WQ	The three water districts currently operate existing facilities for conjunctive use and groundwater recharge. KRCD helps with grant writing and inter- regional coordination. This includes working with the North Fork Group, Lower Kings Stakeholders, and stakeholders in the Tulare Basin and within all six KRCD divisions.	KRCD
FA2	Urban Water Management Plans	CU, WQ, LU	UWMP prepared for each city w/ 3000 connections. These are used to forecast demand and supply, review investments and implementation of BMPs, and evaluate the potential for wastewater recycling.	All incorporated cities
FA3	Groundwater Management Plans	CU	CID, AID, and FID maintain and update GWMPs for their area. KRCD is supporting implementation of Lower Kings GWMP that includes RCWD area.	IRWMP Region and Lower Kings Basin
FA4	Agricultural Water Management Plans Water Quality Management	CU	AID, CID and FID AWMPs. Support for Efficient Water Management Practices; Participation in the Agricultural Water Management Council	IRWMP Region
FA5	Kings River Fishery Management Program	EM, CU	Joint program of KRCD, KRWA in cooperation with DFG and local fishery groups to manage flows and restore habitat in the Kings River below Pine Flat Dam.	IRWMP Region
FA6	KRCD Water Conservation Program	CU	KRCD provides irrigation system and pump efficiency evaluations to growers to save both water and power; coordinates workshops; and produces the Irrigation News and AgLine	KRCD

Integrated Strategies, Regional Priorities, and Project Implementation Plan

			Information Service to allow growers to access CIMIS.	
FA7	Selma Kingsburg Fowler County Sanitation District Master Plan	CU, WQ, LU	SKFSD is updating their capital facilities plan for collection and treatment of wastewater from member cities and counties. Work included a reclamation and recycle water feasibility study.	Selma, Kingsburg, Fowler
FA8	City of Fresno Water Master Plan	CU, WQ, LU	City of Fresno is currently updating the City's water and wastewater master plan, UWMP, and capital facilities plan.	City of Fresno
FA9	FID, City of Fresno, City of Clovis wastewater reuse	CU, WQ	Indirect use of recycled wastewater for agricultural purposes; exchange of Kings River water for city use; mound control for WWTP.	FID
FA10	The Kings Ribbon of Gems, A Vision for the Lower Kings River	EM, CU	King River Conservancy program to continue to improve habitat, open space and public access to the Kings River.	Kings River corridor
FA11	San Joaquin River Parkway Plan	EM, WQ, FPM	Plan defines how habitat, open space, public trails, and resources are to be acquired and managed. Produced and coordinated by the San Joaquin River Parkway and Conservation Trust.	San Joaquin River corridor
FA12	Fresno Metropolitan Flood Control District Service Plan	FM, CU, EM, WQ	FMFCD integrated plan for flood and stormwater control, recharge, water quality, and habitat management. Provides guidance on capital facility needs.	FID, Cities of Fresno and Clovis, small watersheds draining into IRWMP areas.
FA13	Southern San Joaquin Valley Water Quality Coalition, Water Quality Management and Monitoring	WQ, EM	KRWA and KRCD are participating with others in the SSJWQC to reduce agricultural runoff into waters of the state, manage water quality, and monitor regional conditions.	Kings River and Tulare Lake Basins
FA14	Water Resources Data Base Management Enhancement Program	CU, EM, FM, WQ	KRCD initiated a systems evaluation to begin development of an integrated groundwater and surface water database management system that would support shared access to key water resources data sets.	IRWMP Region

Integrated Strategies, Regional Priorities, and Project Implementation Plan

FA15	Groundwater Levels Monitoring Program	CU, WQ	KRCD, FID, CID, and AID water level monitoring and reporting program. Cities and drinking water purveyors also collect water level data.	IRWMP Region
FA16	Kings Basin Integrated Groundwater Surface Water Model (IGSM)	CU, WQ	Continue to support, apply and develop the Kings IGSM	IRWMP Region
FA 17	Kings River Channel and Levee Maintenance	FPM, EM	KRCD is the local agency responsible for channel improvements and maintenance of the levees on the Kings River, and coordination of all agencies during flood operations and response.	KRCD
FA18	AID, FID, CID Groundwater Recharge and Conjunctive Use Program	CU, WQ	The three water districts currently operate existing facilities for conjunctive use and groundwater recharge. KRCD helps with grant writing and inter- regional coordination. This includes working with the North Fork Group, Lower Kings Stakeholders, and stakeholders in the Tulare Basin and within all six KRCD divisions.	KRCD
FA19	KRCD Groundwater Reporting Program	GU, WQ	KRCD produces an annual report of groundwater conditions and trends	KRCD
FA20	KRCD Power Program	CU, FM	KRCD operates the Pine Flat Hydroelectric Facility, Malage Peaking Power Plan; is working to permit the Community Power Plant; and is coordinating the Community Choice Power program.	KRCD
21	KRCD Weather Modification Program	CU, EM	KRCD coordinates the regional weather modification program which results in additional precipitation into the Kings Watershed and provides water supply, water quality, and fishery flow benefits.	KRCD, Kings River Watershed

9.3.1 THE PLANNING FRAMEWORK - WATER MANAGEMENT STRATEGIES, PROJECT CATEGORIES, AND STATE PREFERENCES

In developing the Planning Framework, the Forum sought to define how to integrate projects and programs into the five project categories to best meet the IRWMP goals and the State's preferences. After developing the Planning Framework, reviewing baseline conditions, and evaluating water management strategies, the Water Forum decided that Conjunctive Use and Groundwater Banking would be the unifying theme of the Upper Kings Basin IRWMP. Conjunctive Use and Groundwater Banking was selected as the unifying theme because overdraft is the highest priority problem with the greatest potential to create conflicts amongst water users; to impact current economic viability of agriculture; and to influence the ability for municipal areas to grow in accordance with adopted land use plans and State laws which require proof of a long term, sustainable water supply.

9.3.2 PROJECT TIMING AND LIFE CYCLE

- Projects have been integrated and prioritized based on readiness to proceed and where an individual project was in the planning process.

The project review and ranking included assessing where a project was in the planning process or the project lifecycle (Figure 9-1) to determine it's readiness to proceed.

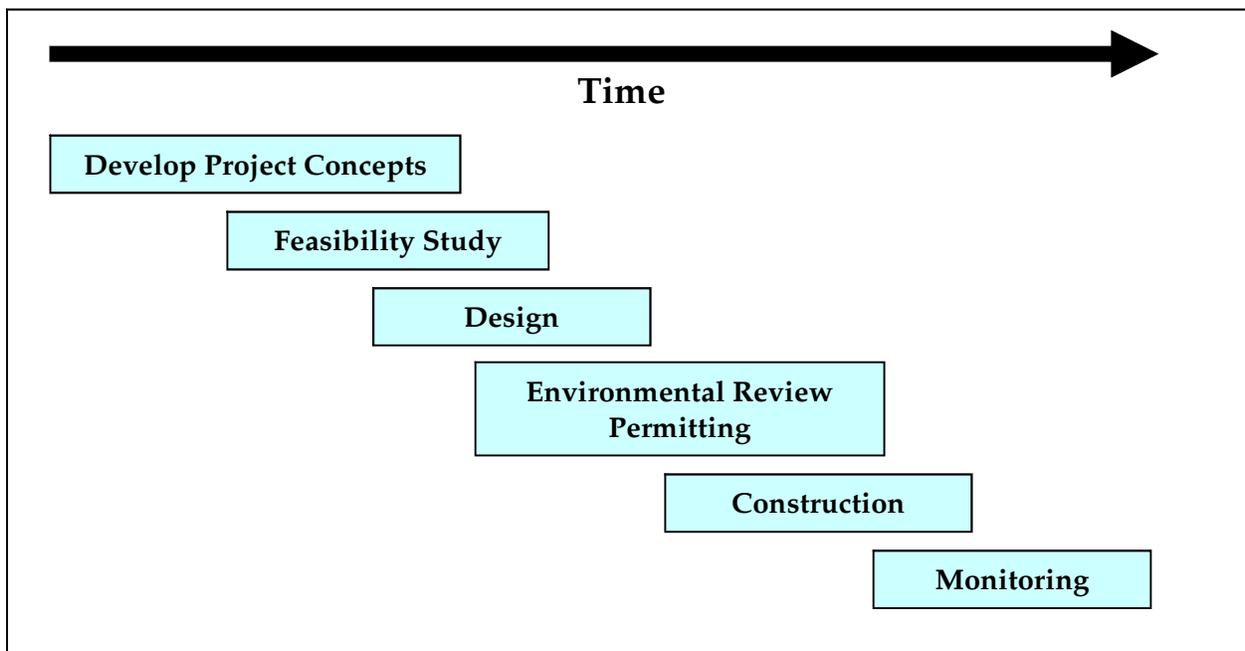


Figure 9-1. Project Planning Process and Lifecycle

The Upper Kings Basin IRWMP will be implanted in multiple Phases (Figure 9-2) that include:

- Phase 1 - Immediate priorities (Proposition 50 and 84 Implementation Grant application in 2007); and Near-Term priorities (1-3 years);
- Phase 2 - Mid-Term priorities (3-6 years); and
- Phase 3 - Long-Term priorities (greater than six years).

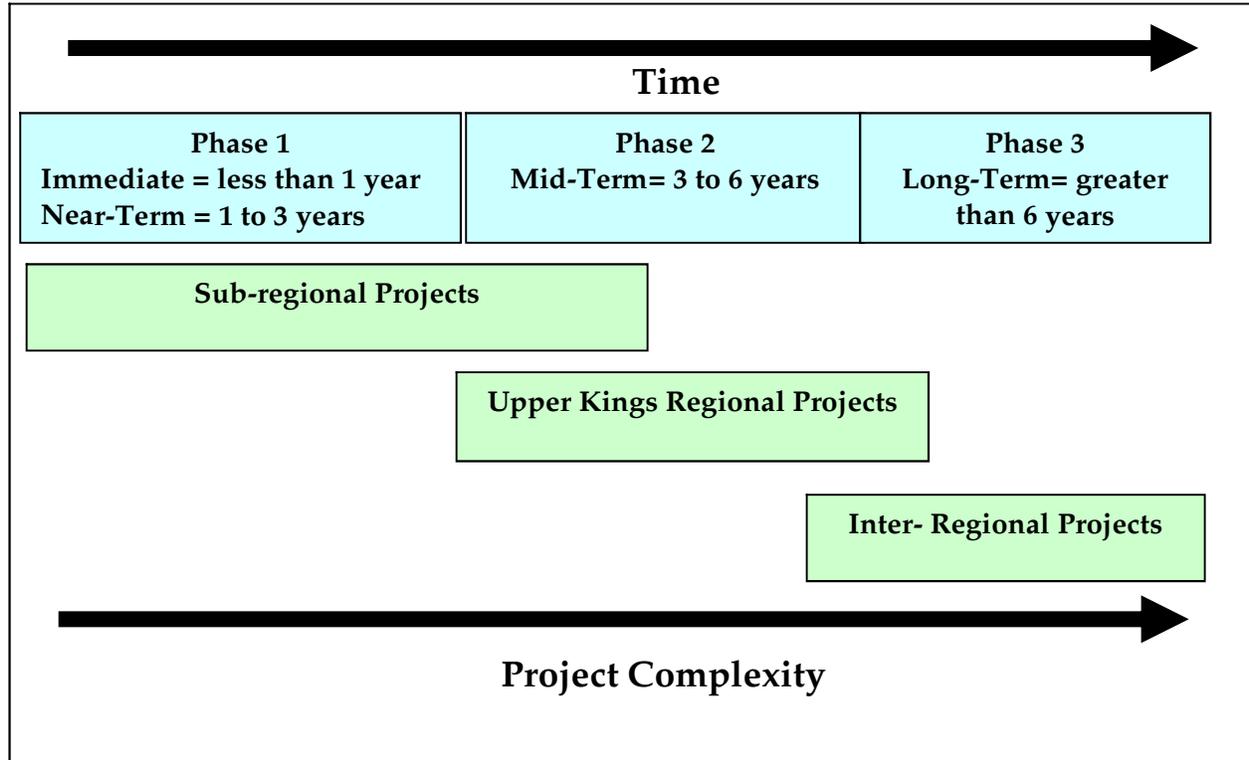


Figure 9-2. Geographic Scale, Timing, Project Complexity

No stakeholder sponsored projects have been eliminated from the Upper Kings Basin IRWMP. Instead, the application of the Water Forum’s ranking criteria were used to evaluate readiness to proceed; identify the top candidates for state funding; and help the Forum determine which projects require additional financial and technical support to demonstrate their scientific, technical, and economic merit. If a project required further work, it was moved to later Phases of the implementation plan.

9.3.3 RESPONSES TO IMPLEMENTATION OF PROJECTS, REGIONAL CHANGES AND PROJECT SEQUENCING

Decision-making will be the responsibility of the Steering Committee. Due to the diversity of interested parties comprising the Steering Committee, a majority vote of Steering Committee would address regional issues. It will be incumbent upon the Steering Committee to assess the

implementation schedule of projects to determine the level of readiness to proceed and prioritize accordingly. If projects cannot meet projected implementation schedule, as represented by applicant, the Steering Committee should be informed, who then can determine the appropriate response if one is required.

9.3.4 GEOGRAPHIC SCALE

The regional conjunctive use project concepts will be developed and integrated at three geographic scales:

- Sub- Regional – direct and In-Lieu recharge projects within AID, CID, and FID subregions.
- Regional- larger projects cosponsored by multiple Water Forum participants and beneficiaries.
- Inter- Regional- large scale groundwater banking projects that include imported water and third parties outside of the IRWMP Region

The geographic extent of a project is also related to the time scale as shown in Figure 9-2. The more complex regional and inter- regional projects require more time to negotiate agreements, define funding, or overcome identified constraints, and these are moved to the later phases of implementation.

9.3.5 INTEGRATION WITH EXISTING PLANS

The water and land use agencies in the IRWMP Region will continue to employ coordinated approaches to the planning of multi-beneficiary projects that will achieve the parties' common objectives. The RCUP program seeks to integrate elements of the existing Groundwater Management Plans (GWMPs), capital facility plans, AWMPs, UWMPs, and City and County general plans (WRIME, 2007a). The general plan review specifically evaluated how each general plan recognizes regional water resources issues; incorporated water management strategies; and could be supported by the Upper Kings Basin IRWMP. The review identified areas where the IRWMP would help the land use agencies meet their goals and objectives, but also identified areas where there were gaps between general plans and the IRWMP goals and objectives. These gaps include areas where the general plans did not recognize regional water issues or did not contain water management strategies being considered for inclusion in the Upper Kings Basin IRWMP. Where possible, the Upper Kings Basin IRWMP will help fill the gaps and meet local general plan goals and objectives. The information in the Upper Kings Basin IRWMP, including the analysis results of the Kings IGSM, will also support updating the other existing plans (Figure 9-3).

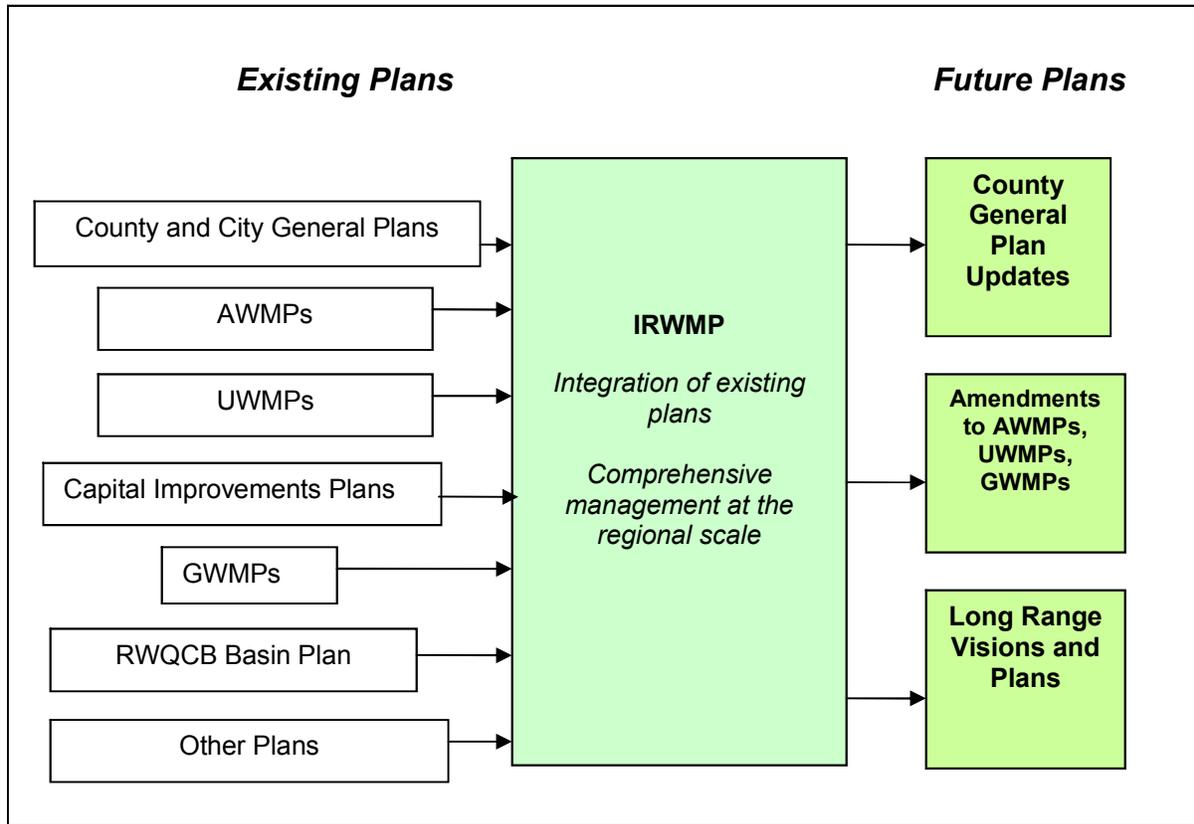


Figure 9-3. Upper Kings Basin IRWMP Links With Existing Plans

9.3.6 INSTITUTIONAL AND POLITICAL INTEGRATION

This level of integration is based on formation of institutional and political alliances of water suppliers and governmental entities to formulate, develop, finance, and implement integrated programs for the common benefit of the citizens in the Kings Region. In addition, continuing existing political alliances and building new ones with entities outside the IRWMP Region will strengthen working relationships and foster long-term, viable water management solutions.

9.4 RCUP DESCRIPTION AND BASIN MANAGEMENT OBJECTIVES

The RCUP will:

- Reduce overdraft through both Direct Recharge and In-Lieu Recharge projects elements;
- Develop multiple sources of water and expand the Kings water supply portfolio;
- Use of existing and improved conveyance;
- Expand the recharge areas; and

- Include a range of new facilities to provide operational flexibility.

Direct Recharge Projects include expansion of existing recharge ponds, acquisition of land and construction of new ponds, injection wells, facilities to spread water, new conveyance or improvements to existing conveyance facilities, wells to recover stored groundwater, and other necessary infrastructure.

In-Lieu Recharge Projects include new surface water treatment plants or expansion existing facilities to provide treated drinking water for urban uses, and to replace current groundwater pumping; and/or improvements of existing wastewater treatment facilities or construction of new wastewater treatment plants to allow for reclamation and reuse of highly treated wastewater for municipal and agricultural uses. In-Lieu recharge could also include providing surface water supplies or reclaimed wastewater to areas that currently rely on groundwater.

9.4.1 RCUP BASIN MANAGEMENT OBJECTIVES AND PERFORMANCE MEASURES

Basin Management Objectives (BMOs) are time specific, quantifiable performance measures that will be used to verify progress in meeting the IRWMP goals and the more generalized objectives presented in Chapter 5. The State advocates the concept of locally established BMOs in the groundwater management plan and this concept has been carried over for purposes of the Upper Kings Basin IRWMP. BMOs provide a basis for tracking the IRWMP implementation progress and program performance. BMOs are also helpful groundwater management in areas such as the Kings Basin, which have different groundwater users and/or overlapping jurisdictional agencies. Coupled with dedicated monitoring and reporting of the groundwater basin conditions, the BMOs will be used by the Water Forum to gauge the progress in implementing projects to meet the IRWMP goals and objectives, and determine whether the anticipated benefits are being achieved. In the future, the BMOs may be used by the Water Forum to “trigger” management actions or respond to changing circumstances and new knowledge.

Project Development BMOs

Project development BMOs are established for the three major phases of project development—immediate/near term, mid term, and long term as defined below. The availability of funding could alter the ability to meet BMOs and/or result in moving projects to later phases. Measurable BMOs for each phase are described below and summarized in Table 9-2. Project related BMOs and performance measures include:

- Overdraft reduction (acre feet);
- Pond capacity developed (acres);

Table 9-2. Management Objectives for Project Development or Capacity Basin

(Values reported as Totals at end of Implementation Phase)

Item	Phase 1			Phase 2	Phase 3
	Immediate Prop 50/84 2007 Application	Near Term 1-3 years	Mid Term 3-6 years	Long Term Greater than 6 years	
Overdraft Reduction	5,000 acre feet	10,000 acre feet	20,000 acre feet	50,000 acre feet	
Direct Recharge Elements					
Total New Pond Area	100 to 200 acres	200- 400 acres	800 acres	> 1,200	
Instantaneous Capacity	100 to 150 cfs	150- 300 cfs	400 cfs	500 cfs	
Project Geographic Focus	Sub- regional & Regional	Sub-regional & Regional	Regional, Inter-Regional	Inter- Regional	
Owner/Operator	AID, FID, CID sponsoring agency	AID, FID, CID, sponsoring agency or JPA	AID, FID, CID, sponsoring agency or JPA	AID, FID, CID, sponsoring agency or JPA	
Source of Surface Water for Recharge	Kings, San Joaquin	Kings, San Joaquin	Kings, San Joaquin Imported/ Banked	Imported/ Banked	
Recovery of Stored Water	Pumped by overlying users in AID, FID, CID	Pumped by overlying users in AID, FID, CID, and expanded to include RCWD.	Pumped by overlying users in AID, FID, CID, RCWD. Possibly include North Fork Group, KRWA members, and Lower Kings Overlying Interests	Same as Mid-Term but including external third parties outside of Kings Area	
In Lieu Recharge Elements					
Surface Water Treatment	2.0 Mgd 2200 afy	5-15 Mgd 5500 – 16750 afy	30 Mgd 33,500 afy	60 Mgd 67,000 afy	
Wastewater Recycling	5000 afy	10,000 afy	20,000 afy	>25,000	

- Instantaneous diversion capacity developed (cubic feet per second);
- Conveyance capacity improvements (linear feet of improvements; flow improvements in cubic feet per second);
- Source of Surface Water used for recharge (acre feet by source);
- Recovery of stored water (acre- feet);
- Surface water treatment capacity developed (Mgd, acre feet per year); and
- Wastewater Reclamation (Mgd, acre feet per year).

The use of BMOs in the IRWMP is intended to meet the state requirements for GWMPs (WRIME, 2006c), and the Upper Kings Basin IRWMP is a mechanism to update and integrate the BMO within the Kings Region. Eligibility for Proposition 50 program funding includes requirements for GWMPs (DWR, 2004) (CWC § 10753.7). The Upper Kings Basin IRWMP incorporates by reference and integrates the four GWMPs for AID, FID, CID, and RCWD portion of the Lower Kings GWMPs.

Overdraft Reduction, Water Level Stabilization BMOs

Chapter 4 documented the historical and potential future overdraft problems in the IRWMP Region. The Upper Kings Basin IRWMP, through the RCUP, will reduce overdraft as shown conceptually in Figure 9-4. The current sustainable supplies are from both groundwater and surface water sources. The figure shows that current sustainable supplies are less than the potential future 2030 demand. The difference between the sustainable supply and demand is the overdraft in the groundwater basin. Demand will exceed the sustainable supplies into the future, resulting in continued overdraft of the groundwater basin, but the overdraft problem will be reduced overtime through implementation of the RCUP projects and increases in the sustainable supplies.

Table 9-2 listed the project development and overdraft reduction BMOs. The management program will be adapted as the effectiveness of the projects is evaluated using the specific performance measures defined for the IRWMP.

As RCUP projects are implemented, the decline in groundwater levels will be slowed as overdraft is reduced. The time when levels stabilize will vary throughout the Kings Basin depending on the projects that are to be developed and operated. This is shown conceptually using the projected hydrographs in the area of the RCWD (Figure 9-5). The Lower Kings Basin GWMP established specific BMOs for the RCWD area that are integrated into the IRWMP. These BMOs recognize that the empty storage space in the RCWD area is an asset that could be actively managed for the benefit of the overlaying land owners in the RCWD and the entire Kings Basin.

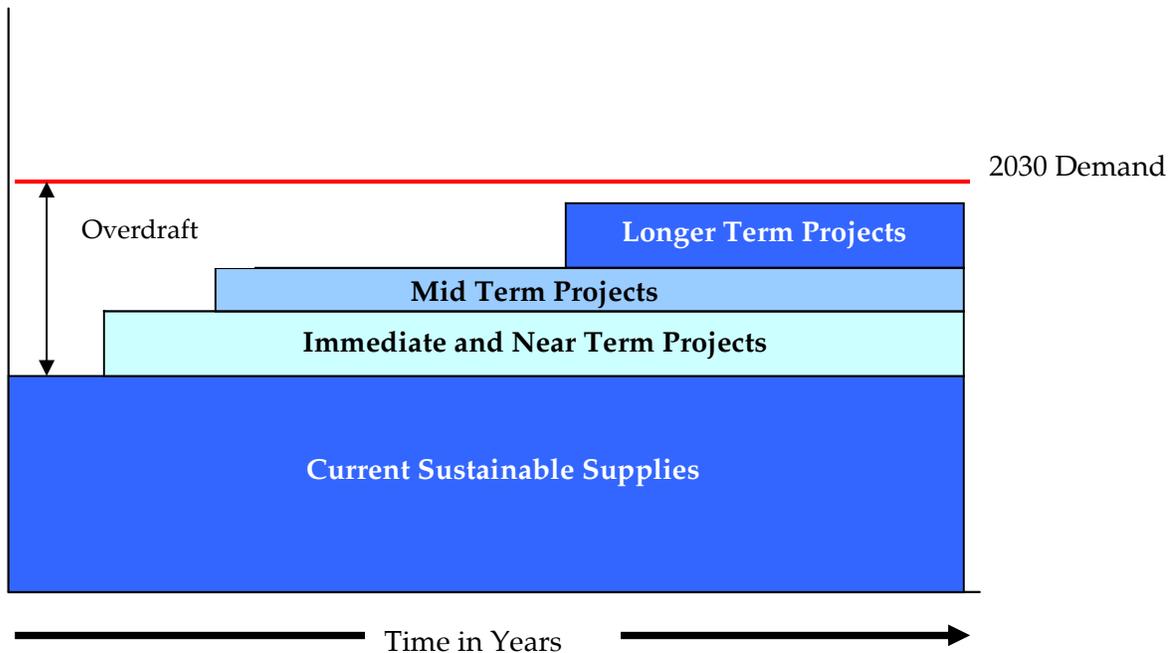
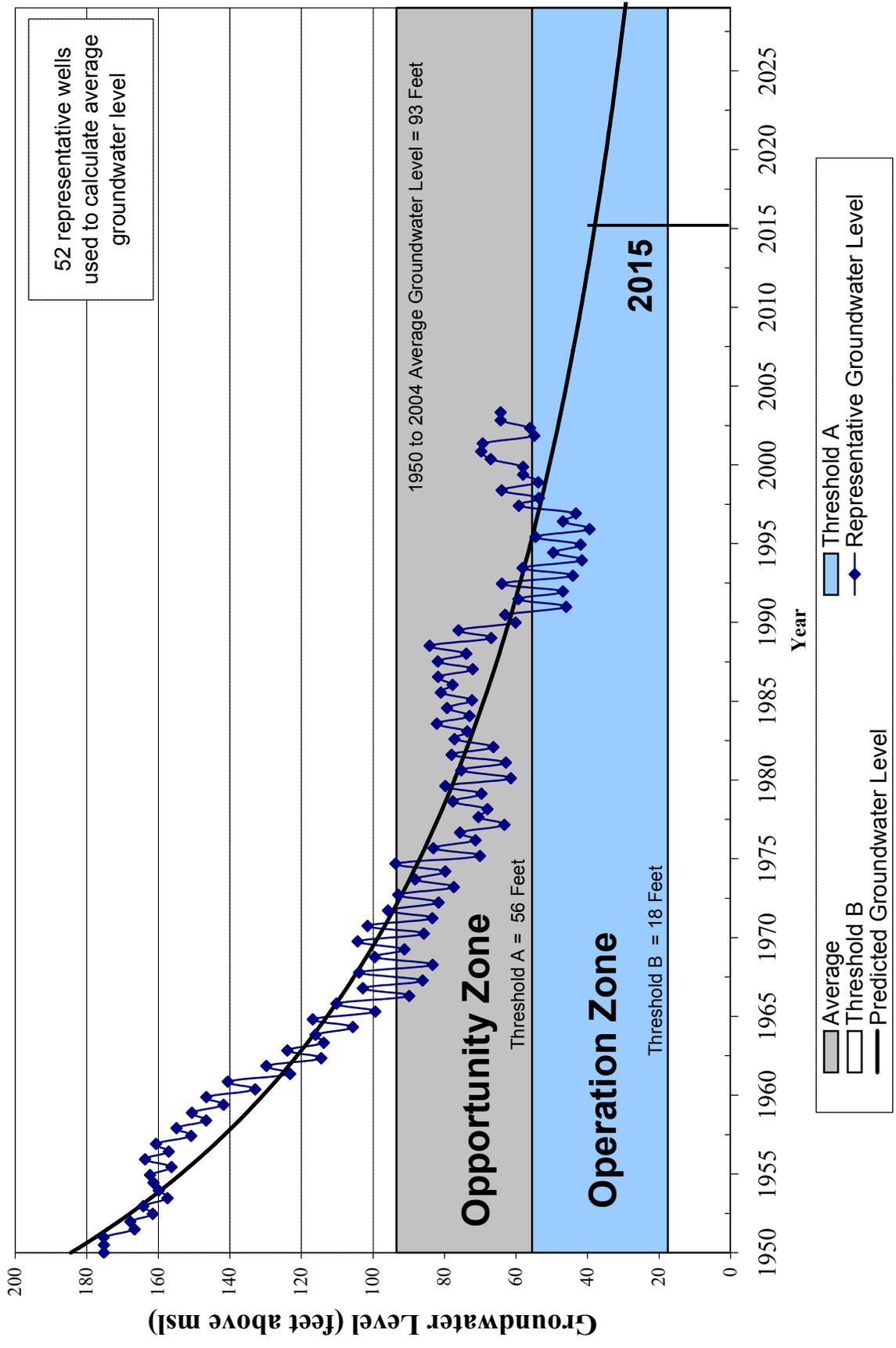


Figure 9-4. Basin Management Objectives and Project Phasing

The concept is to use water levels to define both an “operations zone” and “opportunity zone”. The objectives to reduce overdraft by 2015 and stabilize groundwater levels in an “operations” zone; and over the Long-Term, use the defined “opportunity zone” for purposes of groundwater banking. As previously noted, the purpose of providing groundwater banking services would be to create a new water supply for the Kings Basin by allowing others outside the area to bring in water in wet years for storage in the water in the available groundwater storage, then allowing extraction, delivery, or exchange in dry years. Users of the groundwater bank would be required to dedicate a portion of the stored water to overdraft reduction in the Kings Region. This type of groundwater banking is being successfully practiced in a number of areas of the San Joaquin and Tulare Basin.

Specific water level stabilization BMOs have not been established for other areas in the Kings Region. This is desirable and would help improve overall basin accounting, define problems, and document project benefits. Performance measures will be used to track physical basin conditions and progress in implementing projects and realizing the anticipated benefits. Performance of projects established through out the region will tracked through monitoring and measuring both site specific and regional trends including:

- Project specific groundwater levels (feet above mean sea level, depth to water)
- Regional groundwater levels (feet above mean sea level, depth to water)
- Regional water contours (feet above mean sea level, depth to water)



June 2007

FIGURE 9-5

Upper Kings Basin IRWMP

Groundwater Trends and BMOS for the RCWD and Lower Kings Basin Water Management Area A



- Pine Flat Releases (Regular, flood, fish flow in cubic feet per second; acre feet)

9.4.2 WATER SUPPLY SOURCES

Overdraft will be reduced by increasing the size and diversity of the Upper Kings Region water supply portfolio. In order of priority, the sources to be further developed and integrated into the RCUP include:

- Kings River flood releases and capture of flows currently lost to the Upper Kings Region past Peoples Weir.
- AID, FID, CID Kings River water rights.
- Central Valley Project Water:
 - San Joaquin 215 flood water;
 - City of Fresno CVP Class 1 water; and
 - FID CVP Class 2 water.
- Kings River water contracted by FID to the Cities of Fresno and Clovis.
- Small local watershed runoff:
 - Fresno Streams Group (Dry, Dog, Fancher, Redbank); and
 - AID Area local drainages (Wahtoke, Wooten, Sand, Long and Story, Cottonwood).
- Water purchased and imported by local agencies from outside sources.
- Other water imported, recharged and banked in the Kings Basin for external third parties.
- Reclaimed wastewater sources:
 - Fresno Regional WWTP;
 - Selma Kingsburg Fowler County Services District (SKF) WWTP; and
 - Other WWTP plants in the Region.

9.4.3 CONVEYANCE FACILITIES

Meeting BMOs will require some conveyance improvements. The amount of conveyance improved will serve as a performance measure. Water from the sources identified above will be conveyed through existing, improved or new infrastructure to a point of use or recharge. Immediate and near term conjunctive use projects priorities will rely on existing AID, FID, CID conveyance facilities, minor improvement to existing facilities, and limited new facilities to transport the water from the point of diversion at the Kings River to the recharge or to proposed in lieu facilities for direct recharge projects. It is assumed that only minor improvements to

existing conveyance are needed for immediate- and near term projects. Agreements for wheeling and sharing of facilities are to be negotiated between the irrigation Districts and parties seeking to bank water in their area. Major capacity improvements or new large scale conveyance facilities will need to be further evaluated where these are needed to expand Direct and In-Lieu Recharge Operations for mid- and Long-Term projects. Regional, shared facilities for conveyance of imported water into or out of the area would be deferred for further study and as part of a long term project planning.

9.4.4 RECHARGE AREAS AND LAND ACQUISITION

BMOs for the size of direct recharge facilities have been established based on target flood flow rates, a percolation rates observed at other facilities in the Kings Region, and the Regional Conjunctive Use Feasibility Study (WRIME, 2006). Acquisition or access to land, either through purchase or easement, is needed for direct recharge projects and to construct percolation ponds. Control or ownership of land is required to construct percolation ponds, injection wells, surface water treatment facilities, wastewater treatment facilities, or new conveyance. Land acquisition costs are a primary candidate for grant funding to help capitalize direct recharge projects. AID, CID, FID, and RCWD will be responsible for working with stakeholders in their jurisdictions to develop necessary local funding and to acquire lands for development of additional direct recharge facilities. Relatively large tracks of land are needed for large scale percolation ponds and related facilities. Land will be acquired from willing sellers; though eminent domain could be used if required. Easements and rights of way will be acquired were needed

9.5 PROJECT DEVELOPMENT AND IMPLEMENTATION

This section describes the project priorities and programmatic actions to implement the projects that were described and prioritized in Chapter 8.

9.5.1 PHASE 1 - PROJECTS AND ACTIONS

Phase 1 is the immediate and near term projects and programmatic actions needed to implement the RCUP priorities and Upper Kings Basin IRWMP.

Projects

The RCUP project facilities to be located in the Upper Kings Region will be operated by Upper Kings partners to store and salvage Kings River floodwater and CVP sources (Class 1, 2, and 215). In-Lieu projects are established to meet both water quality and water supply reliability goals and objectives by providing alternative sources of surface or reclaimed water to replace

groundwater so that groundwater remains in storage for use in dry years. Phase 1 includes both direct and In-Lieu recharge projects. In order of project priority, the Phase 1 projects include:

- CU 1. Flood Control Basin (Basin BT) Pipeline
- CU 2. Alta Irrigation District Eastside Water Quality and Urban Reliability Project
- CU 3. Consolidated Irrigation District Groundwater Mitigation Banking Program
- CU 4. Fresno Irrigation District Joint Conjunctive Use project

Both the AID and CID projects have multiple components that are able to stand-alone and be developed as funding is defined and committed. As described in Chapter 8, the AID has both in-lieu and direct recharge components intended to serve severely disadvantaged communities in Tulare County. The CID program includes acquisition and development of up to seven properties for purposes of direct recharge.

Phase 1 In-Lieu Reclamation and Reuse Project Elements include:

- CU 5. Clovis Surface Water Treatment Plan Expansion
- CU 6. Recycled Water Master Plan Pipeline
- CU 7. Dinuba Reclamation/Conservation/Recreation Program

A number of projects are intended to provide operational flexibility and increase the supply reliability. These are:

- CU 8. Clovis Water Intertie Project
- CU 9. Enterprise Canal Improvements Project
- CU 10. City of Fresno Residential Meter Retrofit Program

Only one project Water Quality Project Category was identified for the City of Reedley 5 Mgd Wastewater Treatment Plant Expansion.

Planning and Programmatic Actions

Planning and programmatic actions are intended to respond to the findings made in Chapter 7, Water Management Strategies. RCUP planning and programmatic actions for Phase 1 include:

1. Complete CEQA reviews where needed and procure necessary permits.
2. Evaluate conveyance capacity constraints and define needed facility improvements.
3. Initiate Land Acquisition Program element and begin acquiring land within AID, CID, and FID for purposes of developing both sub-regional, and regional integrated conjunctive use project facilities.

4. Initiate Water Acquisition Program element to purchase and recharge CVP 215 and other water from willing sellers when such water is available.
5. Define Proposition 84 project priorities.
 - a. Revise ranking and prioritization criteria base on Proposition 84 Proposal Solicitation Package.
 - b. Identify and prioritize Near-Term funding priorities.
6. Continue planning and feasibility evaluations for proposed Phase 2 projects.
7. Continue working to expand and define project concepts for regional and inter-regional efforts;
 - a. RCWD and Lower Kings stakeholders to develop regional and inter-regional groundwater banking project facilities, funding, and groundwater basin management and oversight principles.
 - b. Continue dialog with SKF CSD, member cities and Fresno County on development of regional reclamation and re use program and projects.
8. Continue to work with the other stakeholders in the Tulare Lake Basin to define inter-regional priorities and projects.
9. Establish local funding mechanism for cost sharing and to match federal and state funding sources and requirements.
10. Finalize implementing agreements for sub-regional and Upper Kings regional groundwater banking, project funding, and groundwater basin management and oversight.
11. Develop groundwater basin accounting procedures and policies.
12. Finalize groundwater management and oversight process and organizational roles and responsibilities.

Disadvantaged Community Project - Water Quality Projects

The project proposed by AID will served disadvantage communities in this part of the Kings Region. Special planning and program development actions are needed to further assist DAC and to meet the environmental justice expectations of the IRWMP. In seeking to involve representatives of DACs in the process, it became clear that the organization providing water and wastewater services often do not have the time, staff capacity, or financial resources to be actively engaged in the Water Forum, define the needs, or develop capital facilities plans. Self Help Enterprises assisted the Water Forum in identifying the needs for DACs. In addition, the Water Forum held a special Public Works meeting in April of 2007 to further identify projects in the Water Quality project category and develop a water quality position statement for the Water Forum. The preliminary list of DAC needs was presented in Chapter 8. The planning activities to support DAC include:

- DAC 1. AID will define plans and strategies for integrating other cities into the Eastside Water Quality and Urban Reliability Project.

- DAC 2. The Water Forum, with support of KRCD and Self Help Enterprises, will:
 - a. Conduct additional outreach activities to better define the needs of the DAC in the Kings Region;
 - b. Define projects, establish near- and Mid-Term funding priorities; and
 - c. Link these priorities to available funding.
- DAC 3. The Water Forum will establish specific priorities for Proposition 84 funding for meeting DAC needs for projects that are ready to proceed.
- DAC 4. KRCD will incorporate the priorities in the updates to the Upper Kings Basin IRWMP, and work with the Cities, Counties and Special Districts to coordinate input to the San Joaquin Partnership and Blueprint efforts; also working with local legislators to seek federal and state funding.

Environmental Management Project and Programmatic Actions

There were no projects that were ready to proceed or that met the immediate- or Near-Term project requirements. There needs for further program development and planning were established and include those listed below.

- EM 1. KRCD will work with the Water Forum to assist the Kings River Conservancy in identifying grant funding to build management capacity, refine the Kings River of Gems program concepts, and obtain funding.
- EM 2. The Water Forum will develop an official position on the values and benefit of the Kings River of Gems program for acquiring property, preserving habitat and gaining public access to open space resources.
- EM 3. KRCD/KRWA will continue to implement and fund the Fisheries Management Program.
- EM 4. The Water Forum should conduct further planning efforts and coordinate with the Counties and Cities to review opens space needs and priorities, and to integrate open space, parks, and habitat preservation efforts.
- EM 5. The Water Forum, through KRCD, will track and evaluate grants funding for development of open space and preservation of habitats.
- EM 6. The California Native Plant Society will work to develop guidelines for design, construction, and plant selection for recharge basins in which some degree of wetlands restoration is a goal.

9.5.2 PHASE 2 - PROJECTS AND PROGRAMMATIC ACTIONS

Phase 2 include the project and programmatic actions to expand the Direct and In Lieu program elements and be implemented in the Mid-Term (3-6 years).

Projects

Some of these projects could be implemented sooner should feasibility studies, funding, partners, and other pre-requisite activities be defined and completed. This list includes project concepts that are being developed in other planning efforts (e.g.; Fresno Metro Plan; SKF Master Plan). It is anticipated this list will evolve as projects are better defined and additional projects are identified. Phase 2 Direct Recharge projects have not been prioritized and include;

- City of Fresno Northwest Regional Recharge Facility
- City of Fresno Southwest Regional Recharge Facility

Phase 2 In-Lieu Recharge projects include;

- City of Fresno Southeast Surface Water Treatment Plant
- City of Fresno NE Fresno Recycled Water Transmission Pipeline
- City of Fresno Tertiary Treatment at Fresno/Clovis Regional Reclamation Facility

There was also one project in the Flood Control/Stormwater Management Project category for the City of Reedley Storm Water Interceptor and Outfall Project.

Phase 2 Planning and Programmatic Actions

Planning and programmatic actions to further implement Phase 2 projects and plan for Phase 3 include:

1. Develop regional and inter-regional groundwater banking project concepts and develop necessary agreements with the RCWD and other Lower Kings interests. Prospective sub-regional projects identified in the Lower Kings GWMP include;
 - a. Raisin City Recharge Pond; and
 - b. Raisin City Recycled Water Program.
2. Evaluate the project concepts and feasibility of a CID Surface Water Treatment Plant of the Highway 99 Corridor.
3. Evaluate the feasibility of additional "In-Lieu" regional reclamation and reuse for SKF Tertiary Treatment Plant.
4. Continue to evaluate, discuss and seek consensus on regional groundwater banking program and facilities to provide inter-regional groundwater storage and banking, and include other interests in the Kings River and potentially external third parties seeking to store water.

9.5.3 PHASE 3 - LONG-TERM, INTER- REGIONAL PROJECTS

Phase 3 would be to develop Inter- Regional scale conjunctive use and groundwater banking program elements to create an new water source of supply to the Kings Region. Such a program would also help to generate capital by recognizing the market forces at play through out California. The concept is to market the storage space in the lower part of the Kings Basin and provide access to up to 2 million acre-feet of groundwater storage space to external third party interests. The target yield to the Kings is a 150,000 to 300,000 acre-feet of new supplies based on a percentage (15%) of the stored water being allocated to overdraft recovery.

Because of the complex technical and institutional issues and constraints, the program is conceptual only at this point. The water management strategies related to groundwater banking, conjunctive use, water transfers, importation, and exchanges have been discussed in detail in Chapter 7, and both the opportunities and constraints were clearly articulated. For the long term, these concepts need the attention of the Water Forum and the opportunities for development of an inter- regional groundwater bank are believed to be great given the statewide needs for; 1) storage south of the delta; 2) dry year supplies to increase supply reliability, and 3) potential for drought and climatic changes.

1. To successfully develop project concepts the Water Forum will need to more actively engage the RCWD and other unorganized overlying land owners in the area.
2. Initiate a dialog with others in the Kings Basin through the KRCD and KRWA Boards, and the persons that were actively engaged in the Lower Kings Basin Advisory Panel during development of the Lower Kings GWMP.
3. Hold focused Water Forum meeting on regional groundwater banking and invite others from out side the area to share ideas and perspectives.
4. Arrange field visits with landowners and other leaders in the Lower Kings area to successful groundwater banking projects and agencies in the Tulare Lake areas including the Semi- Tropic, Arvin Edison, and Kern water banks to learn about project successes and areas to avoid when developing banks.

9.6 INTEGRATED PROJECT SCHEDULE AND BUDGET

9.6.1 INTEGRATED SCHEDULES

Each project stakeholder developed a project schedule. The basic schedules were submitted to the web page. Figure 9-6 presents a roll up schedule for the ten immediate- and Near-Term projects priorities that are integrated into the RCUP. The Mid- and Long-Term projects will be added to the schedule as the project details are better defined. The Gantt chart in the figure indicates completed activities and planned activities.

ID	Task Name	Start	Finish	2006	2007	2008	2009	2010	2011	2012	2013	2014
1	CU1- Clovis Flood Control Basin Pipeline	Tue 6/5/07	Tue 11/1/08									
2	Project Development	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
3	Feasibility Study	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
4	Detailed Design	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
5	Plan Specifications	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
6	Approval by Lead Agency	Tue 6/5/07	Thu 11/1/07									
7	Implementation	Thu 11/1/07	Tue 11/1/08									
8	CU2- AID Eastside Water Quality and Urban Reliability Project	Tue 6/5/07	Fri 4/4/14		◆	COMPLETED						
9	Project Development	Tue 6/5/07	Tue 6/5/07									
10	Feasibility Study	Tue 11/1/08	Mon 9/1/08									
11	Detailed Design	Tue 4/1/08	Wed 4/1/09									
12	Plan Specifications	Thu 4/2/09	Fri 4/2/10									
13	Permitting & Environmental Review	Mon 9/1/08	Mon 2/2/09									
14	Approval by Lead Agency	Mon 2/2/09	Fri 5/1/09									
15	Implementation	Mon 4/5/10	Fri 4/4/14									
16	CU3- CID Groundwater Mitigation and Banking Program	Tue 6/5/07	Wed 2/22/12									
17	Project Development	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
18	Feasibility Study	Tue 6/5/07	Fri 9/28/07									
19	Detailed Design	Mon 10/1/07	Fri 3/28/08									
20	Plan Specifications	Mon 3/31/08	Thu 7/23/09									
21	Permitting & Environmental Review	Mon 9/3/07	Mon 2/4/08									
22	Approval by Lead Agency	Tue 2/5/08	Mon 3/24/08									
23	Implementation	Fri 7/24/09	Wed 2/22/12									
24	CU4- FID Joint Conjunctive Use Project	Tue 6/5/07	Tue 3/22/11									
25	Project Development	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
26	Feasibility Study	Tue 6/5/07	Fri 9/28/07									
27	Detailed Design	Mon 10/1/07	Fri 3/28/08									
28	Plan Specifications	Mon 3/31/08	Thu 7/23/09									
29	Permitting & Environmental Review	Mon 10/1/07	Mon 3/3/08									
30	Approval by Lead Agency	Tue 3/4/08	Mon 4/21/08									
31	Implementation	Fri 7/24/09	Tue 3/22/11									
32	CU5- Clovis Surface Water Treatment Plant Expansion	Tue 7/1/08	Mon 2/6/12									
33	Project Development	Tue 7/1/08	Wed 10/1/08									
34	Feasibility Study	Fri 8/1/08	Mon 11/3/08									
35	Detailed Design	Fri 8/1/08	Tue 2/3/09									
36	Plan Specifications	Wed 2/4/09	Thu 2/4/10									
37	Permitting & Environmental Review	Wed 10/1/08	Wed 7/1/09									
38	Approval by Lead Agency	Thu 7/2/09	Tue 9/1/09									
39	Implementation	Fri 2/5/10	Mon 2/6/12									

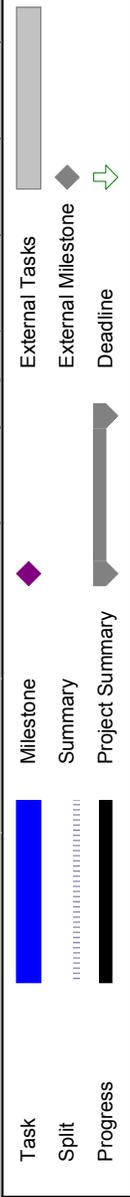


Figure 9-6. Integrated Schedules of IRWMP Projects

ID	Task Name	Start	Finish	2006	2007	2008	2009	2010	2011	2012	2013	2014
40	WQ1 - Reedley 5 MGD WWTP upgrade	Tue 6/5/07	Thu 7/29/10									
41	Project Development	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
42	Feasibility Study	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
43	Detailed Design	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
44	Plan Specifications	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
45	Permitting & Environmental Review	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
46	Approval by Lead Agency	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
47	Implementation	Tue 6/5/07	Thu 7/29/10					█				
48	CU6- Clovis Recycled Water Master Plan	Tue 6/5/07	Thu 7/26/12									
49	Project Development	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
50	Feasibility Study	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
51	Detailed Design	Tue 6/5/07	Tue 6/5/07									
52	Approval by Lead Agency	Tue 6/5/07	Fri 6/29/07									
53	Implementation	Mon 7/2/07	Thu 7/26/12							█		
54	CU7 - Clovis Water Intertie	Tue 6/5/07	Thu 4/16/09									
55	Project Development	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
56	Feasibility Study	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
57	Detailed Design	Tue 6/5/07	Wed 8/1/07									
58	Plan Specifications	Thu 8/2/07	Fri 9/28/07									
59	Permitting & Environmental Review	Tue 6/5/07	Tue 7/31/07									
60	Approval by Lead Agency	Wed 8/1/07	Tue 9/18/07									
61	Implementation	Wed 9/19/07	Thu 4/16/09									
62	CU8- Dinuba RCR Project	Tue 6/5/07	Wed 7/2/08									
63	Project Development	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
64	Feasibility Study	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
65	Detailed Design	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
66	Plan Specifications	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
67	Permitting & Environmental Review	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
68	Approval by Lead Agency	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
69	Implementation	Tue 6/5/07	Wed 7/2/08									
70	CU9- Clovis Enterprise Canal Improvements	Tue 6/5/07	Wed 9/25/13									
71	Project Development	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
72	Feasibility Study	Tue 6/5/07	Tue 6/5/07		◆	COMPLETED						
73	Detailed Design	Tue 6/5/07	Tue 6/30/09									
74	Plan Specifications	Wed 7/1/09	Wed 7/27/11									
75	Permitting & Environmental Review	Thu 5/1/08	Thu 5/27/10									
76	Approval by Lead Agency	Fri 5/28/10	Fri 12/24/10									
77	Implementation	Thu 7/28/11	Wed 9/25/13									

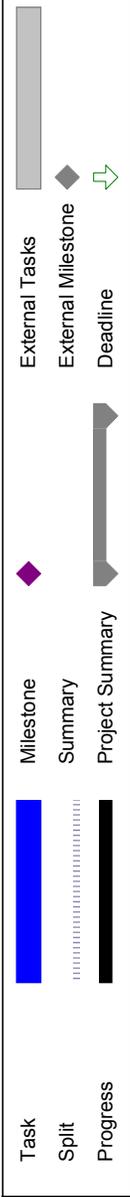


Figure 9-6. Integrated Schedules of IRWMP Projects

9.6.2 INTEGRATED BUDGETS

Each of the project stakeholders also provided individual project budgets and uploaded or entered relevant information to the project definition web site. Table 9-3 presents the summary budget for all of the ten priority projects. Detailed budgets are being further refined and put into formats consistent with the state's applications. KRCD is working with the Water Forum to standardize the budget submittals to allow for ease of comparison and aggregation. Project sponsors are to provide detailed breakdowns showing project components costs in the following categories:

- Direct Project Administration Costs
- Land Purchase/Easement
- Planning/Design/Engineering/ Environmental Documentation
- Construction/Implementation
- Environmental Compliance/ Mitigation/Enhancement
- Construction Administration
- Other Costs
- Construction/Implementation Contingency

Additional detail within each category is also needed to support Water Forum negotiations on project priorities. To a large degree, the priorities are predicated on the available funding from both the local sources and state. Detailed budgets will support adaptive management, provide flexibility in responding to changes in the total funding that may be available; and allow revisions to the project priorities of needed. For example, a large projects may have specific elements or components that are fundable, ready to be implemented; and would produce quantifiable results in terms of new yields. The AID Eastside Water Quality and Urban Reliability Project has two discreet but interdependent elements: a surface water treatment plant and the Traver Recharge Pond Elements, either of which could stand alone and be funded independently as needed. The CID Groundwater Mitigation Banking Program is currently comprised of 7 separate recharge project elements, all of which are independently fundable and would increase the sustainable water supply in the Kings Region.

Funding and financing is discussed in more detail in Chapter 10. The Kings IRWMP projects will seek funding under Proposition 50 and 84, but the Water Forum recognizes the need and value of bringing the Kings Region needs into a coherent planning framework and regional water management budget so that local needs can be matched to multiple sources of local, state, and federal funds. Over the Long-Term, the Kings IRWMP will also support the Kings Region

Table 9-3. Summary Budget for Upper Kings Basin IRWMP Projects

Project Sponsor	Project ID	Project Title/ Sub-Components of Project	Project Components Costs	Total Project Cost
City of Clovis	CU1	Flood Control Basin (Basin BT) Pipeline		\$250,000
		Implementation	\$250,000	
Alta Irrigation District ¹	CU2	Eastside Water Quality and Urban Reliability Project		\$20,000,000
		SWTP	\$17,114,300	
		Traver Banking	\$2,885,700	
Consolidated Irrigation District ²	CU3	CID Groundwater Mitigation and Banking Program		\$15,915,000
		Recharge Ponds (Cole Slough Canal)	\$1,743,000	
		Santa Fe Pond Enlargement	\$2,590,000	
		Recharge Pond (Kingsburg /Selma Branch Canal Divide)	\$6,048,000	
		Recharge Pond (Kingsburg Branch Canal)	\$574,000	
		Ward Drainage Canal Capacity Enlargement	\$231,000	
		Recharge Pond (Ward Drainage Canal)	\$2,909,000	
		Recharge Pond (Fowler Switch)	\$1,820,000	
Fresno Irrigation District	CU4	Fresno Irrigation District Joint Conjunctive Use Project	\$10,000,000	\$10,000,000
City of Clovis	CU5	Surface Water Treatment Plant Expansion		\$3,600,000
		Design	\$310,000	
		Implementation	\$3,290,000	
City of Reedley	WQ1	5 MGD Wastewater Treatment Plant upgrade	\$30,000,000	\$30,000,000
City of Clovis	CU6	Recycled Water Master Plan	\$35,000,000	\$35,000,000
City of Clovis	CU7	Water intertie (North)		\$890,000
		Design	\$100,000	
		Implementation	\$790,000	
City of Dinuba	CU8	Dinuba RCR	\$62,576,066	\$62,576,066
City of Clovis	CU9	Enterprise Canal Improvements		\$842,380
		Improvements	\$506,000	
		Pump station & Trash Removal	\$336,380	
Total			\$179,073,446	\$179,073,446

1. Seeking funding for Traver Recharge Portion of the Project only. Project is for DACs.

2. Requesting funding for discreet land acquisition elements and projects, which can be completed in 1-3 years.

in acting as a political unit to generate legislative support and find alternative sources of state and federal funding. The detailed budgets will allow the Water Forum to represent the needs of the Kings Region to funding entities and to match project needs with available funding sources.

9.7 CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) AND PERMITTING

9.7.1 COMPLIANCE APPROACH AND RESPONSIBILITIES

The adoption of the Upper Kings Basin IRWMP or submittal of any implementation grant proposals by KRCD are exempt from the CEQA since these actions are related to feasibility and planning studies (§15262) and information collection (§15306). The Upper Kings Basin IRWMP consisted of basic data collection and resource evaluation activities which would not result in the disturbance of any environmental resource; and involved planning studies for possible future actions by the participating agencies will be required to comply with CEQA. Potential environmental impacts of all individual projects listed in the Upper Kings Basin IRWMP have been, or will be evaluated in accordance with CEQA by the project proponents sponsoring the project and serving as the lead agency. The Upper Kings Basin IRWMP does not legally bind participants to carry out projects listed in the plan.

The responsibility for complying with CEQA and other environmental laws rests with the public agency that is proposing the projects. The Upper Kings Basin IRWMP work plan was designed with an eye toward expediting CEQA compliance and streamlining subsequent environmental review for public agency stakeholders. The information compiled and analysis conducted for the Kings IRWMP has resulted in materials that can be incorporated by reference into the CEQA process and documents for Upper Kings Basin IRWMP projects. The information will support preparation of an initial study, development of the public Notice of Preparation (NOP) that initiates environmental review and public involvement; or in preparing the needed CEQA documents. Individual projects must be certified through either negative declaration, mitigated negative declaration or a full Environmental Impact Report (EIR).

During project planning, the environmental data that was collected was factored into the development and application of the ranking and screening criteria, and CEQA clearance was one of the 'readiness-to-proceed' criteria used by the Water Forum to set project priorities. Where multiple agencies are participating in funding for the project, the lead agency will be determined by the project participants. Where agreements between agencies are to be adopted for projects, which would commit to a course of action to the exclusion of other courses of

action, these agencies will need CEQA clearances to commit funding or approve the final agreements.

9.7.2 AVOID, MINIMIZE AND MITIGATE

The purpose and need for the RCUP is also to mitigate for existing overdraft and accommodate planned growth. Environmental, water quality, and other baselines conditions were documented during the project planning to identify environmental constraints and opportunities. This was intended to identify environmental impacts and benefits earlier rather than later in the planning process; and to allow for flexibility in design of the capital facilities, avoidance of impacts, determination of mitigation costs, and inclusion of environmental project design guidelines in any of the proposed Upper Kings Basin IRWMP alternatives. The purpose of this proactive approach was also to ensure that impacts were considered and avoided to the degree possible long before an EIR or other CEQA documents were prepared for Upper Kings Basin IRWMP projects.

9.7.3 GROWTH AND CUMULATIVE IMPACTS

In order to avoid issues related to the inconsistency of this Upper Kings Basin IRWMP and any of the land use plans, the growth forecasts used in the modeling of future no project conditions was based on build out within the sphere of influence and regional population forecasts. The adopted general plans were used to forecast the 2030 conditions. The Kings IGSM was used to analyze the water budget conditions that would exist in the future based on existing land use and likely future land use conditions at build out. The future 'with' and 'without' project analysis of the water budget was conducted to provide a baseline from which to compare individual project impacts and benefits. The information generated from this analysis may be used by project proponents to evaluate individual or cumulative project impacts. Also, it would be easier for project proponents to complete a more comprehensive analysis with this information. This should also help reduce the environmental documentation cost and expedite the environmental review process for individual IRWMP projects.

9.8 OTHER IMPACTS AND BENEFITS

Benefits of the IRWMP

The anticipated regional vs. local benefits were discussed in Section 1.7. Quantitative benefits for each of the projects were identified in Table 8-1. Project priorities were in part based on how well projects demonstrated tangible, measurable benefits and contributed to reduction in

overdraft. Project sponsors also provided information on qualitative benefits as summarized in Chapter 8.

9.8.1 EFFECTS OF NOT IMPLEMENTING THE IRWMP

If the IRWMP is not implemented it is anticipated that overdraft will continue resulting in:

- Increased pumping costs;
- Declining water levels;
- Potential conflicts between overlying water users for available groundwater supplies;
- Potential loss of supply to downstream users that may make claim to the water;
- Loss of economic activity at the farm level;
- Inability to respond to dry year conditions;
- Reduced supply reliability; and
- Limitations planned development and inability to comply with revised state laws requiring proof of adequate and sustainable water supplies.

9.8.2 IMPACTS AND BENEFITS TO ADJACENT AREAS

The Upper Kings Basin IRWMP may influence adjacent areas to the north, south and west. To the north, Madera County is experiencing rapid urban growth. Continued overdraft in the Kings Region, including the Lower Kings area, will influence the cross county flows and could result in inter-county conflicts if the IRWMP is not implemented. These transboundary effects would be reduced through IRWMP projects. Both Madera County and the Kings Region are likely to benefit by the additional groundwater recharge that will occur incidental to the San Joaquin Restoration projects.

To the west, overdraft in the Lower Kings is likely to continue and this problem would be made worse if the IRWMP is not implemented. It is also important to note that if the Upper Kings Basin IRWMP projects are implemented, it is likely that the Lower Kings would receive uncompensated benefits from the additional recharge in the Upper Kings Region. This inequity could result in conflicts since benefits could accrue to non-funding participants. There has been anecdotal information provided that indicates that there may be poor quality water to the west and southwest of the Upper Kings Basin IRWMP that could be drawn into the Kings Basin if water levels remain at their currently depressed levels, but it was beyond the scope of this project to collect historical water quality data or samples. To the south of the project area, south of the Kings River, the proposed projects are believed to be relatively neutral in their effects.

9.8.3 POTENTIAL IMPACTS OF THE IRWMP

Individual project impacts will be fully reviewed pursuant to CEQA and mitigated to the fullest extent required. This section briefly reviews potential effects of the RCUP elements that would be reviewed in more detail in initial studies prepared to meet CEQA requirements.

Construction

In general, negative impacts from implementation of the Upper Kings Basin IRWMP and RCUP are thought to be limited primarily to construction related effects such as disruption of traffic, dust, noise, sedimentation from disturbed lands, and related effects which can be mitigated through standard construction practices.

Hydrology and Groundwater

Hydrology effects are beneficial. The RCUP would support and compliment the Kings River Fisheries management program and remove disincentives to the release of cold water flows for restoration of Kings River fishery resources by accommodating recapture of the released water for beneficial use. Also, capture of flood flows would reduce the potential for downstream flooding. Local stormwater capture would also provide a net benefit where included in RCUP projects.

Groundwater effects are primarily beneficial. As described further below, pre- and post project water level and quality monitoring will be conducted to document the effectiveness of the proposed projects and confirm that there are no third party effects or negative impacts. It is not expected that there will be any changes to the rate or direction of flow, nor transport of contaminants as a result of any recharge operations, which would result in negative reviewed water quality conditions, regulatory requirements, and potential water quality effects of direct and In-Lieu operations.

Water Quality

The water quality evaluation conducted for the Upper Kings Basin IRWMP (WRIME, 2007x) discussed the potential effects of recharging Kings River and Friant water to the Upper Kings Basin IRWMP Region for selected groups of chemical constituents. The data show that recharge of Friant and Kings River water would result in a net benefit to groundwater quality as compared to current conditions. The high quality of source water will result in dilution of minerals and other constituents in the native groundwater, and, as a consequence, any recovered water would generally be of better quality than the native groundwater. The

available data would indicate that groundwater is currently meeting standards in most cases and has historically sustained municipal and agricultural beneficial uses. For recharge projects sited in areas identified as having groundwater of sufficient quality to meet beneficial uses, the higher quality source water will retain quality sufficient to continue to meet these beneficial uses, even after mixing with lower quality groundwater. This will allow full utilization of the source water, when extracted.

Other Environmental Resources

Pre-clearance surveys are to be conducted prior to acquiring land for development of IRWMP related projects. For recharge projects this includes pre-clearance surveys will be required prior to taking title to the land including, biological/botanical; Phase 1 hazardous materials, and review of cultural resources. This is intended to completely avoid any environmental constraints or negative effects. In addition, projects are being designed to incorporate environmental and habitat features. Visual resources from recharge facilities will not be effected since they will preserve the open space character in the area where facilities are to be developed. The effects to agricultural lands are minimal. There may be some conversion of prime farmland to recharge ponds, but since one of the objectives of the IRWMP is to preserve agricultural land uses through provision of a long term water supply, these effects are thought to be marginal.

9.9 ENVIRONMENTAL JUSTICE CONCERNS

Environmental justice is a key component of the IRWMP and the Forum has a sound process to address any environmental justice concerns that may arise during planning and implementation of projects. A brief description of this process is provided below.

Potential project sites will be selected based upon soil conditions, water availability, water delivery facilities, agency coordination, environmental value, and landowner cooperation. The predominant factor for site selection is the existing soil characteristics and its water percolation ability. Areas with low or problem groundwater levels will be rated higher and given priority over areas with good groundwater conditions. Potential projects in areas, towns, or cities will not be rated and prioritized based upon characters of size, ethnicity, economics, or religious beliefs. Thus, no environmental justice concerns will be issues for the proposed projects or for the program in general.

During the environmental CEQA process, local, state, and federal resource and regulatory agencies, landowners, and the public will be informed of the proposed projects. The agencies

and public will have the opportunity to review, address, comment upon, and to provide input into the environmental process.

In addition, the Upper Kings Basin IRWMP is targeting defining the specific needs of disadvantaged communities and working to equitably distribute funds to those areas that lack the management, technical, and financial capacity to compete for the available funds against the larger more well organized water district and cities within the Kings Region.

9.10 RELATIONSHIP TO OTHER REGIONAL EFFORTS

The Water Forum support local primacy in the planning process and a “bottoms- up” approach to water management while also recognizing the other regional resource management effort in the Kings Basin and Southern San Joaquin Valley, including the Tulare Basin, and the relationship to the State’s effort. In the long term, participation and coordination of with these efforts will support the implementation of the Upper Kings Basin IRWMP by leveraging the synergy of work approaches and coordinating all work products. Figure 9-7 shows how other planning efforts in the Kings Region are integrated and how the Upper Kings Basin IRWMP fits into the other large scale efforts. In addition, these complementary regional efforts will help the Water Forum in prioritizing the regional goals for the Upper Kings Basin IRWMP. A brief description of the key regional efforts is given below.

9.10.1 SOUTHERN SAN JOAQUIN VALLEY WATER QUALITY COALITION

Kings River Water Association (KRWA) and KRCD are participating in the Southern San Joaquin Valley Water Quality Coalition (SSJWQC), which was established in 2002. The SSJWQC was formed to deal with water quality issues and concerns affecting the Kings River area and the Tulare Lake Basin. The SSJWQC participating agencies believe that they will be better served approaching these and other water quality issues on a regional approach rather than individually.

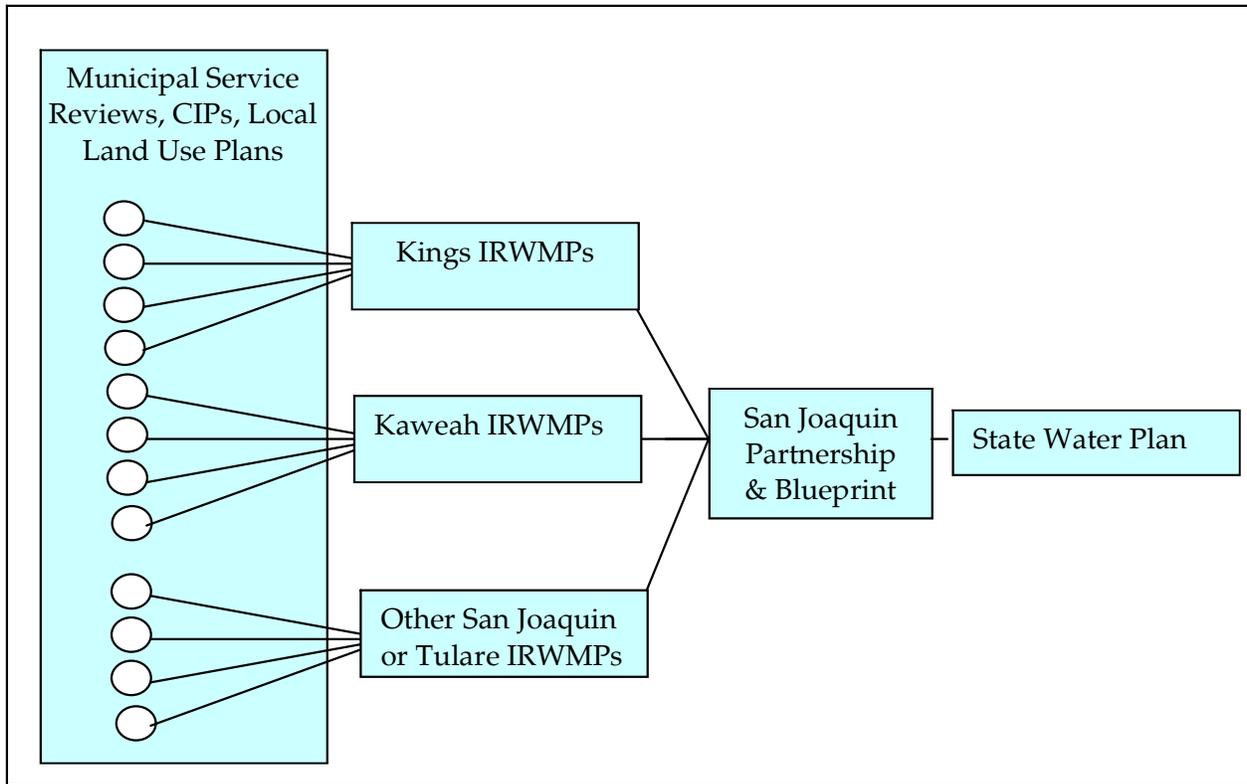


Figure 9-7. IRWMP Relation to Local and Regional Plans

9.10.2 THE LOWER KINGS BASIN GROUNDWATER MANAGEMENT PLAN (LKGWMP)

The Lower Kings Basin Groundwater Management Plan (LKGWMP) was recently completed by KRCD (WRIME, 2005a) and the BMOs from this effort are incorporated into the Upper Kings Basin IRWMP. Two other localized groups, the McMullin Group and North Fork Group (NFG) were active in the LKBAP and coordinated input to the GWMP. The NFG is working to develop conjunctive use and recharge projects under an MOU with DWR. KRCD will work to support both groups in identifying capital facilities and programs that would provide regional benefit, and will keep the Lower Kings Basin stakeholders informed of opportunities provided through the IRWMP. It is also anticipated that the Lower Kings stakeholders, via the LKBAP, may appoint a representative to the Forum to support the implementation of the IRWMP efforts and develop programs over an even wider region.

9.10.3 TULARE LAKE BASIN

There are a number of local IRWMP efforts in the Tulare Lake Basin that need to be factored into the Upper Kings Basin IRWMP implementation strategy. Integration with these efforts is necessary by virtue of the requirements and approach to be used by the State to distribute

Proposition 84 IRWMP related funding. The Kings Region is in the Tulare Lake Basin. The State has \$1 Billion in IRWMP related funding, of which \$60 Million will be dedicated to activities in the Tulare Lake Basin. Upper Kings Basin IRWMP representatives from KRCD and AID have been meeting with others in the Tulare Lake Basin to discuss strategies for combining efforts and setting project funding priorities. A Joint Powers Authority is being considered to integrate the other independent efforts listed below. It is not known how the Kern County Water Agency or other interests within the Tulare Basin intend on coordinating. Two existing IRWMP efforts are ongoing in the Tulare Lake Basin including the Kaweah Delta IRWMP and the Pond Poso/Semi- Tropic IRWMP

9.10.4 OTHER SAN JOAQUIN VALLEY REGIONAL PLANNING

There are a number of related efforts in the San Joaquin Valley that interface with the Upper Kings Basin IRWMP. These are discussed below.

Federal San Joaquin Valley Integrated Regional Water Management Plan Team

This effort was initiated by the local congressional delegation to begin the process of identifying regional infrastructure needs that could be supported through federal funding. Initial work included outreach to leaders in the community to develop a list of water related priorities.

California Partnership for the San Joaquin Valley

This a state initiated through an executive order of the Governor to focus attention on the needs of the San Joaquin Valley. There is a 26 member board that includes eight Cabinet Secretaries, eight locally – elected officials, eight civic leaders, and two depute chairs. The “Strategic Action Proposal” sets forth the overall strategies and defines specific actions. There are ten working groups focused on developing the specific action proposals, one of which is specifically targeted at water resources. The mission of the water group is “to ensure a reliable, adequate quality water supply to sustain a high quality of life and a work- class agricultural sector while protecting and enhancing the environment”. Efforts have been initiated to develop and implement an integrated San Joaquin Valley Regional Water Plan (SJVRWP) to define and integrate other water plans. Efforts are just getting under way. The SJVRWP would:

- Develop and implement an integrated San Joaquin Valley Regional Water Plan;
- Incorporate major levee enhancements in San Joaquin Valley and Sacramento-San Joaquin Delta to safeguard regional water quality and water supply as well as provide for flood control;
- Augment surface and groundwater banking programs and recycled and brackish water projects in the San Joaquin Valley;

- Improve water quality and expand salinity management infrastructure development;
- Promote riparian environmental restoration; and
- Expand agricultural and urban water use efficiency and energy efficiency programs.

San Joaquin Valley Regional Blueprint

The San Joaquin Valley Regional Blueprint “Vision for the Valley” consists of eight San Joaquin Valley counties; Fresno, Kern, Kings, Madera, Merced, San Joaquin, Stanislaus and Tulare seeking to develop a valley wide “vision” of land use, transportation and water supply strategies to guide growth. This group is now actively engaged and integrated into the Partnership discussed above. It is intended to provide a valley wide blueprint that will include growth principles and scenario planning tools for use at both the local and regional planning levels. Each county has coordinated public involvement in the visioning process at the local level, while the nonprofit Great Valley Center in Modesto coordinated the effort into a regional, valley wide context.

The Blueprint process commenced in February 2006, and will continue through December 2007. The process is intended to help the Valley’s counties plan for future growth through the integration of transportation, water supply, housing, land use, economic development and environmental protection. At its conclusion, the Blueprint process will enable the Valley's planners to provide a comprehensive and integrated decision-making tool that will allow for scenario planning, more efficient use of resources, and an understanding of regional impacts and solutions. The intent is also to realize economies of scale because each county will utilize the same data and expertise base for the project. This group will interface with the work of the California Partnership for the San Joaquin Valley and helps support state data collection and integration needs for the region.

The Fresno Council of Governments Blueprint Roundtable is the local, 32-member committee that will provide advice for Fresno area public outreach activities. As visions are articulated through community input, the information gathered will go before the Roundtable to be formed into a preferred growth "scenario". Once a scenario is agreed upon, it will be forwarded to the Blueprint Regional Advisory Committee (BRAC), which will work with the Great Valley Center to craft the larger valley wide vision.

This chapter discusses the non- structural management actions that are to be implemented as part of the Upper Kings Basin IRWMP. These management actions are broken into Technical Elements and Institutional Elements. Specific actions and responsibilities are identified.

Technical Elements are related to:

- Monitoring, Measurement of Plan Performance, Reporting;
- Data Management;
- Kings IGSM Model Use And Application; and
- Reporting.

Institutional Elements include:

- Governance;
- Finance; and
- Water Forum Coordination and Community Affairs.

The action items defined below are intended to respond to the solution principles and findings presented in Chapter 7 - Water Management Strategies.

10.1 TECHNICAL MANAGEMENT ELEMENTS

A summary of actions is presented in Table 10-1 for each of the Technical Management Elements.

10.1.1 MONITORING, MEASUREMENT AND REPORTING (MMR) OF PLAN PERFORMANCE

MMR Action 1 - Upper Kings Basin IRWMP Annual Reporting

KRCD will produce an annual 'state of the basin' report. The report will be produced using the data management system defined below. The purpose of the report is to document progress using the performance measures and BMOs established for the IRWMP. The report would be produced as close to the end of the water year as possible (production goal of January) and will be presented to the KRCD Board and Water Forum; and provided to individual stakeholders so that the findings can be presented to the other elected bodies in the Kings Region. The report will:

Table 10-1. Summary of Technical Management Elements

Action	Description	Lead Roles & Responsibility	Time Frame ⁽¹⁾	Current Status
Monitoring, Measurement, and Reporting (MMR) of Plan Performance				
MMR 1	Annual Water Resources Report	KRCD	Near-Term	Ongoing
MMR 2	Groundwater Level, Quality, and Flow Monitoring at Recharge Facilities	Project Sponsors	Near-Term	Ongoing
MMR 3	Conduct data network evaluation and develop regional monitoring plan.	KRCD	Mid-Term	Future Task
MMR 4	Develop regional monitoring wells	KRCD, AID, FID, CID	Mid-Term	Ongoing
MMR 5	Fishery monitoring program	KRCD	Immediate	Ongoing
MMR 6	Water Quality Monitoring.	KRCD	Mid-Term	Ongoing
MMR 7	Supervisory Control and Automated Data Acquisition for Irrigation Systems	KRCD, AID, FID, CID	Immediate	Expanding in existing areas & under development in new regions
Data Management (DM)				
DM 1	Develop and Implement Regional Data Management System	KRCD, AID, FID, CID	Immediate	Ongoing
DM 2	Expand Regional Data Management System and Connect to Statewide System	KRCD	Near-Term	Future Task
Kings IGSM Model Use and Application (MOD)				
MOD 1	Apply Kings IGSM to Alternatives Evaluation	KRCD, TAD	Near-Term	Future Task
MOD 2	Define studies to fill data gaps	TAD	Mid-Term	Future Task
MOD 3	Review modeling needs and develop plan for update or additional analysis tools	Individual agencies, KRWA, KRCD	Near-Term	Ongoing

⁽¹⁾ Immediate, Near-Term (1-3 yrs), Mid-Term (3-6), Long-Term (>6)

- Be closely coordinated with AID, CID, FID, KRWA, and routed through the Technical Analysis and Data Work Group for review;
- Document physical conditions in the basin using the defined performance measures which will include; rainfall, streamflow, reservoir conditions, groundwater levels at key locations; and water level contours.
- Include an integrated depth-to-groundwater map; and provide the means to test for, and map, problematic water quality constituents (e.g., nitrates and DBCP).

- Describe the status of project implementation, progress in meeting the measurable basin management objectives, and specific actions on projects defined in the Upper Kings Basin IRWMP.
- Use the UWMPs to update demand and supply forecast on a five-year cycle (05' and 00' years) consistent with state law.

Costs: Estimated at \$50,000 to \$60,000 annual cost in staff time.

Timing: Annually. Goal is to produce a first report by January 2008.

Responsibility: KRCD to produce the report. Other Water Forum members to provide key data sets. Final document format will be determined during design of the DMS and revised once the Data Network Evaluation has been completed.

MMR Action 2 - Groundwater Level, Quality and Flow Monitoring of Recharge Facilities

KRCD, AID, FID, CID and other project sponsors will install sufficient monitoring wells as part of the projects and at each recharge site to provide information needed to determine vertical and horizontal groundwater flow conditions and potential groundwater mounding in the vicinity of each site; avoid third party impacts; and document performance and the benefits of the projects. In general, this means that project specific monitoring programs will be established around each recharge site. Sites with complex geology may require multiple completion wells to monitor water levels in all affected strata. Movement of recharged water will be tracked to monitor recharge effectiveness. Pre- and post- project water quality monitoring will be conducted based on protocols and approaches described in the water quality report (WRIME, 2007c). In addition, flow into the ponds will be measured and reported on an annual basin to document the volumes of recharge and account for the planned benefits. The final groundwater monitoring plan for each project will be consistent with state requirements.

Costs: Costs for development of monitoring will vary for each facility depending on site conditions and will be incorporated into the final project design and budget.

Timing: Project specific monitoring plans are required before project funding. Implemented on all immediate and near term projects. Ongoing monitoring consistent with the approved plan once projects are completed.

Responsibility: The project sponsors and cooperators are responsible for: 1) development of detailed monitoring plan consistent with state requirements; 2) stable funding for maintenance and operations of the monitoring program consistent with state standards and requirements; 3) submittal of monitoring results to the KRCD for inclusion in the proposed Data Management System and Annual Report implemented.

MMR Action 3 - Conduct data network evaluation and design regional monitoring plan

The purpose of the proposed special study is to design a cost effective water resources monitoring and data collection program to fill data gaps; document the status of current water resources problems and detect new problems; and provide information to track progress in implementing Upper Kings Basin IRWMP projects and management actions. The network will be used to evaluate groundwater, surface water and climatic conditions (evapotranspiration, rainfall, etc).

Cost: \$50,000- 100,000. Shared by Water Forum partners; subsidized by grants.

Timing: Mid-Term project to be complete within 1-3 years.

Responsibility: KRCD provides oversight and coordinates the work with the Technical Analysis and Data Work Group and seeks grant funding to support the project and retain a contractor for professional services. Stakeholders will document their current programs. Additional participation in the TAD will be sought from state and federal interests to gain technical insights and experience.

MMR Action 4 - Develop regional monitoring wells

KRCD, AID, CID, and FID will expand the regional monitoring well network as appropriate to fill data gaps, track aquifer response from pilot and full-scale groundwater recharge and production facilities. The need for additional monitoring wells, whether through construction of dedicated wells or collection of data at existing wells, will be assessed and a plan developed.

Costs: Vary depending on site conditions and requirements, equipment specification, etc. To be determined based on results of MMR 3

Timing: Mid-Term project consistent with adopted monitoring plan from Action 2, above.

Responsibility: KRCD to coordinate implementation, seek state and federal grant funding, and contract for drilling services. Stakeholders to provide data at existing sites and will bear equitable share in regional monitoring program costs.

MMR Action 5 - Fishery monitoring program

KRCD will work with KRWA to continue the fishery monitoring program. This includes the program to track fish, monitor streamflow and temperature, and quantify the benefits of the flow releases made to restore habitat.

Costs: Existing program costs are \$200,000.

Timing: Ongoing

Responsibility: KRCD, KRWA

MMR Action 6 - Water Quality Monitoring

KRCD will collect and summarize groundwater quality data from the annual sampling and testing program of the cities and other sources purveying drinking water, and will coordinate these efforts with the USGS, California Department of Health Service, county environmental health departments, DWR and the RWQCB. KRCD will explore the viability and feasibility to act as a regional clearinghouse for groundwater quality data to better diagnose issues and develop cooperative solutions.

Costs: To be determined based on results of MMR 3

Timing: Mid-Term

Responsibility: Drinking water systems to provide required water quality testing results to KRCD for inclusion in the DMS. KRCD consolidate data currently submitted to the State DHS from regulated drinking water systems and summarize in the Annual Report.

MMR Action 7 - Supervisory Control and Automated Data Acquisition for Irrigation Systems

As part of the updates to their AWMPs, AID, FID and CID, will seek to improve measurements within the distribution system to track recharge project operations and document the benefits of the conjunctive use, water conservation, and the overall district wide delivery efficiency. KRCD and the districts will work together to obtain state and federal grant funding for these efforts. Since CID has not begun to instrument their system, they should be a first priority and should seek to obtain grants for this purpose.

Costs: Determined by each irrigation district based on current program.

Timing: Mid-Term

Responsibility: AID, FID, CID when updating AWMP. KRCD to support grant applications as requested.

10.1.2 DATA MANAGEMENT (DM)

A major component of the Upper Kings Basin IRWMP is the management of historical and future project data, including project monitoring data during project construction, operation, and maintenance. One of the regional goals of the IRWMP is to develop a centralized

repository of local information, which is easily accessible and managed to produce information crucial to assisting the implementation and monitoring of the IRWMP projects. This requires a flexible and expandable Data Management System (DMS) to provide shared access to information for the Water Forum and its member agencies.

The Forum members agreed to develop comprehensive Data Management System (DMS) for the Upper Kings Basin to allow shared access to water resources data by the member agencies and other stakeholders. It will be a basin-wide database management system designed to serve as a common point of storage for various types of data, including groundwater levels, water quality, well logs, hydrogeologic information, streamflows, precipitation, and others. The DMS will also include extensive sets of data that will be used in the Kings Basin Integrated Groundwater and Surface water Model (IGSM). The Upper Kings Basin Data Management System (UKBDMS) will be located at the office of the KRCD and will be accessible via GIS-based web interface to other member agencies and interested parties.

Currently the Department of Water Resources (DWR) is in the process of developing a statewide data management and integration system called Integrated Water Resources Information System (IWRIS). The UKBDMS will connect to IWRIS as a DMS node for the statewide system.

The UKBDMS will be completed in two phases over a period of 2 years.

DM Action 1 - Develop and Implement Regional Data Management System.

Action 1 will focus on acquisition and installation of all components necessary for KRCD to have a GIS-based web interface for access to the data via the internet. Action 1 project activities will focus on the groundwater levels and surface water data collected by participating agencies. The goals of Action 1 are to establish a shared project vision, develop data sharing agreements with member agencies, design a structure for capture and storage of standardized data, upload and verify selected surface water and groundwater data, and make them accessible to stakeholders via a GIS-based web interface. Action 1 will support the data sharing and access needs of the Water Forum members.

Costs: \$100K-\$200K

Timing: Ongoing

Responsibility: KRCD, AID, CID, FID

DM Action 2 - Expand Regional Data Management System and Connect to Statewide System.

Action 2 of the project will focus on expanding the UKBDMS to include additional data, such as hydrogeologic data, model input/output data, well log data, project cost data, water quality data, project monitoring data etc. This phase will include connection and coordination with the statewide data management systems, such as Surface Water Ambient Monitoring Program (SWAMP), Groundwater Ambient Monitoring and Assessment (GAMA), Integrated Water Resources Information System (IWRIS), Water Data Library (WDL), etc.. It will also include linkages to other off-site databases maintained by member agencies.

In addition to serving as a repository for regional compilation of water resources data and information, the Upper Kings Basin IRWMP will support statewide data activities by requiring that data collected to support project performance assessment is collected in a manner consistent with continuing statewide data collection programs. Consistency with Statewide monitoring programs is critical to ensuring that regional projects contribute to efficient, uniform, and comprehensive study design and data collection. Data collected as part of IRWMP project implementation will be required to be comparable with applicable statewide SWAMP and GAMA programs. Upon completion of the IRWMP performance assessment, the project-specific data collected, along with its associated quality assurance/quality control information, would be provided to the state in a format that could be easily integrated into statewide data collection and tracking programs. As appropriate, the Water Forum will also encourage project proponents to contribute data to the following statewide data programs:

- DWR Integrated Water Resources Information System (IWRIS), a website that connects to local databases through a GIS-based web interface;
- DWR Water Data Library (WDL), which contains groundwater level and water quality data;
- California Environmental Resources Evaluation System (CERES), an information system developed by the California Resources Agency to facilitate access to natural resource data;
- California Environmental Data Exchange Network (CEDEN), a website developed by the State for coordinated data sharing.

Other Long-term goals of regional data management are:

- Increase the staff efficiency and effectiveness;
- Reduce cost of long-term information management;
- Provide a one-stop shop for basin-wide water related data; and
- Provide the highest level of support to the Water Forum, the KRCD Board, and the member agencies.

Costs: \$300K-\$600K

Timing: Near-Term

Responsibility: KRCD with funding assistance from Forum members and DWR.

10.1.3 KINGS IGSM MODEL USE AND APPLICATION

An integrated hydrologic model that is capable of representing the Kings Basin hydrology and water management facilities was developed to assist the Water Forum in addressing important technical and policy questions. The Kings IGSM was developed in cooperation with the Technical Analysis and Data Work Group (TAD) and with financial support from DWR and Water Forum Partners. The City of Fresno funded improvements to the model in and around the City to support the development of the City of Fresno Metro Plan. The TAD helped with development of the modeling goals and objectives and selection of the model; supported data collection and development of the model input files; and reviewed and provided critical insights during the calibration and development of the model (WRIME, 2006). Prior to developing the model, three modeling objectives were established:

1. To develop, for the Kings Basin area, an analytical tool that can represent the groundwater and surface water flow systems and their interactions;
2. To develop a planning level analytical tool that can provide quantitative information on a comparative basis to help answer different questions on the groundwater and surface water system characteristics and to help evaluate alternative conjunctive water management strategies; and
3. To develop a tool that can be used in assessing management strategies consistent with the IRWMP goals and objectives.

The principal advantage of Kings IGSM is its built-in capability to simulate many aspects of the hydrologic system, including land use and joint operation of surface water and groundwater resources. A systematic process of model development and utilization was followed and coordinated through the TAD. The process for calibrating the model was completed in early 2007. The model calibration report (WRIME, 2007b) documents the model inputs and the calibration results. Three key uses of the model are:

- System Behavior and Impacts Study to formulate and compare alternatives and enhance understanding of the physical system response characteristics;
- Long Term Planning to assess the hydrologic responses to different planning scenarios; and
- Short Term Planning/Operational to estimate system operations using short-term predictive runs or to develop monitoring programs for water measurements.

The model and related data that has been collected can be used in the future to meet the following needs and provide the following benefits:

- To support the ongoing studies/projects related with the Kings IRWMP;
- To improve the efficiency and effectiveness of future model development and application efforts;
- To fill data gaps and prioritize other studies and data collection efforts to improve the understanding of the Kings Basin;
- To ensure data quality and integrity;
- Improves data collection, processing, and documentation process;
- Provides information to all project participants about the location, status, and source of data;
- Identify currently available data (format, source, location, status), and create a data inventory; and
- Document methodology and estimate missing data.

Model Uses during Development of the Upper Kings Basin IRWMP

The Kings IGSM is the tool used to document the scientific and technical merit, and the purpose and need for the Upper Kings Basin IRWMP and the proposed project. The calibrated model served to document the historical conditions in the basin, quantify overdraft, and create better understanding of how the Kings Basin has been operated in the past.

A baseline model was also developed as documented in Chapter 4. The model was used to evaluate the future, no- project conditions and document the size of overdraft that could result for two different development scenarios, the Existing Conditions and the 2030 Baseline Conditions. The Existing Conditions and 2030 Baseline Conditions model runs provide the reference frame for comparison of all alternatives; help to define the size of the water supply problem that the Kings IRWMP is trying to address; and support sizing of project facilities to increase the sustainable surface water and groundwater supplies.

Actions for Modeling

MOD Action 1 Apply Kings IGSM to Alternatives Evaluation

The Kings IGSM will support the Water Forum’s adaptive management strategy and will be applied to the comparison of alternatives; selection and sizing of facilities; determination of project feasibility; conduct of environmental evaluations; evaluation of project benefits and cost allocation; and procurement of permits and project approvals. The approach for conducting the

alternative analysis involves developing alternative model scenarios to represent the project conditions and operating assumptions. This can be done a number of ways and further work is required. Alternatives models are different variations of the baseline model with different model inputs to represent each of the projects or combination of projects and operating assumptions. The results of these models runs are used to determine the comparative impacts and benefits of different alternatives with reference to the baseline model results.

Costs: Estimated at \$100,000 to \$125,000

Timing: Immediate

Responsibility: KRCD, Technical Analysis and Data Work Group

Mod Action 2 Define studies to fill data gaps

The model development identified areas where further data would improve the overall model; reduce uncertainty and increase confidence in the results. The model calibration report documents the data gaps. The data network evaluation above will help to fill many, but not all of the gaps. The supervisory control and automated data acquisition systems of the irrigation districts are also needed to fill data gaps related to where water is distributed and recharge to the groundwater basin from canal seepage. Work needs to be done to further develop the scope of work, fill the data gaps and improve the knowledge base.

Costs: Vary by special study to be implemented.

Timing: Near- to Mid-Term

Responsibility: Technical Analysis and Data Work Group

MOD Action 3 Review modeling needs and develop plan for update or additional analysis tools

The Kings IGSM is a valuable tool for modeling the Kings Region. The model was also improved by the City of Fresno to allow for more detailed evaluation of conditions in and around the city. The model is still a regional model throughout the rest of the Kings Basin. The model also currently does not include a water quality component. This could be developed as the need arises.

Additional modeling tools could also be developed to compliment the Kings IGSM and provide benefits in analyzing future conditions. There is no operational model of the Kings River system of storage at Pine Flat and delivery down the Kings River and to the irrigation distribution system. The system of delivery and operations is quite complete and evaluation of

various operational conditions would benefit by a dedicated analytical tool that was capable of daily simulation of the systems. In addition, the Kings IGSM could be improved through integration with a canal network analysis tool that better quantifies the flows and losses through the irrigation systems, and is capable of evaluating hydraulic conditions. Such tools would also support design of system improvements, documentation of the recharge benefits, and confirmation of the overall distribution systems efficiency. Additional data collection would be needed to support development and calibration of such an analysis tool.

Costs: TBD

Timing: Mid- to Long-Term

Responsibility: Individual Irrigation Districts; KRWA in cooperation with KRCD; support through the Technical Analysis and Data Work Group

10.2 INSTITUTIONAL MANAGEMENT ELEMENTS

This section provides an overview of Funding and Governance options considered by the Water Forum to implement the Upper Kings Basin IRWMP. Final funding and governance approaches are presented below and summarized in Table 10-2.

The finance and governance options were discussed at multiple meetings of the PSC and Forum through the fall of 2006. Briefings were provided to the Forum to help evaluate alternative funding and governance approaches. Institutional and financial arrangements are needed to implement local and regional projects, improve groundwater management, prevent conflicts, and meet the IRWMP goals and objectives. This section also defines the principles for funding individual project and the common elements in the Upper Kings Basin IRWMP.

Historically, the stakeholders in the IRWMP Region worked cooperatively to fund and construct Pine Flat Reservoir. The cooperative approach to the management of the surface water resources and Pine Flat Reservoir continues today under the direction of the KRWA Board based on a range of complex agreements that dictate how the Kings River and Pine Flat are operated, funded and shared. The Water Forum stakeholders recognize that the previous fragmented approach to managing groundwater has not produced a consensus or a physical solution; that the groundwater basin is integrally connected; and that all parties need to work together to define institutional mechanisms to fund and provide oversight during implementation of the IRWMP and related projects. The stakeholders also recognize that to effectively solve overdraft, a different approach to management and governance of the groundwater basin should be considered.

Table 10-2. Institutional Management Elements

Action	Description	Roles and Responsibility	Time Frame ⁽¹⁾	Current Status
Finance (FIN)				
FIN 1	Adopt and accept Funding and Financing Policies	Water Forum	Immediate	Under development
FIN 2	Pursue Proposition 50 and 84 Grant	KRCD	Immediate	In Preparation
FIN 3	Negotiate and finalize the funding components for a Joint Powers Authority	Water Forum	Immediate	Future Task
FIN 4	Funding Source Review and Financial Plan	KRCD; Water Forum members	Mid-Term	Future Task
Governance (GOV)				
GOV 1	Negotiate and adopt an agreement to develop a Joint Powers Authority	KRCD; Water Forum	Immediate	Future Task
GOV 2	Adaptive Management Strategy	Water Forum	Immediate	Future Task
GOV 3	Do the other	KRCD, AID, FID, CID		Future Task
Water Forum Coordination and Community Affairs (CA)				
CA 1	Implement near term community affairs program	KRCD; District General Managers; Individual Forum members	Immediate	Completed/ Ongoing
CA 2	Host a tour of water banking facilities.	KRCD	Immediate	Future Task
CA 3	Update Stakeholder Involvement and Community Affairs Strategy	KRCD; Water Forum Education and Public Affairs Work Group	Near-Term	Completed/ Ongoing

⁽¹⁾ Immediate, Near-Term (1-3 yrs), Mid-Term (3-6), Long-Term (>6)

More recent history related to groundwater and surface water management demonstrates the independent nature and spirit of the water agencies, cities, land owners, and ditch companies, and the tendency to work within their own jurisdictions to fund and to resolve problems. The independent character of the agricultural community and agencies is part of the Kings Region cultural, economic, and political heritage, and has lead to the historical successes in water management and facility development. The independent nature has created also created fragmented governance and management of the groundwater resources; is a contributing factor in the basin overdraft; and may prove to be a constraint to developing physical solutions at the regional scale.

10.2.1 FUNDING AND FINANCING

This section provides a general overview of potential funding sources, programs, and project partnerships available from federal, state, and local sources. These were discussed by the Projects Work Group, PSC, and Water Forum. The Upper Kings Basin IRWMP documents the local funding and financing sources and potential strategies. Current funding approaches for the overlying irrigation districts and land use agencies (cities and counties) are briefly discussed to identify funding and financing opportunities for Upper Kings Basin IRWMP projects and programs.

The funding sources, agreements, and mechanisms will vary depending on the program or project; source of funds; how costs and benefits are distributed; and other political and economic variables. The development of new water supplies and the necessary infrastructure is a major financial undertaking that may require debt service.

Local resources need to be dedicated to implement projects and programs identified in the IRWMP and match state and federal grant monies; and provide for the long term maintenance and operations of project and the common program elements. State and federal grants may provide an opportunity to fund some activities, such as planning, feasibility study, and design work, but some programs such as monitoring and annual reporting require ongoing, stable funding from local sources. Low-interest loans may be available for capitalizing new facilities, acquiring land, and constructing projects, but local money would still be needed to retire debt and for long term operations and maintenance.

The IRWMP member agencies have identified local revenue to leverage outside funding from state and federal programs. The distribution of costs and benefits will be documented through programmatic engineering and economic evaluations. Where necessary within each of the jurisdictions, elections are to be held to seek approval for necessary assessments and fees. Increasing benefits assessments or fees by the overlying water or irrigation districts, or the land use agencies may require further studies and a special election pursuant to state law as defined by Proposition 218.

Potential Project Beneficiaries in the Upper Kings Region

Those stakeholders in the IRWMP Region that are the anticipated project beneficiaries include:

- AID, CID, FID, RCWD;
- City of Fresno, Clovis (Kings River water rights and/or CVP contractor);
- Other city and county municipal purveyors in the Upper Kings Region; and

- Development interests seeking to ensure a Long-Term, sustainable and viable water supply for new development.

Geographic Area of Benefit and Other Potential Project Users or Beneficiaries

The initial area of benefit is the Upper Kings Region. The area of benefits may be expanded to include additional partners and beneficiaries:

- Lower Kings Basin overlying groundwater pumpers that are KRWA members and in the Place of Use;
- Lower Kings Basin overlying groundwater pumpers that are not within the KRWA Place of Use;
- Other KRWA members; and
- Other non KRWA members, entities outside of the Upper Kings Region, and non- overlying entities that would benefit by having access to available groundwater storage in the Upper and Lower Kings Basin.

Funding Sources

Federal Funding

Federal funds can be made available to KRCD and KRWA member agencies through a variety of mechanisms, including subsidies, appropriations, in-kind services, grants, loans, and cost-sharing agreements. The following processes described how to securing these funds.

Legislative Approach

Federal funding can be secured through the legislative process to directly fund an approved project. KRCD and/or KRWA, working with a local congressional representative, can begin this process. The project may require the establishment of federal interest through an act of Congress (authorization) and then be funded in subsequent years (appropriation). An appropriation can be made the same year if the project is consistent with the goals and objectives of an existing federal program. Competition for Congressional funds is formidable and requires broad support of local, regional, and state interests for projects to be successful in obtaining funding.

Federal Agency Interest

Funding can also be secured for projects directly from federal agencies. Local projects may be consistent with the goals and objectives of an agency and eligible for funds and in-kind services

through directed actions and partnerships. Federal agencies commit to projects during their respective internal budgeting processes and have the flexibility to disperse funding over several years. KRCDD had several partnerships with the U.S. Bureau of Reclamation (USBR) and the U.S. Army Corps of Engineers. Both agencies have experienced funding reductions in recent years so the ability to partner with local agencies has been limited. Agencies, such as Fresno Irrigation District, have obtained Federal funding for projects as recently as 2007.

Federal Assistance Programs

A third option is to apply for project funding under an existing federal agency grant, loan, or assistance program. Potential partnering agencies include the USBR, U.S. Environmental Protection Agency (EPA), the Corps, United States Department of Agriculture (USDA), U.S. Fish and Wildlife Service (USFWS), and U.S. Geological Survey (USGS). Eligibility, cost sharing, and application requirements vary among the programs.

State Funding

State funds are similar to the federal funding mechanisms. The availability of state funds for water-resources projects is a reflection of the current fiscal climate. Propositions 13 and 204 have demonstrated the state and voter commitment to supporting locally sponsored groundwater recharge facilities and studies. Voter approval of Proposition 50, the \$3.4 Billion Water Security, Clean Drinking Water, and the Coastal and Beach Protection Act of 2002, is funding a variety of water resources–development programs. These programs include CALFED, Integrated Storage Investigations, and other grants and loans for groundwater recharge construction projects. Currently Proposition 84 was passed by the voters will provide another \$1.0 billion which can be used towards IRWMP related efforts.

Legislative Approach

Although the dollar amounts available from the state are usually not as substantial as federal funding opportunities, the state legislative process is somewhat more straightforward. Appropriating funds through the state legislature is extremely competitive and subject to the state budget conditions.

State Agency Interest

Discretionary funds may be available in the form of directed action assistance or in-kind services. Partnerships with agencies such as the DWR Division of Planning and Local

Assistance (DPLA), Department of Fish and Game, and CALFED may yield monies and services. The current MOU for the Upper Kings Water Forum is an example.

State Assistance Programs

Finally, a third option is to apply for project funding under an existing grant, low-interest loan, or assistance program administered by any of the various state agencies. Under Proposition 13, the Safe Drinking Water, Clean Water, Watershed Protection, and Flood Protection Act of 2000, approximately \$200 million statewide for groundwater management and recharge projects was provided through the DWR DPLA. Similarly, Proposition 13 provided a major source of funding for the CALFED Bay-Delta Program and other such programs administered by SWRCB. A number of local projects were funded in the Kings Region from these sources.

Local Funding

Local funding will vary by source and agency authority. City and county government can generate local funding from a variety of sources including: general funds, water rates, development or impact fees, sales tax connection fees, capital improvement programs, revenue bonds, acreage or ad valorem assessments, and sales taxes.

The water districts can generate local funds through benefits assessment, water standby and availability charges, sales taxes, water service fees, developer fees; or by generating revenue through water sales, groundwater banking, exchange, or transfer related contracts.

Funding Trends

A number of key trends related to state and federal funds will influence local access to outside sources of funds and the Upper Kings Basin IRWMP financial strategy.

- **State and federal deficits.** Deficits have reduced the availability of general-fund revenues to the agencies that previously provided technical support and funds for water-project development.
- **Reduced state and federal grant and loan funding.** Many state and federal programs for grant and loan funding have been curtailed as more pressing social needs redirect funds.
- **Bond funding of studies and planning.** Propositions 204, 13, 50 and 84 have provided a source of money for groundwater investigations, project construction, and groundwater management plans. These funding sources have been depleted or are likely to be oversubscribed and competitive. The will of the voters for additional state debt, along with the state bonding capacity, may be nearing its limits.

- Increased requirements for generating special district fees and assessments. Proposition 218 did for special districts what Proposition 13 did to local government ad valorem taxes. Any new fee or assessment requires voter approval and compliance with legislative and constitutional mandates to conduct the election, and engineering studies to prove benefits and distribute costs.
- State move toward fee-based revenue for service. Reduced general-fund revenues have put the burden on state agencies to increase fees for service such as water-rights permits, dam safety, and other payments by the regulated community.
- Increased competition for grant and loan funds. Reduced local government revenues increase competition for any sources of non-local funds.
- Beneficiary pays principal. Large state and federal programs, such as CALFED, are requiring detailed economic analyses that document who receives project benefits and how payment for program implementation is to be distributed.

IRWMP Approach and Policy to Finance and Funding

FIN Action 1: Adopt and accept Funding and Financing Policies

The Water Forum principles for funding project elements and common program elements are discussed below. For project elements that have been integrated into the RCUP:

- Local funding sources must be firmly defined for all projects and local funding.
- Proposition 50 and 84 should be allocated to IRWMP immediate- and Near-Term priorities as defined by the Water Forum. The IRWMP scoring has been, and will continue to be based in part on whether the project proponent's plan describes a feasible program of financing for implementation of projects and for the long term maintenance and operations.
- Near-, mid-, and long term IRWMP needs are to be met by seeking funding from all available local, state, and federal sources, matched with local dollars.
- Local funding match requirements are to be provided by the project stakeholder or stakeholders (partners) that are the direct beneficiaries as defined by engineering and economic evaluations.
- Specific agreements between partners for a project must clearly define the mechanism for cost sharing and ongoing project maintenance and operations.
- All new projects not already covered by an existing funding mechanism will need to expeditiously engage their communities and obtain approvals for any new project funding, whether for capital formation or for maintenance and operations of new facilities or programs.

- Impact fees on new development are appropriate for funding IRWMP related projects where the nexus between the development and impacts to the groundwater basin can be substantiated by a groundwater impact study.

For IRWMP common elements defined in the IRWMP, the following funding principles apply:

- The common elements represent programs to meet common needs of the overlying water users in the Kings Basin and all stakeholders derive some benefit from implementing these programs.
- The common elements can most cost effectively be implemented and managed by one agency.
- KRCD is the lead to implement common elements and should be compensated for services provided in coordinating programs for the Water Forum.
- AID, CID, FID, KRCD and the other partners in the Upper Kings Basin IRWMP shall finalize agreements to equitably apportion costs for the common elements and will work to memorialize the cost distribution and revenue requirements in a revised MOU or through formation of a Joint Powers Authority.

FIN Action 2 Pursue Proposition 50 and 84 Grants

KRCD will lead the stakeholder effort to pursue Proposition 50 and 84 Grants. This includes preparation of the Proposition 50 Round 2, Step 1 Implementation Grant application and the Step 2 application if invited back by DWR. Preparation of the Step 2 application will have some costs and likely require outside technical engineering assistance to prepare necessary application materials; funding and support from priority projects sponsors to KRCD; and intensive involvement by stakeholders. This is also to track and prepare the Proposition 84 grant applications.

Costs: KRCD staff time. Contract support TBD.

Timing: Immediate- and Near-Term

Responsibility: KRCD, support by project sponsors.

FIN Action 3 Negotiations and finalize the funding components for a Joint Powers Authority

KRCD will work with the rest of the Water Forum to form a JPA negotiating team to define and prioritize common elements, finalize funding requirements, and incorporate the final approach into the proposed JPA.

Costs: KRCD and Water Forum members staff time.

Timing: Immediate

Responsibility: KRCD; Subcommittee of the Water Forum.

FIN Action 4 KRCD monitor and track funding sources

KRCD will track federal, state, and regional funding sources and keep the Water Forum apprised of opportunities to write grants to obtain funding for IRWMP implementation plan priorities. A standing Water Forum agenda item on funding sources will be used to brief the community.

Costs: KRCD staff time.

Timing: Ongoing

Responsibility: KRCD; Water Forum Funding and Financing Work Group.

FIN Action 5 Develop Mid- and Long-Term Financial Plan

KRCD will provide support to the Water Forum to define mid- and Long-Term capital improvements and project needs as part of an adaptive management strategy, and a detailed financial plan will be developed for regional and inter- regional projects. KRCD will coordinate these efforts; track legislation; developing political consensus; coordinate with state and federal legislative representatives on funding priorities; and specifically seeking dedicated funds from state and federal sources. KRCD will:

- Continue working with the cities, county, LAFCOs and other special districts to identify water quality capital facility priorities for drinking water treatment plants and wastewater treatment plants;
- Special emphasis is to be place on further identification of the needs of DACs; and
- Coordinate efforts to further develop programs that implement the Water Forum Water Quality Position Statements presented in Chapter 7.

Costs: KRCD, and Water Forum members staff time.

Timing: Near- to Mid-Term

Responsibility: KRCD; Water Forum.

10.2.2 GOVERNANCE

An oversight and governance mechanism has been identified to provide oversight during implementation of the Upper Kings Basin IRWMP and to adapt to changing circumstances within the Kings Region. Since the King Basin groundwater is a common and shared resource,

and because the IRWMP unifying theme is the Regional Conjunctive Use Program, this sections reviews methods for Management of Groundwater in California. This section also documents the institutional structures that were evaluated to define how the Upper Kings Basin IRWMP would be implemented.

Methods of Groundwater Management in California

DWR has identified six methods of groundwater management in California. They are listed below along with the identification of management authority and extent (*parenthesis*) in the chronological order in which they have been developed:

- Overlying Property Rights (property owner);
- Statutory Authority (legislatively defined local agency or district);
- Adjudicated Groundwater Basins (groundwater basin, water master or court);
- Groundwater Management Districts or Agencies (legislatively defined local agency or district);
- Groundwater Management Plan (AB 3030, SB 1938) (local agency or district); and
- City and County Ordinances (city or county).

Based on this list, it is apparent that there can be overlapping jurisdictions and approaches to groundwater management. If groundwater management is not developed appropriately, the presence of multiple jurisdictions can lead to complicated and potentially conflicting groundwater management approaches within a basin.

In California, surface water and groundwater rights are separate and distinct. This has an influence on how the resources are governed and managed at the local level. A permit application process for appropriating surface water in California is contained in the California Water Code. The California Water Code does not authorize the State of California to manage groundwater; therefore, groundwater rights have evolved through a series of court decisions dating back to the late 1800s. Recently, through legislation and as supported by bond funding, DWR has helped local entities develop local groundwater management plans, groundwater related projects, and conjunctive use strategies. These are discussed further below.

Kings Basin Groundwater Management

In general, water interests in the Kings Basin have not historically governed, managed, and operated the groundwater basin in an integrated manner.

Although there is currently no groundwater management authority in the Kings Basin, groundwater management is practiced primarily through exercise of the overlying property

rights and through development of local groundwater management plans by AID, FID and CID, and by RCWD and other interest in the Lower Kings Basin. Local surface water is managed under a system of agreements and entitlements coordinated by the Kings River Water Associations (KRWA). KRWA demonstrates that local entities can resolve long-standing disputes and there is a history of surface water management, but no similar institutional arrangements are in place to locally manage groundwater resources. KRCD does not have legislative groundwater management authorities and provides services and support only when requested. Their role has been primarily one of coordination rather than of active governance or management of the groundwater basin. KRCD has been very active in supporting local water management districts and ditch companies to obtain state grant funding to develop local GWMPs, conduct technical studies, and construct groundwater recharge projects.

Potential Approaches for the Upper Kings Basin IRWMP

The Water Forum recognizes that projects developed by consensus through a collaborative process have the greatest potential to retain local control of the groundwater basin and to increase the likelihood of success for project implementation. Implementation of the Upper Kings Basin IRWMP can best be achieved by continuing to develop a broad base of political and financial support. This discussion below outlines the collaborative processes and organizational structures that were considered by the Water Forum that would allow all individual users and districts the authority to implement the IRWMP, while at the same time harnessing the collective authorities of each stakeholder. Two major management processes have been considered as outlined below—the individual interest-based model and the mutual interest-based model. The individual interest-based model represents the historical management of groundwater in the Kings Basin. The following text describes the two models in more detail and the advantages and disadvantages of each model. A governance model can be combination of the two so that the advantages of regional water management are realized without individuals feeling a loss of control over local management.

Individual Interested-Based Model

Under the individual interested-based model, stakeholders would govern and develop water resource projects individually. This has been the current model for the Kings Basin. This model would continue to serve as a voluntary outreach approach, and meetings would be hosted by KRCD, where representatives from each stakeholder group could get together to discuss and seek to resolve regional water resources and groundwater issues. At these meetings, agreements can be made if multiple groups would like to contribute to the development of regional projects; however, the ultimate project-making authority would remain within the entity that is sponsoring the project. Financing would also be the responsibility of the

sponsoring agency or group. The other water management agencies could guide subsequent actions and provide funding. Advantages to this approach are as follows:

- Allows agencies to focus their resources on projects that are specific to their needs,
- No loss of control over management of individual groundwater resources, and
- Easiest to implement because it is a continuation of the current approach to groundwater management in the region.

Disadvantages to this approach are:

- More difficult to pursue regional projects that would benefit the entire Kings Basin;
- Confusion over who coordinates projects and what role each agency plays during regional project planning, construction, operation, and maintenance;
- Inability to generate economies of scale for large projects;
- Projects that benefit only individual entities are less likely to receive state and federal funding;
- Nothing to prevent individual stakeholders from undertaking actions that are not complementary to the IRWMP for the whole Kings Basin; and
- No framework to resolve conflicts among individuals.

Mutual Interest–Based Model

Under the mutual interested–based model, a group of stakeholders in the Kings Basin would form an institutional framework to undertake the specific IRWMP projects. The stakeholders would enter into more formal arrangements such as 1) joint-power agreements (JPA), 2) coalitions, or 3) regional groundwater improvement district. The new institution would have representation from each stakeholder in the region and would act as the governing body and funding mechanism for development of groundwater and conjunctive use projects in the region. The level of organization and formality vary with the different approaches as shown in Figure 10-1.

A MOU is a relatively informal agreement between individual public agencies to pursue a common purpose or goal. The organization formed would essentially be a continuation of the Forum efforts, and would not have any formal power and it could not undertake large regional projects or enforce regulations. In effect, a MOU is basically a “gentlemen’s agreement” between all the agencies involved.

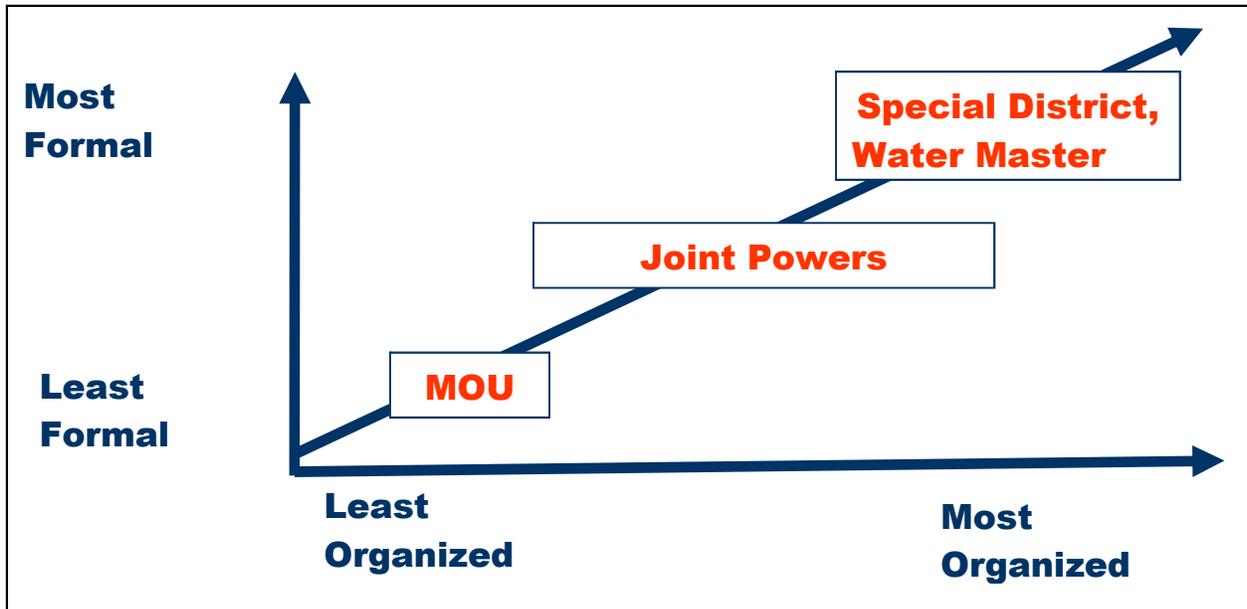


Figure 10-1. Level of Formality and Organization from Different Management Approaches

The JPA provides a formal contract among individual public agencies to jointly exercise the powers of each public agency. A JPA could be organized in any way the members wish. Most JPAs have a governing board made up of elected or appointed members of each participating entity. This can include funding authorities. The governing board sets the policy direction for the JPA and coordinates the means by which to enforce the policy.

The mutual interest–based approach would help ensure that Upper Kings Basin IRWMP actions are carried out and provide stable funding and institutional mechanisms for implementing projects. In the longer term, a set of policies, agreements, or regulations could be developed that would ensure local interests control and manage the resources. For example, regional banking would require rules and regulations to protect local interests and maintain local control.

The institution or organization would be responsible for planning, construction, operation, and maintenance of projects outlined in the IRWMP, and for establishing any operating rules or regulations designed to protect and preserve local authority. It could have the power to raise money for projects and could also employ staff to ensure that its objectives are met.

Advantages to this approach are:

- Ensures that the goals and objectives are met and that the regional benefits are realized;
- Projects proposed by the governing body are much more likely to receive state funding; and

- Easier to resolve individual conflicts internally.

The obstacles that must be overcome to make this approach work are:

- Overcoming historical disputes between individuals, groups, or organizations in the region;
- Ensuring that every stakeholder has fair representation in the governing body. (For example, have each stakeholder’s vote weighted by a factor of acreage, water use, population, monetary contribution, etc.);
- Ensuring that the institution formed is perceived as legitimate by both the locals and the state government;
- Obtaining funding for the institution;
- Ensuring that the institution does not threaten the development of individual projects as long as they still meet the regional goals and objectives;
- Ensuring that disadvantaged communities, special-interest groups, and new stakeholders have a means by which to be included and represented in the governing body; and
- Agreeing on regulations that must be easily understood and easy to enforce and on penalties if the regulations are not followed.

Joint Powers Authority

KRCD requested WRIME to prepare a short review and summary of Joint Powers Agreement (JPA) used by other agencies in California to implement integrated projects similar to those being considered by the Upper Kings Water Forum. WRIME worked with DWR to identify, collect, and summarize JPAs from similar groups across the state. This effort was intended to assist the stakeholders in developing an appropriate institutional framework for implementing IRWMP projects. JPAs collected, summarized and discussed by the Forum include:

- Sacramento Groundwater Authority,
- Regional Water Authority,
- San Timoteo Watershed Management Authority,
- American River Authority, and
- Northeastern San Joaquin County Groundwater Banking Authority.

The JPA have very similar components, with some variation based primarily on the purpose of the new authority (i.e., formed for a specific project or for more broadly stated goals). As a group, the JPAs can be used as a template to create a comprehensive JPA for the Upper Kings Basin IRWMP region. Table 10-3 summarizes the content of the 5 JPAs using 16 broad topics- indicating whether these topics are included in the JPA or not. The JPAs may have included the same topic, but may have substantive differences in how the topics are treated. Note that the

selected topics list is only intended as a general overview and is not an exhaustive summary or comparison of the content of the documents. Copies of the documents have been added to the project archives.

Table 10-3. Comparison of Joint Powers Agreements

Item	Authority				
	SGA	RWA	ST	ARA	GBA
Length (Pages)	17	13	13	17	7
Mission Statement/Goals/Principles/Purpose	Y	Y	Y	Y	Y
Boundaries	Y	Y	Y	N	N
Powers and Limitation	Y	Y	Y	Y	Y
Board of Directors/Governing Board/Commission	Y	Y	Y	Y	Y
Voting	Y	Y	Y	Y	Y
Executive Director	Y	Y	Y	N	N
Committees formed by/at pleasure of Board	N	Y	Y	N	N
Meeting/Quorum Rules (Brown Act)	Y	Y	Y	Y	Y
New Member Guidelines	N	Y	Y	Y	N
Discription and Procedures for Projects to be Undertaken	N	Y	N	Y	Y
Budgets and Payments	Y	Y	Y	Y	Y
Financing	N	Y	N	Y	Y
Accounting/Audits	Y	Y	Y	Y	Y
Liabilities	Y	Y	Y	Y	N
Recession/Termination/Withdrawal/Assignment	Y	Y	Y	Y	Y

SGA-Sacramento Groundwater Authority
 RWA-Regional Water Authority
 ST-San Timoteo Watershed Management Authority
 ARA-American River Authority
 GBA-Northeastern San Joaquin County Groundwater Banking Authority

Institutional Structure and Approach to Implementing the Upper Kings Basin IRWMP

GOV Action 1 Negotiate and adopt an agreement to form Joint Powers Authority

The Water Forum has elected to develop a JPA to include the signatories of the original MOU. The JPA will be used for formalize governance and financing of the IRWMP management actions. A subcommittee of the Water Forum will be formed to develop a draft JPA agreement to circulate to the elected bodies for adoption. The goal would be to adopt the JPA by the time the Proposition 50 Step 2 application would be due, but no later than the due date for Proposition 84 grant application.

Costs: KRCD and Water Forum members staff time.

Timing: Immediate

Responsibility: KRCD to facilitate. Each stakeholder to participate in negotiating the JPA.

GOV Action 2 Adaptive Management Strategy

The Water Forum JPA will include the process for updating and revising the IRWMP as circumstances change. The adaptive management strategy needs to be more formalized and is intended to allow for decisions on interim changes to project priorities; to respond to changing physical conditions (e.g.; climatic change, drought); or adapt to changing policy circumstances (e.g.; grant opportunities; adoption of new members; expansion of the Kings Region).

Cost: Water Forum participant staff time.

Responsibility: Water Forum.

Time Line: Immediate to Near-Term. Goal of September 2007.

GOV Action 3 Establish a negotiating team to work with others in the Tulare Basin

The funding for Proposition 84 is based on hydrologic region. A Water Forum negotiating team is needed to track the other IRWMP efforts in the Tulare Basin and coordinate with other interests. Coordination may include adoption of an MOU or JPA for the larger region.

Costs: KRCD and Water Forum negotiation team staff time.

Responsibility: Water Forum; Inter- Region Negotiating Team

Time Line: Immediate to Near-Term. Goal of September 2007.

10.2.3 WATER FORUM STAKEHOLDER INVOLVEMENT AND COMMUNITY AFFAIRS

CA Action 1 Implement near term community affairs program

A set of near term actions are needed generate public support and awareness for the plan and create political momentum for its adoption, implementation, and funding. This includes completion of the JPA to define funding and governance roles and responsibilities. The target audience is both the public and decision makers to gain support for the Upper Kings Basin IRWMP implementation plan and gain support for adoption of the JPA. Near term actions include:

- Refine the major messages;
- Develop six month budget and detailed calendar of actions;
- Press release on draft documents;

- Produce slide show presentation to explain the problems, goals and objectives, and priorities of the Upper Kings Basin IRWMP;
- Produce collateral materials for distribution including:
 - Backgrounder – a detailed document describing the history of the Water Forum, the need for its services, and the value that it brings to the service area;
 - Point of View – a several page description of the organization’s view on current issues and how it will approach these issues;
 - Fact Sheet – a one or two page document that highlights the crucial facts needed to understand water resource issues in the region;
 - Case Study – an example of how similar efforts worked in other regions of the State;
 - Media Kit – a compilation of PR materials that is used to communicate the Water Forum’s messages to a desired audience; and
 - Article Abstracts – specific article ideas sent to editors and writers to suggest a story that will relate to the organization’s goals.
- Editorial Pitching – contact with targeted editors and writers to develop story ideas and secure coverage;
- Press Tour – a scheduled campaign of face-to-face meetings with targeted editors, writers, and other thought leaders to develop personal relationships and accurately convey the desired messaging through dialogue;
- Water Forum members need to further reach out to business and community groups and be activist in the speakers bureau; and
- Seek to get on the local public television and radio talk shows.

Costs: \$35,000 in KRCD staff time. \$7,500 to \$10,000 in printing and other direct costs.

Responsibility: Individual Water Forum members; District General Managers; KRCD staff support.

Time Line: Immediate to Near-Term.

CA Action 2 Host a tour of water banking facilities.

The target audience is the elected officials of current Water Forum members which may not have been as actively engaged in the development of the Upper Kings Basin IRWMP. Concept is to visit local recharge facilities and projects to discuss the program (e.g.; Leaky Acres; Fresno or Clovis SWTP; Canal facilities; Kings River Diversion; Pine Flat Dam, FID Waldron Groundwater Banking Facility, etc.).

Costs: \$7,500 in KRCD staff time. \$2,000 in other direct costs.

Responsibility: KRCD to coordinate.

Time Line: Immediate to Near-Term.

CA Action 3 Update Stakeholder Involvement and Community Affairs Strategy

The existing strategy has served the Water Forum. Not all of the strategies that were included in the plan have been able to be implemented given the timing of the project and available resources. The pending Proposition 84 funding cycle also provides a “driver” to update the plan. There is additional work to do to educate both the public and the different decision making bodies and a concerted effort is needed to gain acceptance of the community to fully implement the Upper Kings Basin IRWMP and adopt a JPA that will ensure success.

Costs: \$15,000 in KRCD staff time

Responsibility: Water Forum individual members; Education and Outreach Committee, District General Managers; KRCD

Time Line: Immediate to Near-Term.

Numerous documents were used in developing the Kings Basin IRWMP work plan. A list of the references and data sources, including a bibliography, is provided below as supporting documentation for the work plan. The KRCD can provide these documents to the interested parties.

40 CFR, 1995. *Environmental Protection Agency Code of Federal Regulations*. Washington D.C.

AB 3616, 1990. *Agricultural Water Suppliers Efficient Water Management Practices Act of 1990*. Sacramento, CA.

AID, 1999. *Water Management Plan for Alta Irrigation District*. Dinuba, CA.

Bertoldi, G. L., R. H. Johnson, and K. D. Evenson. 1991. *Groundwater in the Central Valley California—A Summary Report*. US Geological Survey Professional Paper 1401-A.

CALFED, 2003. *Guide to Regulatory Compliance For Implementing CALFED Actions, Volume 1: General Guidance*. Sacramento, CA.

California Water Service Company, 2002. *Urban Water Management Plan for the Selma District*. September 2002.

CH2M Hill, 1992. *Fresno/Clovis Metropolitan Water Resources Management Plan, Phase II Report, Water Supply Alternative*.

City of Clovis, 1991. *Water System Master Plan*. Clovis, CA.

City of Clovis, 1993. *City of Clovis General Plan*. Clovis, CA.

City of Clovis, 1996. *Wastewater Master Plan Update*. Clovis, CA.

City of Clovis, 2003. *Southeast Urban Center Specific Plan*. Clovis, CA.

City of Clovis, 2005. *Urban Water Management Plan*. Clovis, CA.

City of Dinuba, 2005. *Urban Water Management Plan*. Dinuba, CA.

City of Fresno, 2002. *2025 Fresno General Plan*. Fresno, CA.

City of Fresno, 2006. *Fresno Metro Plan (Draft)*. Fresno, CA.

- City of Fresno, 2007. *About Wastewater Management*. Fresno, CA.
- City of Reedley, 1993. *City of Reedley General Plan 2012*. Reedley, CA.
- City of Reedley, 2005. *2005 Urban Water Management Plan for the City of Reedley Municipal Water System*. Reedley, CA.
- City of Reedley, 2006. *Wastewater Treatment Plan 2006*. Reedley, CA.
- City of Sanger, 2000. *Urban Water Management Plan*. Sanger, CA.
- City of Sanger, 2006. *Wastewater Treatment Plan 2006*. Sanger, CA.
- City Water Survey, 2005. *A Report Prepared by The United States Conference of Mayors Urban Water Council*. Sacramento, CA.
- Clean, Safe Water for the 21st Century, *A Renewed National Commitment to Water and Wastewater Infrastructure*. *Water Infrastructure Network*. Sacramento, CA.
- CWC §... California Water Code Sections. Sacramento, CA.
- Decision 1290, 1967. State Water Resources Control Board. Sacramento, CA.
- DHS, 2001a. *Guidelines for the Preparation of an Engineering Report for the Production, Distribution, and Use of Recycled Water*. Sacramento, CA.
- DHS, 2001b. *"The Purple Book" California Health Laws Related to Recycled Water*. Sacramento, CA.
- DHS, 2004. *2004 Annual Report to the Drinking Water Program, For Year Ending December 31, 2004*. Sacramento, CA.
- DHS, 2004. *DWSAP Source Water Assessments*. Sacramento, CA.
- DHS, 2006. *Groundwater Recharge Reuse DRAFT Regulations 12-01-04*. Sacramento, CA.
- DWR, 2002. *Final Recommendations Report*. California Floodplain Management Task Force. Sacramento, CA.
- DWR, 2003a. *California's Groundwater - Bulletin 118, Update 2003*. Sacramento, CA.
- DWR, 2003b. *Water Recycling 2030, Recommendations of California's Recycled Water Task Force*. Sacramento, CA.
- DWR, 2004a. *Integrated Regional Water Management Grant Program Guidelines*. Sacramento, CA.

- DWR, 2004b. *The California Water Plan Draft*. Sacramento, CA.
- DWR, 2005a. *Proposal Solicitation Package for Implementation Grants, Step 1 From Integrated Regional Water Management Grant Program Authorized Under Proposition 50, Chapter 8*. Sacramento, CA.
- DWR, 2005b. *Responding to California's Flood Crisis*. Sacramento, CA.
- DWR, 2005c. *The California Water Plan Update 2005*. Sacramento, CA.
- DWR, 2006. *Proposal Solicitation Package for Implementation Grants, Step 2 – 1st Funding Cycle From Integrated Regional Water Management Grant Program Authorized Under Proposition 50, Chapter 8 Final*. Sacramento, CA.
- DWR/SWRCB, 2004. *Integrated Regional Water Management Grant Program Guidelines*. Sacramento, CA.
- EPA, 2002. *The Clean Water and Drinking Water Infrastructure Gap Analysis*, EPA-816-R-02-020. Washington D.C.
- Fresno County, 2000. *Fresno County General Plan Policy Document*, October 3, 2000. Fresno, CA.
- Fresno County, 2000. *The Fresno County General Plan Background Report*. October 2000. Fresno, CA.
- Fresno County, 2000. *Voluntary Rangeland and Foothill Water Quality Guidelines*. Fresno, CA.
- Fresno County, 2004. *The Fresno County General Plan*. Fresno, CA.
- Fresno Irrigation District, 1993. *Support Documents for Fresno Irrigation District Groundwater Management Plan*. Fresno, CA.
- FID, 1996. *Fresno Irrigation District Groundwater Management Plan*. Fresno, CA.
- FID, 2000. *Water Conservation Plan, 5 Year Update* Fresno, CA.
- FID, 2005. *Groundwater Management Plan (Draft)*. Fresno, CA.
- Forum, 2004. *Water Forum Concept Paper*. Fresno, CA.
- Forum, 2006. *Position Statement/Principles: Integrated Water Quality and Sustainable Infrastructure Program for Clean and Safe Water*. Fresno, CA.
- FMFCD, 2004. *District Services Plan*. Fresno, CA.

- Hanak, 2003. *California Water Market, by the Numbers*. Public Policy Institute of California. San Francisco, CA.
- Ireland, R. L., Poland, J. F., AND Riley, F. S., 1984. *Land Subsidence in the San Joaquin Valley, as of 1980*, U. S. Geological Survey Professional Paper 437-I, 93 p.
- Ireland, R.L., et al., 1984. *Land Subsidence in the San Joaquin Valley, as of 1980*. USGS Professional Paper 437-1.
- Kings River Conservancy, 2005. *The Kings Ribbon of Gems A Concept for the Lower Kings River*. Sanger, CA.
- KRCD News, Quarterly KRCD Publication. Fresno, CA.
- KRCD, 1974. *Master Plan*. Fresno, CA.
- KRCD, 1979. *Groundwater Recharge Study*. Fresno, CA.
- KRCD, 1991. *Alta Irrigation District Surface Water Study*. Fresno, CA.
- KRCD, 1993. *Consolidated Irrigation District Surface Water Study*. Fresno, CA.
- KRCD, 1995. *Groundwater Management Plan for Kings River Conservation District Area A*. Fresno, CA.
- KRCD, 1996. *Groundwater Management Plan for Kings River Conservation District Area B*. Fresno, CA.
- KRCD, 1998. *Groundwater Management Plan for Kings River Conservation District Area C*. Fresno, CA.
- KRCD, 1999a. *Artificial Groundwater Recharge in the Kings Service Area*. Fresno, CA.
- KRCD, 1999b. *Artificial Recharge in the Kings River Service Area*. Fresno, CA.
- KRCD, 1999c. *Consolidated Irrigation District Ponding Basin Volume*. Fresno, CA.
- KRCD, 2000. *Feasibility Study Report. Preliminary Design and Estimate of Costs for Two Potential Groundwater Recharge Sites Within the McMullin Recharge Project Area*. Fresno, CA.
- KRCD, 2001. *Kings River Service Area, Annual Groundwater Report 2000*. Fresno, CA.
- KRCD, 2004. *Unpublished City Limit Data*. Fresno, CA.

- KRCD, 2005a. *Annual Report 2004-2005*. Fresno, CA.
- KRCD, 2005b. *Public Outreach and Community Affairs Strategy*. Fresno, CA.
- KRCD, 2006a. *Annual Report 2005-2006*. Fresno, CA.
- KRCD, 2006b. *Environmental Baseline Conditions*. Fresno, CA.
- KRCD/KRWA, 1997. *The Kings River Handbook*. Fresno, CA.
- KRWA, 2001. *Summary of Flood Releases from Pine Flat Reservoir 1954-2000*. Revised August 3. Fresno, CA.
- KRWA, 2005. *Unpublished Kings River Flow Data Measured Below Weirs Data*. Fresno, CA.
- National Water Research Institute, 1998. *Water Research Institute Annual Technical Report FY 1998*. Fountain Valley, CA.
- OPR, 2003. *General Plan Guidelines*. California Office of Planning and Research. Sacramento, CA.
- OPR, 2003. *Local Agency Formation Commission Municipal Service Review Guidelines (FINAL)*. Governor's Office of Planning and Research. Sacramento, CA.
- Provost and Pritchard, 1995. *Feasibility of Utilizing the City of Fresno's Wastewater for Raisin City Water District*. Fresno, CA.
- Provost and Pritchard, 2005. *Unpublished Canal Characteristic Data*. Fresno, CA.
- Provost and Pritchard, 2005. *Unpublished Water Delivery and Water Entitlement Data in Lower Kings Basin*. Fresno, CA.
- Quad Knopf, 1997. *City of Dinuba General Plan EIR*. Visalia, CA.
- Quad Knopf, 1997. *City of Dinuba General Plan*. Visalia, CA.
- Quad Knopf, 2001. *County of Tulare General Plan Background Report*. Visalia, CA.
- Quad Knopf, 2001. *General Plan Policy Summary*. Visalia, CA.
- Recycled Water Task Force, 2003. *Water Recycling 2030*. Sacramento, CA.
- RWQCB, 1998. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition*. Fresno, CA.

- RWQCB, 2002. *Central Valley Regional Water Quality Control Board Watershed Management Initiative Plan*. Fresno, CA.
- RWQCB, 2003. Resolution R5-2003-0105. Sacramento, CA.
- RWQCB, 2004. *Water Quality Control Plan for the Tulare Lake Basin (Basin Plan)*. Fresno, CA.
- RWQCB, 2006. *2006 CWA Section 303(d) List of Water Quality Limited Segment*. Fresno, CA.
- State of California, 2006. *Water Code*. Sacramento, CA.
- State of California, 2000. *Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000*. Sacramento, CA.
- SWRCB, 1988. *Resolution 88-63: Sources of Drinking Water*. Sacramento, CA.
- SWRCB, 1995. *Water Quality Control Plan for the Delta*. Sacramento, CA.
- SWRCB, 2000. *Plan for California's Nonpoint Pollution Control Program*. Sacramento, CA.
- SWRCB, 2001. *Strategic Plan*. Sacramento, CA.
- SWRCB, 2002. *Water Transfer Issues in California, Final Report to the California State Water Resources Control Board by the Water Transfer Workgroup*. Sacramento, CA.
- SWRCB, 2004. *Water Recycling Funding Program Guidelines*. Sacramento, CA.
- Tulare County Association of Governments, 2003a. *Tulare County Data Book Census 2000*. Visalia, CA.
- Tulare County Association of Governments, 2003b. *Tulare County Association of Governments Directory 2003–2004*. Visalia, CA.
- Tulare County Association of Governments, 2003c. *Tulare County Data Book*. Visalia, CA.
- Tulare County, 2004a. *General Plan Background Report Draft*. Visalia, CA.
- Tulare County, 2004b. *Preliminary Issues Report, Tulare County General Plan*. Visalia, CA.
- Tulare County, 2005a. *Tulare County General Plan Policy Alternatives*. Visalia, CA.
- Tulare County, 2005b. *Policy Direction Update, Tulare County General Plan*. Visalia, CA.

- Tulare County, 2005c. *Tulare County Policy Alternatives Report, Tulare County General Plan*. Visalia, CA.
- Tulare LAFCO, 2002. *Policy and Procedure Manual*. Visalia, CA.
- United States, 1972. *Clean Water Act*. Washington, D.C.
- U.S. Fish and Wildlife Service, 2001. *Biological Opinion for the Friant Division Water Contract Renewals, Sacramento, California*. Sacramento, CA.
- USBR, 1999. *Programmatic Environmental Impact Statement for the Central Valley Project Improvement Act*. Fresno, CA.
- USBR, 2000. *Draft, Friant Division Long-Term Contract Renewal Environmental Assessment*. Fresno, CA.
- USBR, 2001. *Final, Friant Division Long-Term Contract Renewal Environmental Assessment and Finding of No Significant Impact*. Fresno, CA.
- USBR, 2005. *Mid-Pacific Region 2005 Conservation and Efficiency Criteria*. Sacramento, CA.
- WRIME, 2002a. *Upper Kings River Basin Phase Ia Basin Assessment Report*. Prepared for Upper Kings River Basin ISI Participants in Coordination with California Department of Water Resources, Division of Planning and Local Assistance, Conjunctive Water Management Branch. Sacramento, CA.
- WRIME, 2002b. *Upper Kings Basin Phase IB Basin Assessment Report*. Sacramento, CA.
- WRIME, 2003a. *Upper Kings Basin Conjunctive Use Project Assessment*. Prepared for Upper Kings River Basin ISI Participants in Coordination with California Department of Water Resources, Division of Planning and Local Assistance, Conjunctive Water Management Branch. Sacramento, CA.
- WRIME, 2003b. *Upper Kings Basin Assessment Report*. Prepared for Upper Kings River Basin ISI Participants in Coordination with California Department of Water Resources, Division of Planning and Local Assistance, Conjunctive Water Management Branch. Sacramento, CA.
- WRIME, 2004. *White Paper No: 1, Summary of Land Use and Water Use*. Prepared for the Upper Kings River Basin Water Forum and The California Department of Water Resources. Sacramento, CA.

- WRIME, 2005a. *Lower Kings Basin Groundwater Management Plan Update*. Prepared for the Kings River Conservation District. Sacramento, CA.
- WRIME, 2005b. *Hydrologic Modeling in Kings Basin, A White Paper*. Prepared for the Upper Kings Water Forum. Sacramento, CA.
- WRIME, 2006a. *Analysis of Water Demand in the Kings Basin. Technical Memorandum, Phase 1, Task 3*. Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation District with support from the California Department of Water Resources. Sacramento, CA.
- WRIME, 2006b. *Analysis of Water Supplies in the Kings Basin. Technical Memorandum, Phase 1, Task 4*. Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation District with support from the California Department of Water Resources. Sacramento, CA.
- WRIME, 2006c. *Baseline Conditions. Technical Memorandum. Phase 1, Task 5*. Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation District with support from the California Department of Water Resources. Sacramento, CA.
- WRIME, 2006d. *Planning Framework, Integration Strategy and Assumptions. Technical Memorandum. Phase 1, Task 12*. Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation District with support from the California Department of Water Resources. Sacramento, CA.
- WRIME, 2006e. *Water Management Strategies, Opportunities and Constraints. Technical Memorandum. Phase 1, Task 13*. Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation District with support from the California Department of Water Resources. Sacramento, CA.
- WRIME, 2006f. *Kings Basin Conjunctive Use Feasibility Analysis Memorandum*. Prepared for the Upper Kings River Water Forum Planning and Steering Committee. Sacramento, CA.
- WRIME, 2007a. *Draft Technical Memorandum- Review of City and County General Plans*. Prepared for the Upper Kings River Water Forum Planning and Steering Committee Land Use and Water Supply Work Group. Sacramento, CA.
- WRIME, 2007b. *Kings IGSM Model Development and Calibration Report, (Work in progress)*. Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation District with support from the California Department of Water Resources. Sacramento, CA.

WRIME, 2007c. *Water Quality Standards, Conditions and Constraints. Technical Memorandum.*
Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation
District with support from the California Department of Water Resources.
Sacramento, CA.

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SECTION ONE – BACKGROUND

INTRODUCTION

With all of today's issues surrounding water, understanding this vital resource is nearly as important as using it. It's vital to work together on this critically important resource that is all too often found to be in short supply. Local interests and stakeholders have come together to form a new collaborative program, the Upper Kings River Basin Water Forum (Water Forum).

The Water Forum's goals are to ensure water reliability, enhance water quality and address agricultural, urban and natural resource needs. It's important for coordinated decision-making and communication with the communities in the region in order to achieve these goals. The Water Forum needs to demonstrate that local initiatives can adequately address broader water resource issues in a coordinated and comprehensive manner.

Several objectives have been framed by the Water Forum, including development and implementation of a community relations strategy to provide outreach and the education of the public and decision makers on water management problems and solutions. This plan provides a framework for community outreach activities over the next five years. Each year, the Water Forum will review the plan and develop an annual scope of work to implement individual tasks. Final approval of a specific year's scope of work is subject to approval by the Water Forum.

GOALS

The following objectives for the public outreach process were developed:

1. Brand the Water Forum as a regional entity addressing water reliability and quality and agricultural, urban and natural resource needs.
2. Educate the public about the region's water resources issues.
3. Promote an Integrated Regional Water Management Plan (IRWMP) to gain support for water management strategies being considered by the Water Forum.
4. Mobilize the electorate to vote on projects that improve regional water reliability and quality.

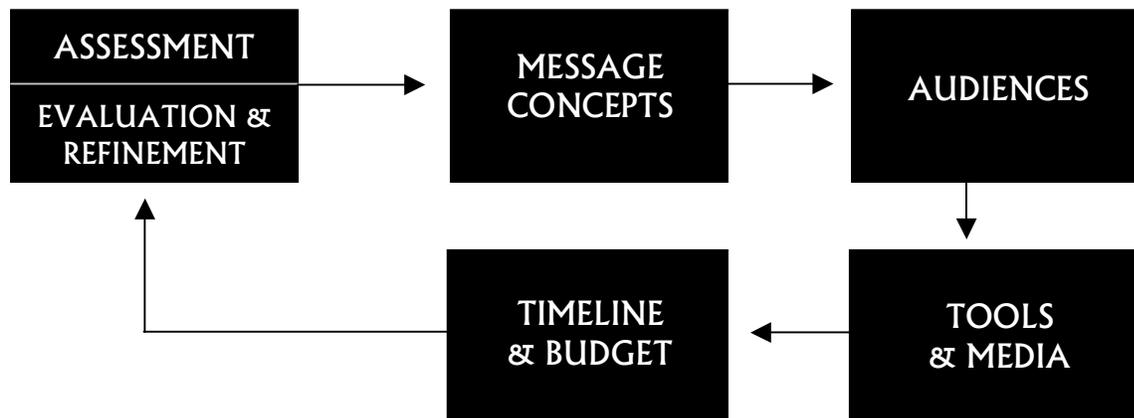
The Strategic Communication Plan's purpose is to provide a strategic foundation and direction for specific tasks to be conducted during the next five years. It provides a structure for documenting progress during the outreach effort and offers guidelines to be considered each time new materials and activities are to be developed which target specific audiences.

STRATEGIC PLANNING PROCESS

Several message concepts for each of the stated goals were developed through a consensus process with Water Forum members. The audiences to be reached were identified, as well as the tools and media to be used in communicating with those audiences. All of these elements, including strategies for assessing the public outreach effort, are discussed in detail in Section Two. The timeline, budget and description of recommended tasks, activities and materials to be developed over the next five years are presented in detail in Section Three.

A draft of this Plan was reviewed by the Water Forum, their input was incorporated, and this final Plan was developed.

Figure 1. Strategic Planning Process



SECTION TWO – STRATEGY

INTRODUCTION

This section of the Plan outlines the strategy to be utilized in implementing the public outreach effort. It specifically presents:

- Message concepts to be communicated
- Audiences to be reached
- Tools and media to be used
- Assessment strategies

SIGNIFICANT FINDINGS AND STRATEGIC OBJECTIVES

Through several months of roundtable discussions the Water Forum generated a substantial amount of information, which was distilled into the following priority issues:

- Overdraft of the groundwater resource
- Water supply reliability
- Degradation of water quality
- Urban development
- Protection of water rights
- Sustaining the agricultural economy
- Protection of life and property from flooding
- Protection of the environment

And, resulted in the following regional goals:

- Halt and ultimately reverse the current overdraft and provide for sustainable management of surface and groundwater.
- Increase the water supply reliability, enhance operational flexibility, and reduce system constraints
- Improve and protect water quality.
- Provide additional flood protection.
- Protect and enhance aquatic ecosystems and wildlife habitat.

To achieve these goals, the Water Forum developed regional planning objectives. These objectives included development and implementation of a community relations strategy. The Water Forum

derived the four strategic communication objectives, described in Section One above, to guide the community outreach effort over the next five years.

MESSAGE CONCEPTS

In order to brand the Water Forum effectively, it is necessary to transform the strategic objectives for public outreach into messages that can be conveyed through appropriate tools and media. It is important to note that these message concepts are not the actual text to be utilized in the media and communication tools but are the concepts that are to be conveyed to the audience. The appropriate text will be developed from the concepts as each component of the public outreach effort is produced.

Objective 1: Brand the Water Forum as a regional entity addressing water reliability and quality for agricultural, urban and natural resource needs.

Message Concepts:

- a. The Water Forum is a regional effort that includes involvement from cities, county, irrigation districts, resource agencies and environmental groups.
- b. Members of the Water Forum have been addressing water supply and quality issues for many years.
- c. Water Forum participants realize that water, land use, and environmental resource issues are interrelated and of regional scope.

Objective 2: Educate the public on the issues of the region's water resources.

Message Concepts:

- a. Overdraft of the groundwater resource is the primary problem to be addressed in the Kings River Basin.
- b. Water demand has exceeded the available surface and groundwater supplies as they are currently developed and managed.

- c. Migration of poor quality water is a factor in the operation of the groundwater basin.
- d. Water is a finite resource.

Objective 3: Promote the IRWMP process to gain support for water management strategies being considered by the Water Forum.

Message Concepts:

- a. The IRWMP will define projects and programs to manage and develop the surface water and groundwater supplies in a sustainable manner.
- b. The IRWMP is the result of a collaborative planning process that is intended to plan for the future as well as reduce or avoid conflicts related to the water supply, groundwater management, ecosystem restoration, and water quality.

Objective 4: Mobilize the electorate to vote on projects that improve regional water reliability and quality.

Message Concepts:

- a. New water supply infrastructure is needed today to meet future demands from urban growth, environmental needs and agricultural usage.
- b. Projects proposed for development have been identified through an integrated hydrologic model of the Kings River Basin to determine the optimal benefits they provide to water resources planning.

AUDIENCES

Specific audiences must be reached in a targeted manner if the Water Forum's public outreach effort is to be successful. This section describes these specific audiences, which are divided into two groups: potential customers and influencers. To produce a measurable change in public awareness and support for the Water Forum, the public outreach effort must prioritize communication with these various audiences on a repeated basis with simple, clear messages. The audiences to be reached include:

Potential Customers

- Large Industry COOs
- Developers
- Agribusiness Owners
- Small Business Owners
- General Public

Influencers

- Business Organizations
- Service Clubs
- Environmental Groups
- Taxpayer Groups
- Media
- Government Officials

Below is description of each of the audiences to be reached.

Large Industry COOs

The chief operations officers (COOs) are responsible for facilities management and would be most interested in the benefits of a reliable water supply. The following industries should be targeted for outreach through one-on-one information exchange meetings:

- Food processing
- Manufacturing
- Hospitals

Another opportunity to reach executives is through presentations at business organizations and service clubs.

Developers

Restrictions are being placed on developers to identify a water supply before a subdivision can go forward. This has made them more aware of the importance of a high quality and reliable water supply. The most effective communication tools for reaching this audience include:

- One-on-one information exchange meetings

- Briefings and/or presentations to the Board of Directors of the Building Industry Association and various committees
- Periodic updates through association newsletters

Agribusiness Owners

Growers depend on reliable, low cost water to irrigate their crops. Due to the large number of stakeholders in this audience, it is recommended that they be reached through direct mail and trade organizations such as the Fresno County Farm Bureau and the Western Growers Association.

Small Business Owners

Small businesses have little time to run their business and stay involved in all the additional topics related to resource issues. This audience should be considered a sub-group of the general public in that they also need assistance in understanding the wider issues, problems and solutions associated with water resource management. Targeted print materials, direct mail, editorials and media exposure are all effective tools with this audience.

General Public

It will be important to maintain an open, public process where citizens are kept informed and allowed to participate in shaping local solutions. If the Water Forum is in the position to build a project, it will be important that the public already know, respect and trust the Water Forum. This level of awareness requires a public awareness campaign utilizing mixed media.

Certain media, including radio and television, are sold by demographics making it necessary to identify target audiences by age, gender and place. For radio and television, demographics are used to select the programming and stations that deliver the broadest audience for the resources allocated to the effort.

One of the largest audiences to be reached in the public outreach effort is the English speaking general public, 25 years of age and older, who reside in the Water Forum service area. This group will be the primary target audience of the media strategy. Within this demographic, most homeowners who vote can be targeted.

Due to the large Latino population in the Water Forum service area, it is recommended that the secondary target audience be the Spanish speaking general public, 25 years of age and older. In general, the Latino community is made up of three generations, each having a different degree of assimilation into American culture. The most effective way to reach these three population segments is to provide messages in Spanish through Spanish radio, television and one-to-one communication.

A combination of media will be selected for the campaign based on each medium's strength to deliver messages to all or segments of the general public in a cost-effective and message-appropriate manner.

Business Organizations

There are many business organizations that exist to recruit new business and provide support to existing businesses and industries. Most of these groups have regularly scheduled meetings where the Water Forum could discuss its short and long-term integrated water management strategies in detail with key executives.

- The economic development corporations (EDCs) for each county
- The chambers of commerce for each of the cities

Endorsement from such organizations would help tremendously as Water Forum meets with business and industry stakeholders to garner support.

Service Clubs

Many key community leaders participate in service clubs, such as Rotary, Kiwanis, Lions, etc. Most groups that regularly schedule meetings are interested in filling their calendars with well-prepared programs that provide essential information on quality of life in the community. Presentations allow for communicating the more complex messages and should be structured to provide clear information and give the group members an opportunity to ask questions and make comments. Many members of these audiences will disseminate the messages to others through word-of-mouth communication.

Environmental Groups

Environmental groups will have concerns about water quality and the health of the aquatic ecosystems in the region. They often pursue litigation as a method of forestalling project progress. It will

be important to meet with environmentalists and maintain open lines of communication to avoid long, protracted battles. By addressing their concerns and incorporating environmental solutions into the planning, the Water Forum may find support instead of adversity.

Taxpayer Groups

Taxpayer groups will register concern over the fiscal impact of projects on taxpayers. It will be important to meet with these stakeholders to assure that communication lines are open and clear.

Media

Media representatives are considered to be an audience because of the important role they play in disseminating the messages, particularly in news coverage of events and related stories. An ongoing task of the public outreach effort will be to respond to changes in media staffing and programming strengths as well as identify the most effective media opportunities for Water Forum. Through these efforts, media representatives will be able to present water resource messages more accurately.

Government Officials

The level of knowledge about water resource issues, specifically groundwater, will vary greatly among government officials. This necessitates the tailoring of the message content to targeted sub-groups. These sub-groups include the following:

- Mayors and city council members
- Public works directors and county administrative officers (CAOs) for each of the counties that fall within the Water Forum service area
- Board of Supervisors for each of the counties
- Planning commissions of each local and county entity

State and federal policymakers are another important sub-group within the government audience. These key leaders shape water resource policy and influence many of the local officials.

One-on-one meetings with these key stakeholders will be one of the most effective communication tools with this audience. Printed materials, a long format video and a PowerPoint presentation are all support tools that will facilitate efficient and effective meetings.

Stakeholder Involvement – Environmental Justice

Under Title VI of the Civil Rights Act of 1964 and Environmental Justice, agencies are required to ensure no person is excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving Federal financial assistance on the basis of race, color, national origin, sex, disability, or religion.

To ensure the proposed Integrated Regional Water Management Plan meets the intent of Title VI and Environmental Justice the Water Forum developed three main fundamental Environmental Justice principles:

- Avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income population.
- Ensure the full and fair participation by all potentially affected communities in the integrated regional water management plan decision-making process.
- Prevent the denial of, reduction in or significant delay in the receipt of benefits by minority and low-income populations.

These principles will guide development of the Integrated Regional Water Management Plan to ensure responsiveness to the needs of disadvantaged communities. The main outreach activities proposed under this program include the following public notification tools:

- Culturally Adapted Community Fliers
- Radio Advertising
- Direct Mail
- Notices in Non-English Language Publications
- Display Ads / Workshops
- Translator / Interpreter for Non-English Speaking Individuals
- Auxillary Aids
- Meetings To Be Held In Locations Accessible By Public Transportation For The Transit Dependent

By implementing these outreach activities we can enhance public involvement processes thereby eliminating participation barriers and encouraging minority and low-income populations in regional water related decision-making.

Figure 2. Audiences Targeted to Receive Specific Message Concepts

MESSAGE CONCEPTS	AUDIENCES										
	Potential Customers						Influencers				
	Government Officials	Large Industry COOs	Developers	Agribusiness Owners	Small Business Owners	General Public	Business Organizations	Service Clubs	Environmental Groups	Taxpayer Groups	Media
<i>Objective 1. Brand Water Forum as a regional entity addressing water reliability and quality for agricultural, urban and natural resources needs.</i>											
1a. The Water Forum is a regional effort that includes involvement from cities, county, irrigation districts, resource agencies and environmental groups.	•	•	•	•	•	•	•	•	•	•	•
1b. Members of the Water Forum have been addressing water supply and quality issues for many years.	•	•	•	•	•	•	•	•	•	•	•
1c. Water Forum participants realize that water, land use, and environmental resource issues are interrelated and of regional scope.	•	•	•	•			•	•	•		•
<i>Objective 2. Educate the public on the issues of the region's water resources.</i>											
2a. Overdraft of the groundwater resources is the problem to be addressed in the Kings River Basin.	•	•	•	•	•	•	•	•	•	•	•
2b. Water demand has exceeded the available surface and groundwater supplies as they are currently developed and managed.	•	•	•	•	•	•	•	•	•	•	•
2c. Migration of poor quality water is a factor in the operation of the groundwater basin.			•	•					•		
2d. Water is a finite resource.	•	•	•	•	•	•	•	•	•	•	•
<i>Objective 3. Promote the IRWMP process to gain support for water management strategies being considered by the Water Forum.</i>											
3a. The IRWMP will define projects and programs to manage and develop the surface water and groundwater supplies in a sustainable manner.	•						•	•			•
3b. The IRWMP is the result of a collaborative planning process that is intended to plan for the future as well as reduce or avoid conflicts related to the water supply, groundwater management, ecosystem restoration, and water quality.	•	•	•	•	•	•	•	•	•	•	•

MESSAGE CONCEPTS	AUDIENCES										
	<i>Potential Customers</i>						<i>Influencers</i>				
	Government Officials	Large Industry COOs	Developers	Agribusiness Owners	Small Business Owners	General Public	Business Organizations	Service Clubs	Environmental Groups	Taxpayer Groups	Media
<i>Objective 4. Mobilize the electorate to vote on projects that improve regional water reliability and quality.</i>											
4a. New water supply infrastructure is needed today to meet future demands from urban growth, environmental needs and agricultural usage.	•	•	•	•	•	•	•	•	•	•	•
4b. Projects proposed for development have been identified through an integrated hydrologic model of the Kings River Basin to determine the optimal benefits they provide to water resources planning.	•						•	•	•		•

TOOLS AND MEDIA

Overall, the Water Forum’s public outreach effort will utilize a combined approach of community relations and mixed media to reach the target audiences. Figure 3, found at the end of this section, summarizes which tools and media will be used to reach specific audiences. Figure 4 illustrates which media will be used for communicating the specific message concepts.

Tools

- Stakeholder Meetings
- Speakers’ Bureau
- Community Relations
- Editorial and Media Relations
- Long Format Video
- Website
- Printed Materials

Media

- Television
- Radio
- Newspaper
- Signage

Stakeholder Meetings

An important part of the public outreach strategy is to meet in person with key community leaders to communicate the basic message concepts. One-on-one stakeholder meetings are especially

appropriate for reaching government officials, large industry COOs and special interest groups. Implemented as information exchange sessions or group workshops, this form of personalized communication is most effective for addressing concerns and gaining support. Print materials should be used and left behind for reference.

Speakers' Bureau

Audiences within governmental agencies, businesses, industry, community groups and environmental groups will be reached, in part, through a speakers' bureau. Speakers will present a prepared program that can include a long format video on the Water Forum and/or a PowerPoint presentation with project details. Printed materials will be disseminated and participants' questions answered. Audiences can be asked to evaluate the products and provide input on issues of concern.

Community Relations

Existing networks can be utilized to set up stakeholder meetings, recruit presenters and speaking engagements, and disseminate targeted materials through existing association newsletters and publications.

Editorial and Media Relations

Editorial and media relations is an extremely valuable tool for building widespread awareness of the Water Forum and its efforts to improve the reliability and quality of the water supply in the Kings River Basin. With this tool, an organization is able to garner critical third-party endorsements that directly reach a target audience. These endorsements come from well-respected journalists, analysts and other community opinion leaders, so the general public perceives the message as genuine. In addition, published reports and articles secured through these activities are able to include a detailed explanation of the desired message, which translates into highly effective communication to the target audience. Specific elements include:

- **Backgrounder** – a detailed document describing the history of the Water Forum, the need for its services, and the value that it brings to the service area.
- **Point of View** – a several page description of the organization's view on current issues and how it will approach these issues
- **Fact Sheet** – a one or two page document that highlights the crucial facts needed to understand water resource issues in the region.

- **Press Release** – an announcement distributed to key media to highlight specific news related to the Water Forum’s goals.
- **Case Study** – an example of how similar efforts worked in other regions of the State.
- **Media Kit** – a compilation of PR materials that is used to communicate the Water Forum’s messages to a desired audience
- **Article Abstracts** – specific article ideas sent to editors and writers to suggest a story that will relate to the organization’s goals.
- **Editorial Pitching** – contact with targeted editors and writers to develop story ideas and secure coverage.
- **Press Tour** – a scheduled campaign of face-to-face meetings with targeted editors, writers, and other thought leaders to develop personal relationships and accurately convey the desired messaging through dialogue.
- **Event Planning** – the planning and execution of a public event to promote broad community awareness of a project or issue that relates to the Water Forum’s goals.

Long Format Video

Audio-visual tools, such as a long format video, are effective in communicating concise messages in group settings. The video can be designed and produced to communicate messages that require more time and detail than can be realized in a television or radio spot. It is an especially useful tool for branding the Water Forum as a reliable entity addressing water reliability and quality.

Website

A website offers easy access to information about the Water Forum and the opportunity to have visual understanding of tough concepts like groundwater overdraft. It is an effective tool because different pages can be tailored to specific audiences. Websites also facilitate inquiries from and responses to the general public through email.

Printed Materials

Printed materials, such as brochures and fact sheets, will be used in the public outreach effort to reach all of the identified audiences.

Media Planning

Media strengths change over time. The television market has experienced dramatic change over the past ten years with the entrance of new competitors and the expansion of cable TV. The radio market has always been fragmented. This trend continues with frequent format changes and lack of audience loyalty. Media analysis will be completed each time a new purchase is made to assure the public outreach effort is as cost effective as possible. Generally, the following components are scheduled into a coordinated communications strategy:

- Newspaper advertisements
- Television public service announcements
- Radio public service announcements
- Signage

To accomplish effective branding in the minds of the general public, the media plan should include at least two mixed media campaigns each year. Each campaign should focus on a central theme and last six to eight weeks.

The Greater Fresno Area is served by a number of television and radio stations, one general market newspaper and a number of smaller newspapers that target rural audiences. Due to the area's relative isolation from media influences from Los Angeles and the San Francisco Bay Area, there are certain communications advantages including broad market coverage, control and cost efficiency.

Television

All television stations located in the market area have viewership levels that will be effective in the public outreach strategy. Generally, television will be used to reach all target audiences within the general public. Television advertising purchases will be based on gross rating points and size of target audiences delivered by available programming. The cost will be balanced with decisions about the type of programming the Water Forum should be identified with. Programming will be selected based on the age of the viewer and other relevant demographics. Public service time will be considered in the media planning process, as some stations are willing to contribute more than others. A list of television stations to be considered includes:

- KVPT, Channel 18 (Valley Public Television)
- KSEE, Channel 24 (NBC)
- KMPH, Channel 26 (FOX)
- KFSN, Channel 30 (ABC)
- KGPE, Channel 47 (CBS)
- KAIL, Channel 53 (UPN)
- KFRE, Channel 59 (WB)
- KFTV, Channel 21 (Univision)
- KNSO, Channel 51 (Telemundo)
- KMSG, Channel 55 (Azteca America)
- ComCast (Cable)

Radio

Radio will also be used to reach most of the target audiences within the general public. A current list of the most popular radio stations should be prepared for every campaign analyzing the audience by demographic and time-of-day factors. The following is a summary of the “top ten” radio stations based on the four-book Arbitron average (Winter 2002 – Fall 2002).

STATION	AVERAGE AQH RATING*	AVERAGE AQH SHARE*	AUDIENCE
KMJ (News Talk 580 AM)	2.3	10.7	General market, 25+
KSKS (Country 93.7)	1.4	6.9	General market, 25+
KJWL (Nostalgia 99.3)	1.4	6.6	General market, 25+
KJFX (Classic Rock 95.7)	1.1	5.1	General market, 25+
KSOF (Lite Rock 98.9)	1.0	4.5	General market, 25+
KMGV (MEGA 97.9)	1.0	4.5	General market, 25+
KOQO (Super Q 101.9)	0.8	3.8	General market, 25+
KEZL (Smooth Jazz 96.7)	0.8	3.6	General market, 25+
KRZR (Wild Hare 103.7)	0.8	3.6	General market, 25+
KLBN (La Buena 105.1)	0.7	3.2	General market, 25+

* *Average AQH Rating* reflects the percentage of total radio audience reached by the station in an average one-quarter hour period from Monday to Friday, 6 a.m. to 7 p.m. based on a four-book Arbitron average. *Average AQH Share* represents the percentage of the radio audience listening to a particular radio station.

Newspaper

The Fresno Bee has been the dominant newspaper of the region for many years. There are also several smaller newspapers that serve the other cities in the Water Forum service area. The following newspapers will be considered for placing advertisements:

- *Business Journal*
- *Clovis Independent*
- *Dinuba Sentinel*
- *Fowler Ensign*
- *Fresno Bee*
- *Hanford Sentinel*
- *Kerman News*
- *Kingsburg Recorder*
- *Neighbors*
- *Parlier Post*
- *Reedley Exponent*
- *Sanger Herald*
- *Selma Enterprise*
- *Vida en el Valle*

Signage

Outdoor advertising, such as billboards and bus signs, are utilized to reinforce the newspaper and broadcast media in reaching the general public audience. It also serves to reinforce the Water Forum’s branding.

Bus signage is an effective medium for delivering messages specifically to the Fresno Metropolitan Area. The signs are posted on the exterior and interior of the buses. The signage on the side of the bus is called a “king” while the signage on the back of the bus is known as a “tail.” These forms are widely visible by commuters and bus riders. The interior bus signage is especially effective in reaching the bus rider. Interior signage is posted on the inside of the bus for three months at a time. Fresno Area Express puts this signage up at no cost to the non-profit or government agency. Both of these opportunities are cost effective and provide visibility to all ethnic demographics and audiences.

Figure 3. Tools and Media Most Appropriate to Reach Specific Audiences

AUDIENCES	TOOLS							MEDIA			
	Stakeholder Meetings	Speakers Bureau	Editorial Relations	Long Format Video	Website	Printed Materials	Direct Mail	Television	Radio	Newspaper	Signage
<i>Potential Customers</i>											
Government Officials	•		•	•		•					
Large Industry COOs	•		•	•		•	•				
Developers	•		•	•		•					
Agribusiness	•		•	•		•	•				
Small Business Owners		•	•			•	•				
General Public					•	•	•	•	•	•	•
<i>Influencers</i>											
Business Organizations	•	•	•	•		•					
Service Clubs		•	•	•		•					
Environmental Groups	•	•	•			•					
Taxpayer Groups	•		•			•					
Media			•	•	•	•					

Figure 4. Tools and Media Most Appropriate in the Distribution of Specific Message Concepts

MESSAGE CONCEPTS	TOOLS							MEDIA				
	Stakeholder Meetings	Speakers Bureau	Editorial Relations	Long Format Video	Website	Printed Materials	Direct Mail	Television	Radio	Newspaper	Signage	
<i>Objective 1. Brand Water Forum as a regional entity addressing water reliability and quality for agricultural, urban and natural resources needs.</i>												
1a. The Water Forum is a regional effort that includes involvement from cities, county, irrigation districts, resource agencies and environmental groups.	•	•	•	•	•	•	•	•	•	•	•	
1b. Members of the Water Forum have been addressing water supply and quality issues for many years.	•	•	•	•	•	•	•	•	•	•	•	
1c. Water Forum participants realize that water, land use, and environmental resource issues are interrelated and of regional scope.	•	•	•	•	•	•	•	•	•	•	•	
<i>Objective 2. Educate the public on the issues of the region's water resources.</i>												
2a. Overdraft of the groundwater resources is the problem to be addressed in the Kings River Basin.	•	•	•	•	•	•	•					
2b. Water demand has exceeded the available surface and groundwater supplies as they are currently developed and managed.	•	•	•	•	•	•	•	•	•	•	•	
2c. Migration of poor quality water is a factor in the operation of the groundwater basin.	•	•	•	•	•	•						
2d. Water is a finite resource.	•	•	•	•	•	•	•	•	•	•	•	
<i>Objective 3. . Promote the IRWMP process to gain support for water management strategies being considered by the Water Forum.</i>												
3a. The IRWMP will define projects and programs to manage and develop the surface water and groundwater supplies in a sustainable manner.	•	•	•	•	•	•	•					
3b. The IRWMP is the result of a collaborative planning process that is intended to plan for the future as well as reduce or avoid conflicts related to the water supply, groundwater management, ecosystem restoration, and water quality.	•	•	•	•	•	•	•					
<i>Objective 4. . Mobilize the electorate to vote on projects that improve regional water reliability and quality.</i>												
4a. New water supply infrastructure is needed today to meet future demands from urban growth, environmental needs and agricultural usage.	•	•	•	•	•	•	•	•	•	•	•	
4b. Projects proposed for development have been identified through an integrated hydrologic model of the Kings River Basin to determine the optimal benefits they provide to water resources planning.	•	•	•	•	•	•	•					

ASSESSMENT

Document and evaluate - both quantitatively and qualitatively - the level of effort expended in the implementation of the public outreach effort and the level of success in increasing awareness of the Water Forum and support for its programs. During the development of each task or project, identify measurable objectives for later evaluation.

Documentation

Quantitative documentation will include, but is not limited to, tracking the:

- Number of stakeholder meetings
- Number of community presentations
- Number of brochures and fact sheets distributed
- Number of impressions generated through articles and public relations
- Attendance at events
- Number of website hits

Qualitative documentation will be solicited through community response forms and evaluation forms given out at community presentations and other events.

At the close of a media campaign, a media reconciliation will provide proof of publication or commercial airing, a cost analysis, and an analysis of the audience reached.

Evaluation

At the end of each fiscal year, an annual report of the public outreach effort will be prepared. It will summarize the year's activities and evaluate the progress and effectiveness of the public outreach effort. As part of the evaluation process, available resources will be reviewed and the Plan shall be updated as necessary.

Accountability to Water Forum Goals

Four strategic objectives were established to guide the public outreach effort over the next five years. Assessment tools include, but are not limited to, the following methods for measuring success in reaching these goals:

Brand the Water Forum as a regional entity addressing water reliability and quality and agricultural, urban and natural resource needs.

- Response forms at community presentations
- Responses solicited through stakeholder focused interviews and information exchange meetings

Educate the public on the region's water resources.

- Response forms at community presentations
- Documentation of editorial/media coverage of Water Forum issues

Promote the IRWMP process to gain support for water management strategies being considered by the Water Forum.

- Response forms at community presentations
- Documentation of editorial/media coverage of Water Forum issues

Mobilize the electorate to vote on projects that improve regional water reliability and quality.

- Stakeholder focused interviews and information exchange meetings
- Document the progress of proposed projects through the decision making process
- Editorial board positions
- Endorsements

SECTION THREE – IMPLEMENTATION

INTRODUCTION

This section of the Plan describes the strategic tasks, identifying public outreach activities and materials to be developed and implemented over a period of five years. The Plan's tasks seek to target specific audiences and coordinate with existing information and educational programs.

CURRENT TASKS: YEAR 1 (2005)

1. Strategic Plan

Prepare a strategic plan that outlines message concepts, target audiences, tools and media to be used, and assessment tools to measure the effectiveness of the public outreach effort. Identify specific activities to be conducted and products to be developed over a 5-year period. The plan will be sufficiently flexible to allow for revisions as necessary.

2. Printed Materials

Develop additional fact sheets to assist Water Forum members in communicating the steps being taken to develop an IRWMP and educate targeted audiences about water resource issues.

3. Stakeholder Meetings

Meet with identified community leaders to promote Water Forum goals and objectives.

4. Assessment and Plan Update

Document and evaluate - both quantitatively and qualitatively - the level of effort expended in the implementation of the public outreach effort and the level of success in increasing awareness of the Water Forum and support for its programs. During the development of each task or project, identify measurable objectives for later evaluation. Quantitative documentation will include tracking the number of community presentations and stakeholder meetings, the number of brochures and fact sheets distributed, the attendance at events, the number of articles written, etc. Qualitative documentation will be solicited through community response forms and evaluation forms given out at community presentations and other

YEAR 2 TASKS (2006)

1. Creative Branding

Identify effective images, themes and a graphic style for use in the General Awareness Packet and other communication collateral. Develop a logo and tag line for the Water Forum.

2. Long format Video

Develop a long format video for educating the public about water resources issues in the region and present the concept of integrated resource solutions. Utilize this communication tool also to brand the Water Forum.

3. Speakers' Bureau

Develop a Speakers' Bureau Kit to provide a script and guidelines for effective presentations to community groups. Generate a PowerPoint presentation to be used alone or in tandem with the long format video as a flexible tool for promoting the IRWMP and promote participation in defining solutions through the IRWMP process. Provide training to Water Forum participants and other interested parties in reaching out to community groups.

4. Website

Develop a website that enhances the public outreach effort to build awareness and understanding of Water Forum, its mission and functions. It will be designed to enhance communication with the various target audiences.

5. Editorial and Media Relations

Prepare press releases and backgrounders, identify opportunities for and write opinion editorials, prepare for and organize editorial board visits, disseminate releases and organize media coverage, and arrange a press tour for broadcast and print media.

6. Community Relations

Utilize existing networks to hold briefing sessions with key community leaders.

7. Stakeholder Meetings

Arrange stakeholder meetings, as needed.

8. Printed Materials

Develop fact sheets or other collateral to assist Water Forum members in communicating with stakeholders and the general public.

9. Assessment and Plan Update

Document and evaluate - both quantitatively and qualitatively - the level of effort expended in the implementation of the public outreach effort and the level of success in increasing awareness of Water Forum and support for its programs. At the end of the fiscal year, review available resources, progress and effectiveness of the public outreach effort and update the Plan as necessary.

YEAR 3 TASKS (2007)

1. General Awareness Packet

Develop and produce a general awareness communication packet for use in stakeholder outreach. The packet will include a folder, brochure and fact sheets.

2. Speakers' Bureau

Support the speakers' bureau program as needed. Revise and update the kit as new messages are incorporated into the program. Promote speaking services, and make presentations whenever possible. Recruit and train speakers as necessary to meet demand.

3. Website

Update and maintain the website to support the public outreach effort and incorporate graphical visuals developed from the integrated hydrologic model. Ensure consistency with other communication tools.

4. Editorial and Media Relations

Provide ongoing strategic public relations services to utilize the press and media in building public awareness of and support for Water Forum and its programs.

5. Community Relations

Utilize existing networks to hold briefing sessions with key community leaders.

6. Stakeholder Meetings

Assist District staff with scheduling and attending stakeholder meetings, as needed.

7. Public Meetings

As the Water Forum becomes involved in financing a water resource project, conduct the necessary public meetings throughout the year to ensure an open, public process. Plan, organize and facilitate these meetings. Produce public meeting notices and place in local newspapers.

8. TV and Radio spots

Develop television and radio spots in English and Spanish. Utilize the spots in the mixed media campaign to mobilize the electorate to take affirmative actions on Water Forum projects seeking funding.

9. Print Ads and Signage

Develop print ads and signage to reinforce the public service announcements in building public awareness of the Water Forum.

10. Mixed Media Campaign

A mixed media campaign utilizing television, radio, newspaper and signage will be used to reach the English and Spanish speaking general public to build support for bond measures to fund Forum projects.

11. Assessment and Plan Update

Document and evaluate - both quantitatively and qualitatively - the level of effort expended in the implementation of the public outreach effort and the level of success in increasing awareness of Water Forum and support for its programs. At the end of the fiscal year, review available resources, progress and effectiveness of the public outreach effort and update the Plan as necessary.

YEAR 4 TASKS (2008)

1. Speakers Bureau

Support the speakers' bureau program as needed. Revise and update the kit as new messages are incorporated into the program. Promote speaking services, and make presentations whenever possible. Recruit and train speakers as necessary to meet demand.

2. Website

Update and maintain the website to support the public outreach effort and incorporate graphical visuals developed from the integrated hydrologic model. Ensure consistency with other communication tools.

3. Editorial and Media Relations

Provide ongoing strategic public relations services to utilize the press and media in building public awareness of and support for Water Forum and its programs.

4. Community Relations

Utilize existing networks to hold briefing sessions with key community leaders.

5. Stakeholder Meetings

Assist District staff with scheduling and attending stakeholder meetings, as needed

6. Printed Materials

Develop fact sheets or other collateral to assist Water Forum members in communicating with stakeholders and the general public.

7. Public Meetings

As the Water Forum becomes involved in financing a water resource project, conduct the necessary public meetings throughout the year to ensure an open, public process. Plan, organize and facilitate these meetings. Produce public meeting notices and place in local newspapers.

9. Dedication Events

Dedicate completed Water Forum water management projects to celebrate and promote the success of an integrated, regional water management efforts by the Water Forum.

10. Assessment and Plan Update

Document and evaluate - both quantitatively and qualitatively - the level of effort expended in the implementation of the public outreach effort and the level of success in increasing awareness of Water Forum and support for its programs. At the end of the fiscal year, review available resources, progress and effectiveness of the public outreach effort and update the Plan as necessary.

YEAR 5 TASKS (2009)

1. Speakers' Bureau

Support the speakers' bureau program as needed. Revise and update the kit as new messages are incorporated into the program. Promote speaking services, and make presentations whenever possible. Recruit and train speakers as necessary to meet demand.

2. Website

Update and maintain the website to support the public outreach effort and incorporate graphical visuals developed from the integrated hydrologic model. Ensure consistency with other communication tools.

3. Editorial and Media Relations

Provide ongoing strategic public relations services to utilize the press and media in building public awareness of and support for Water Forum and its programs.

4. Community Relations

Utilize existing networks to hold briefing sessions with key community leaders.

5. Stakeholder Meetings

Assist District staff with scheduling and attending stakeholder meetings, as needed

6. Printed Materials

Develop fact sheets or other collateral to assist Water Forum members in communicating with stakeholders and the general public.

7. Public Meetings

As the Water Forum becomes involved in financing a water resource project, conduct the necessary public meetings throughout the year to ensure an open, public process. Plan, organize and facilitate these meetings. Produce public meeting notices and place in local newspapers.

9. Dedication Events

Dedicate completed Water Forum water management projects to celebrate and promote the success of an integrated, regional water management efforts by the Water Forum.

10. Assessment and Plan Update

Document and evaluate - both quantitatively and qualitatively - the level of effort expended in the implementation of the public outreach effort and the level of success in increasing awareness of Water Forum and support for its programs. At the end of the fiscal year, review available resources, progress and effectiveness of the public outreach effort and update the Plan as necessary.

YEAR 4 TASKS - 2008	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Budget
Speaker's Bureau													In-kind
Website													\$7,000
Website maintenance													In-kind
Editorial and Media Relations													In-kind
Community Relations													In-kind
Stakeholder Meetings													In-kind
Printed Materials													\$8,000
Public Meetings													In-kind
Dedication Events													\$15,000
Assessment and Plan Update													In-kind
													\$30,000.00

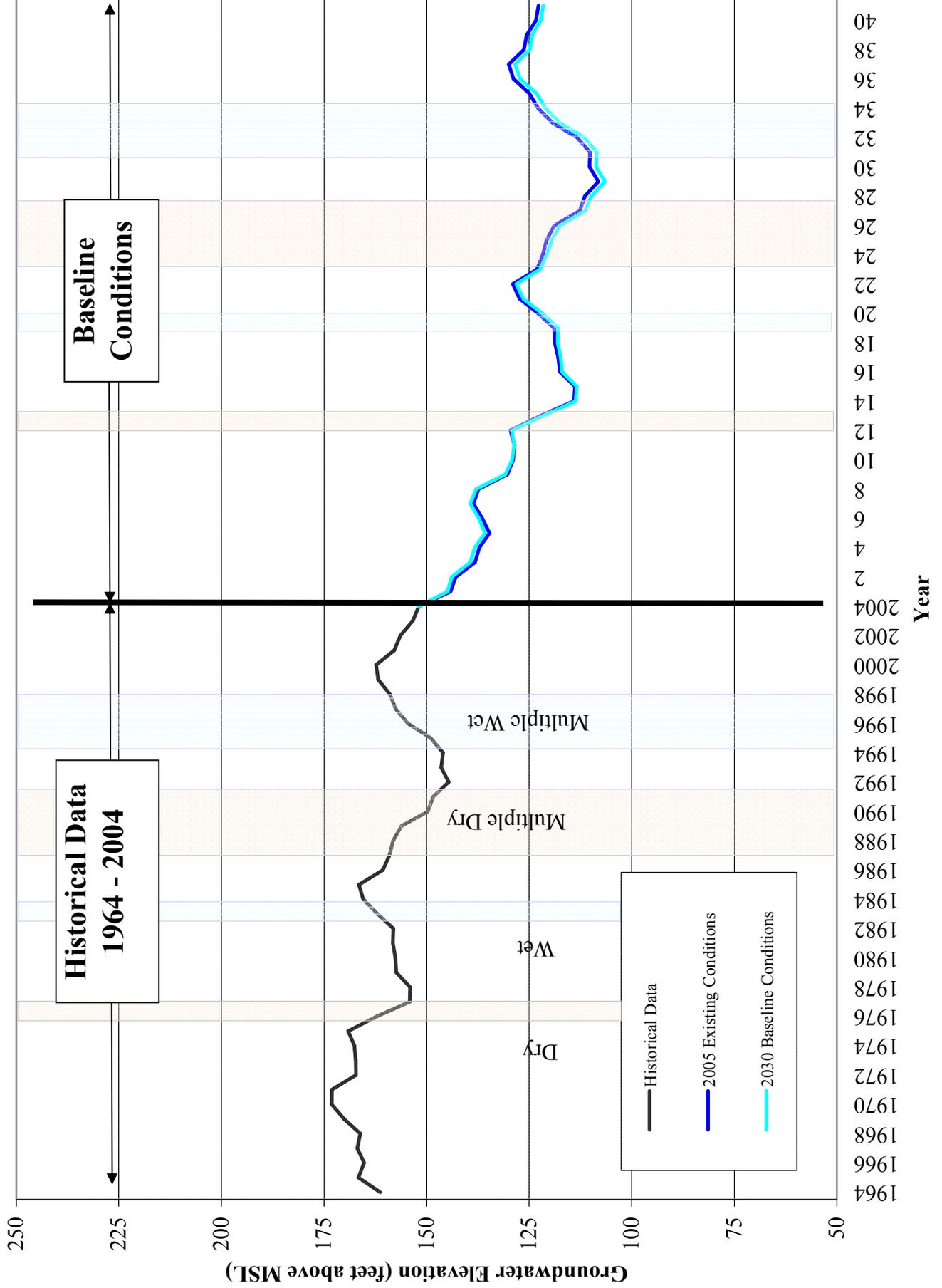
YEAR 5 TASKS - 2009	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Budget
Speaker's Bureau													In-kind
Website													\$7,000
Website maintenance													In-kind
Editorial and Media Relations													In-kind
Community Relations													In-kind
Stakeholder Meetings													In-kind
Printed Materials													\$8,000
Public Meetings													In-kind
Dedication Events													\$15,000
Assessment and Plan Update													In-kind
													\$30,000.00

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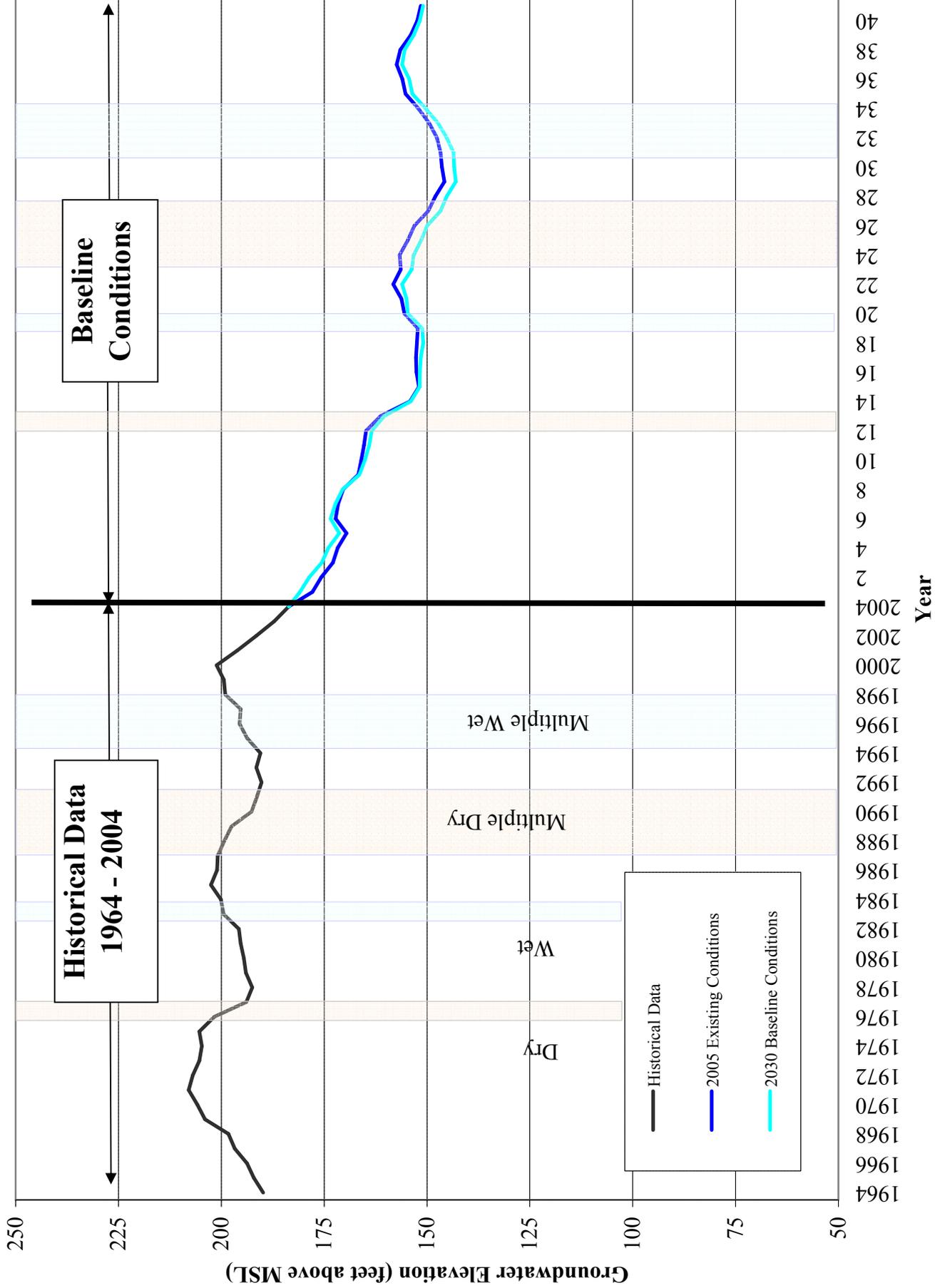
APPENDIX B

**GROUNDWATER LEVEL HYDROGRAPHS
FOR HISTORICAL AND BASELINE ANALYSIS**

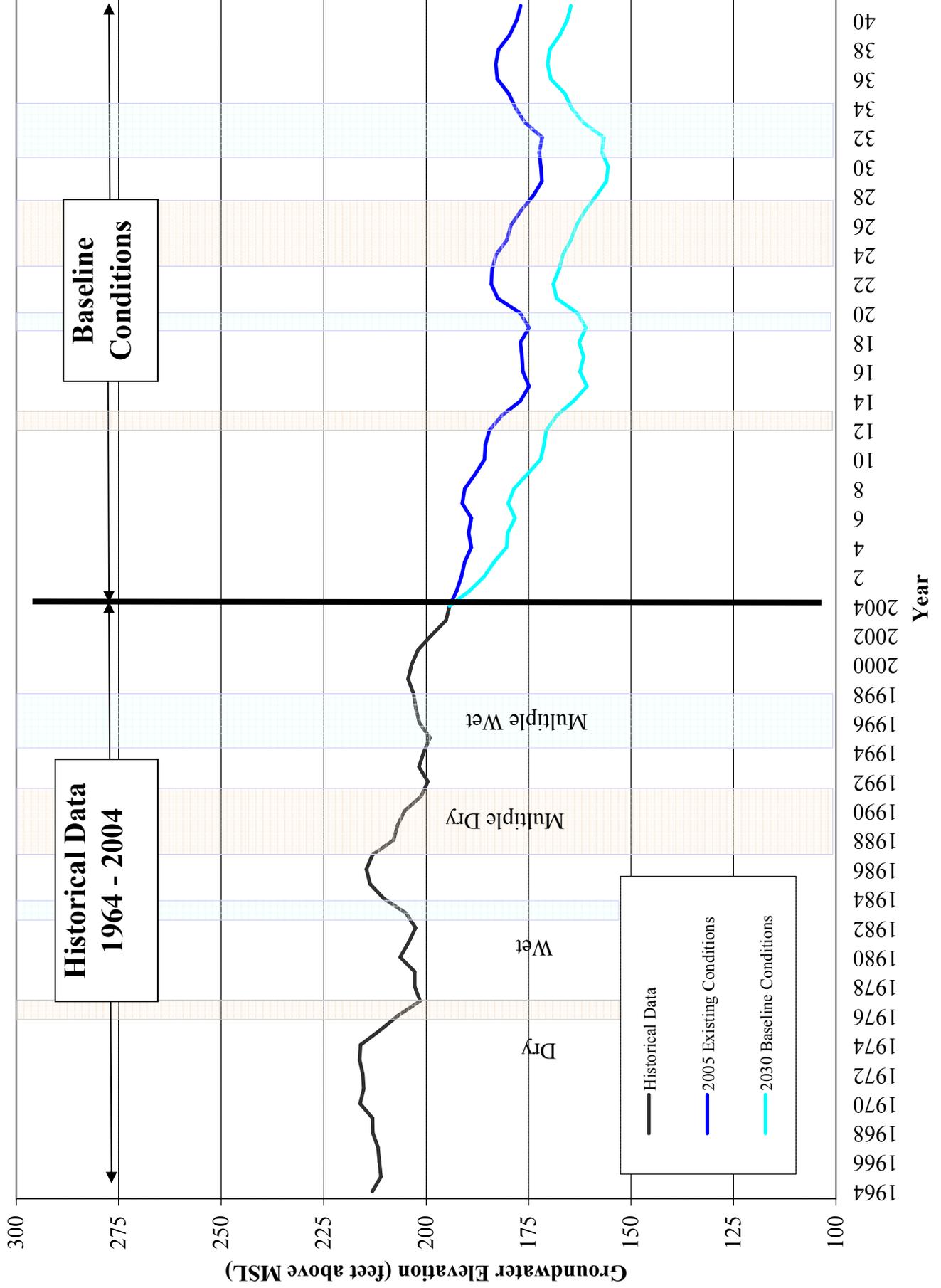
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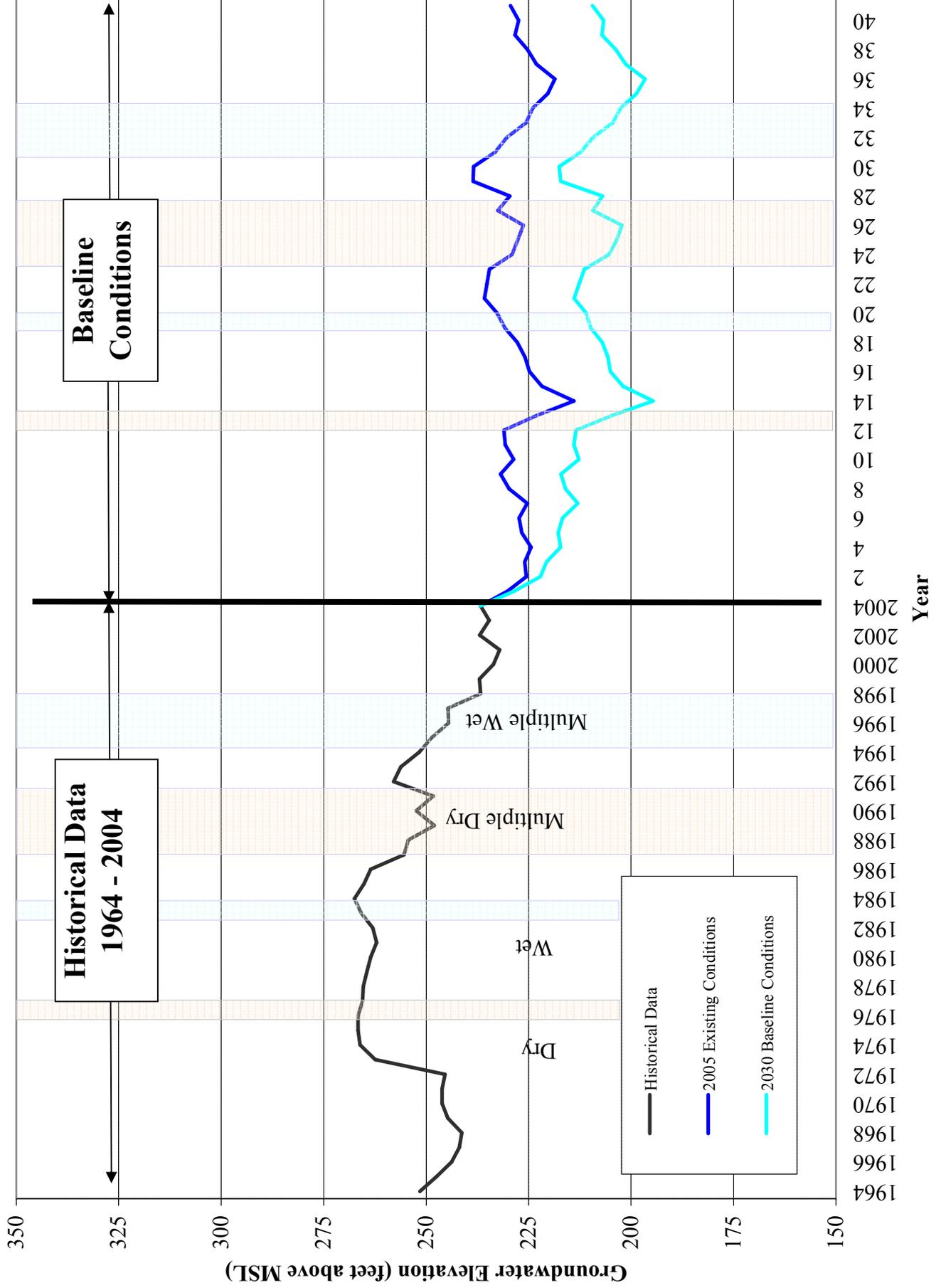
Annual Groundwater Levels in the Fall for Well 35



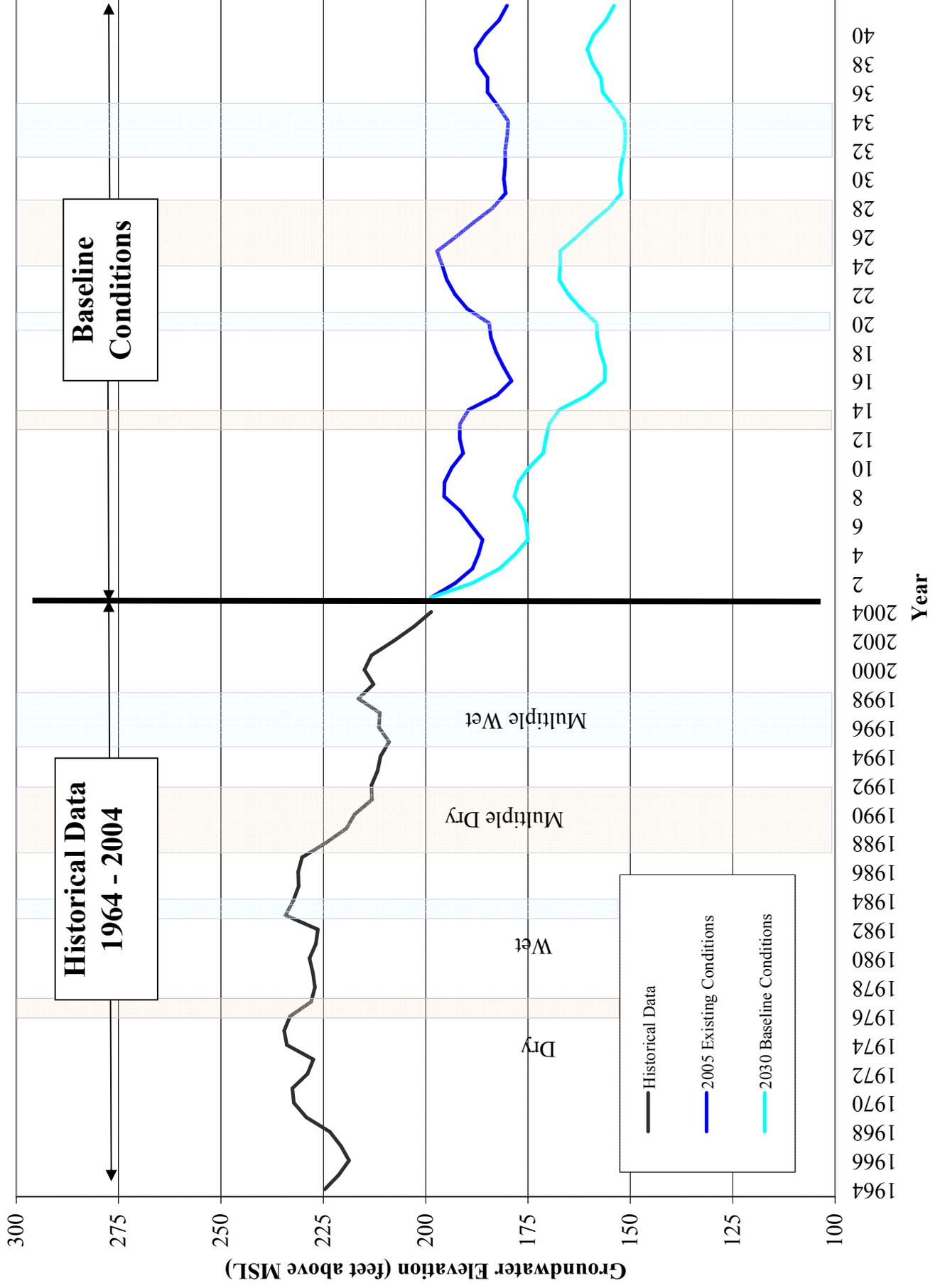
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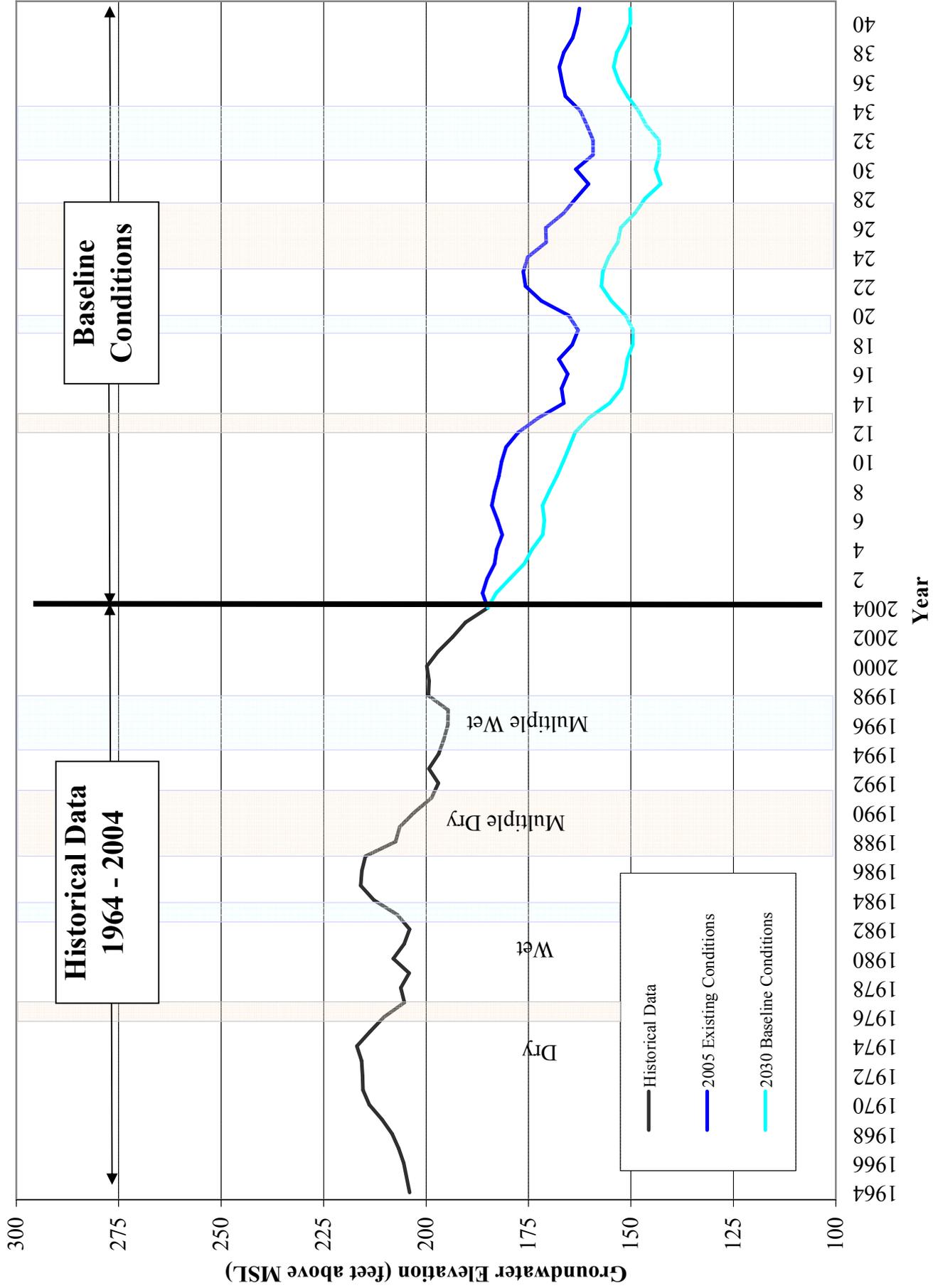
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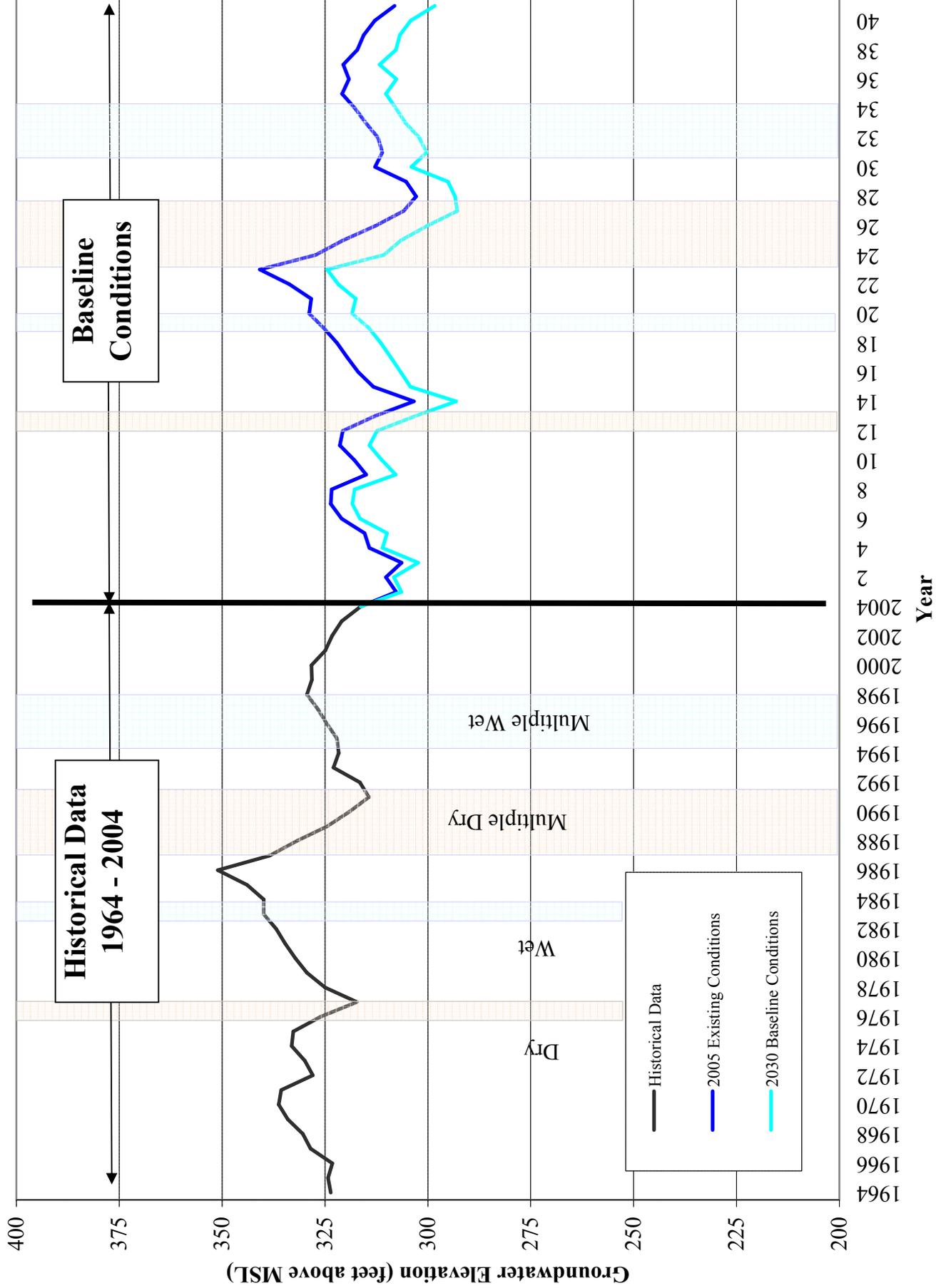
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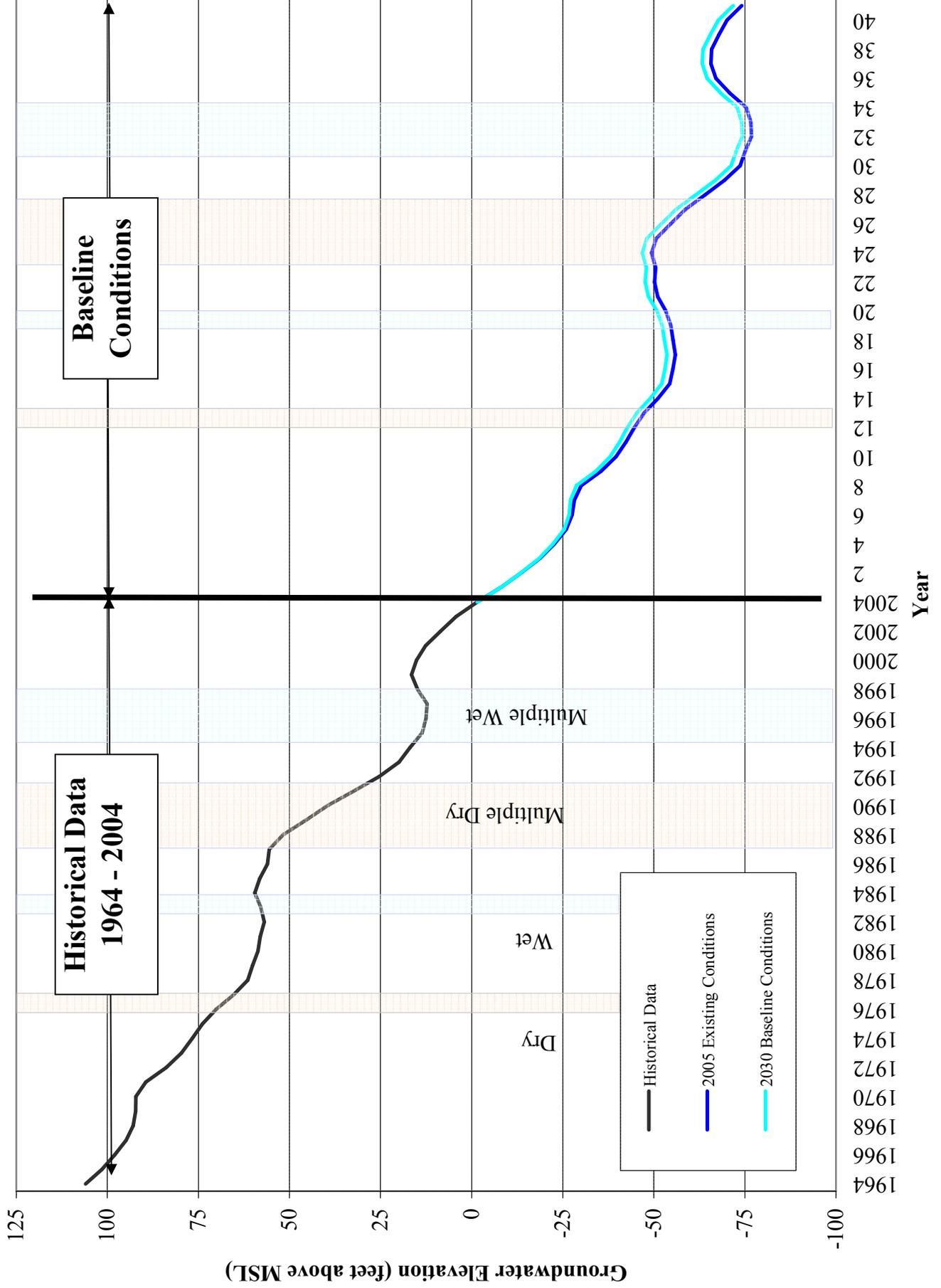
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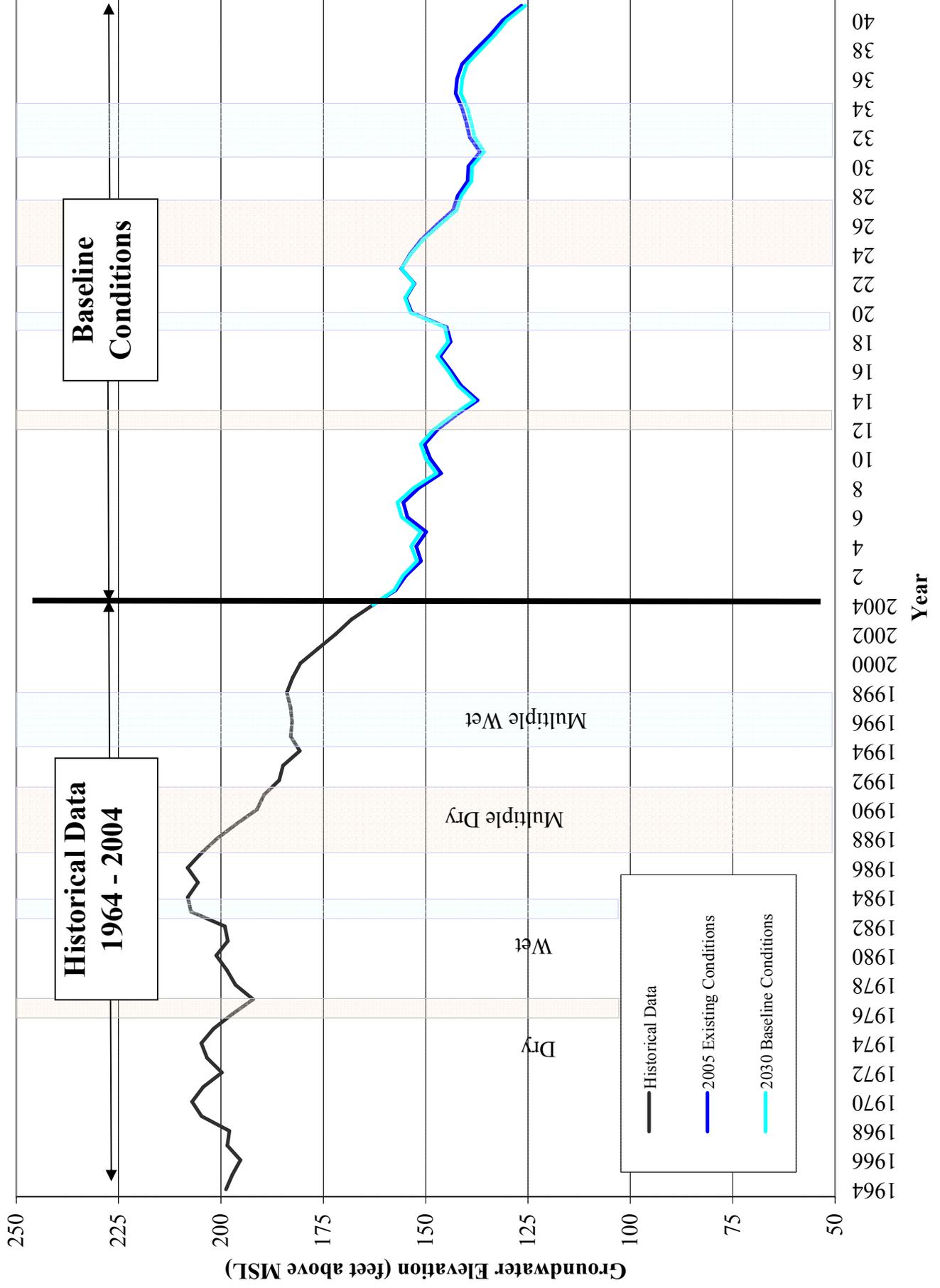
Annual Groundwater Levels in the Fall for Well 70



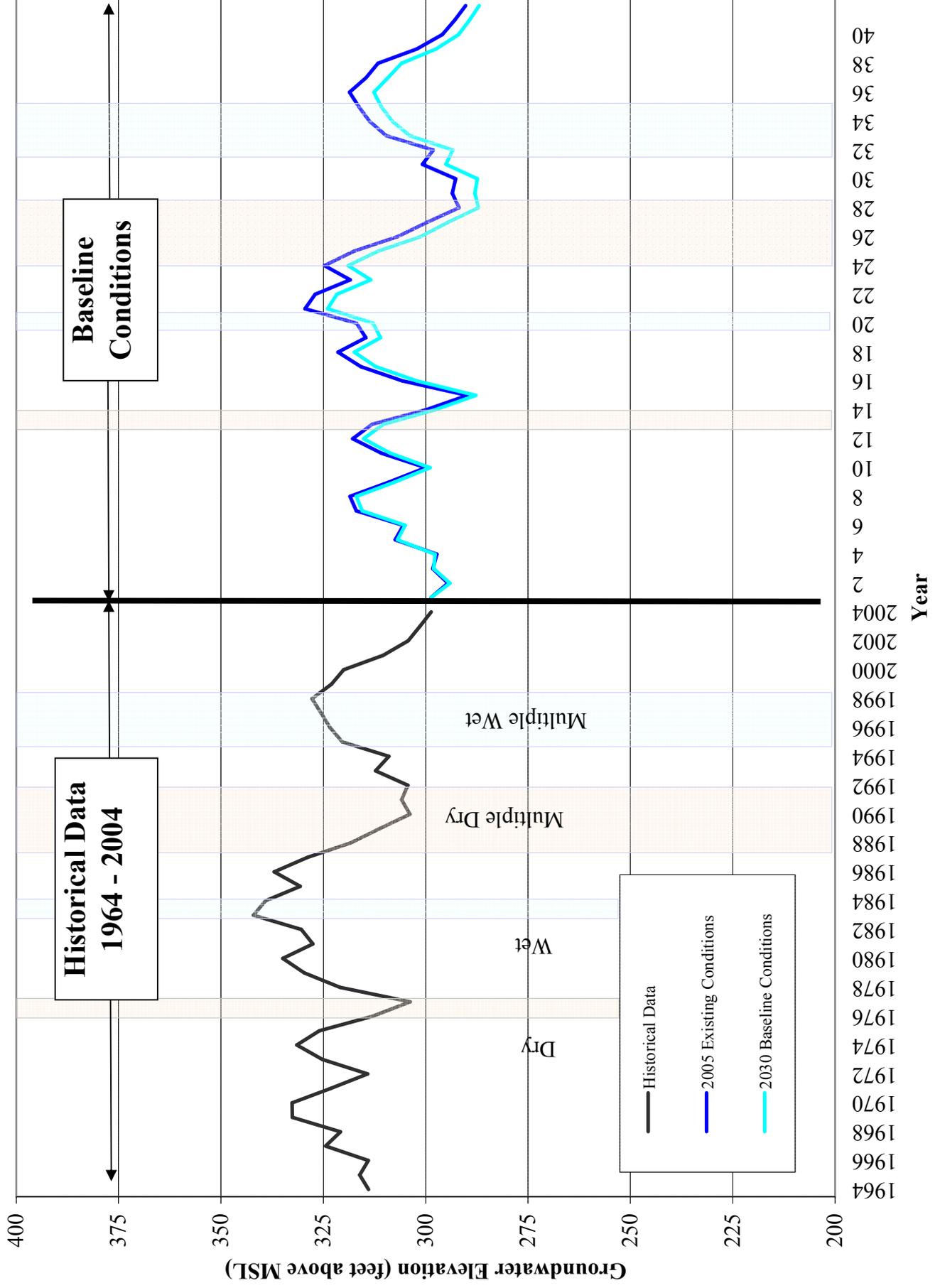
Annual Groundwater Levels in the Fall for Well 84



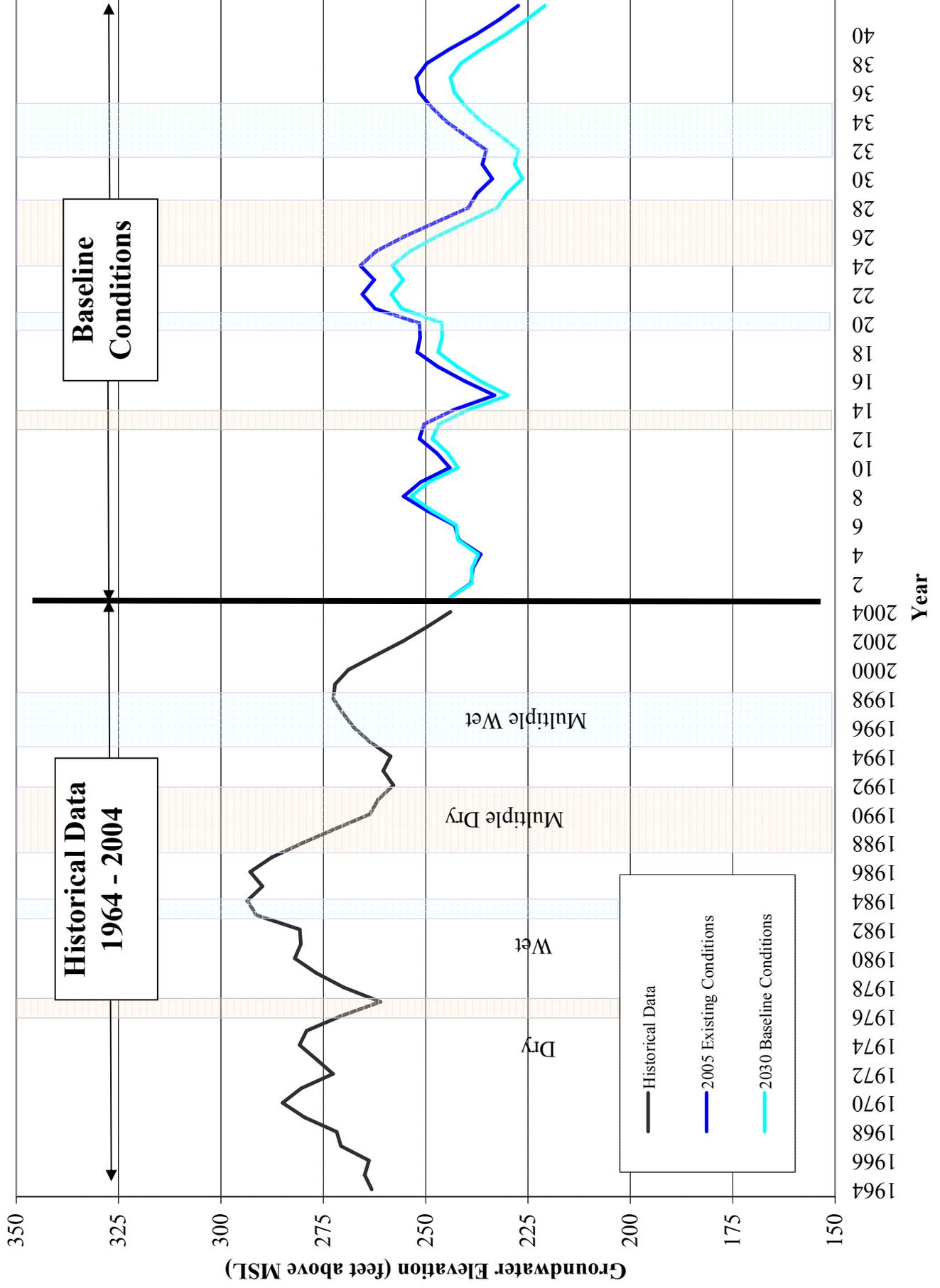
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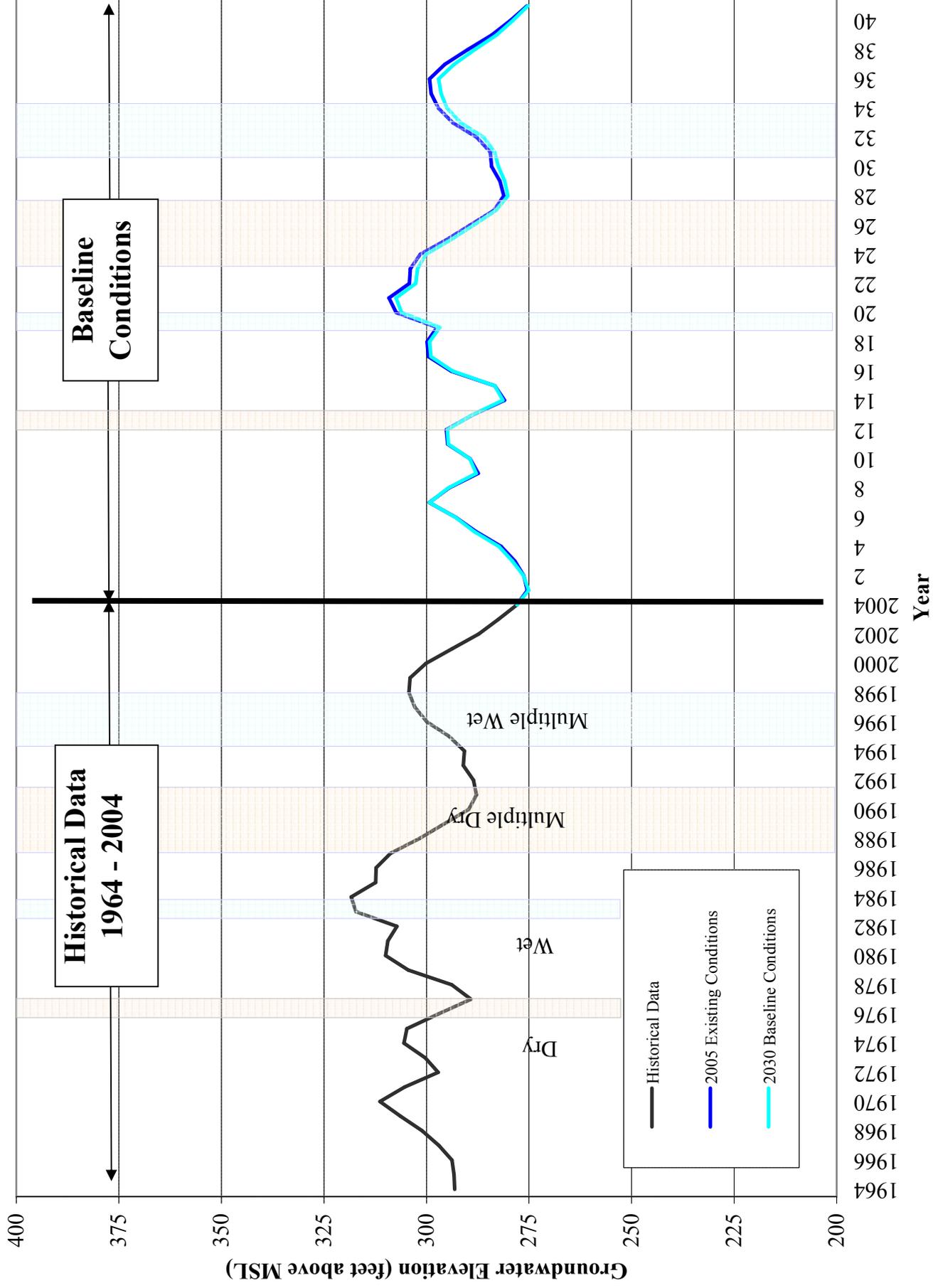
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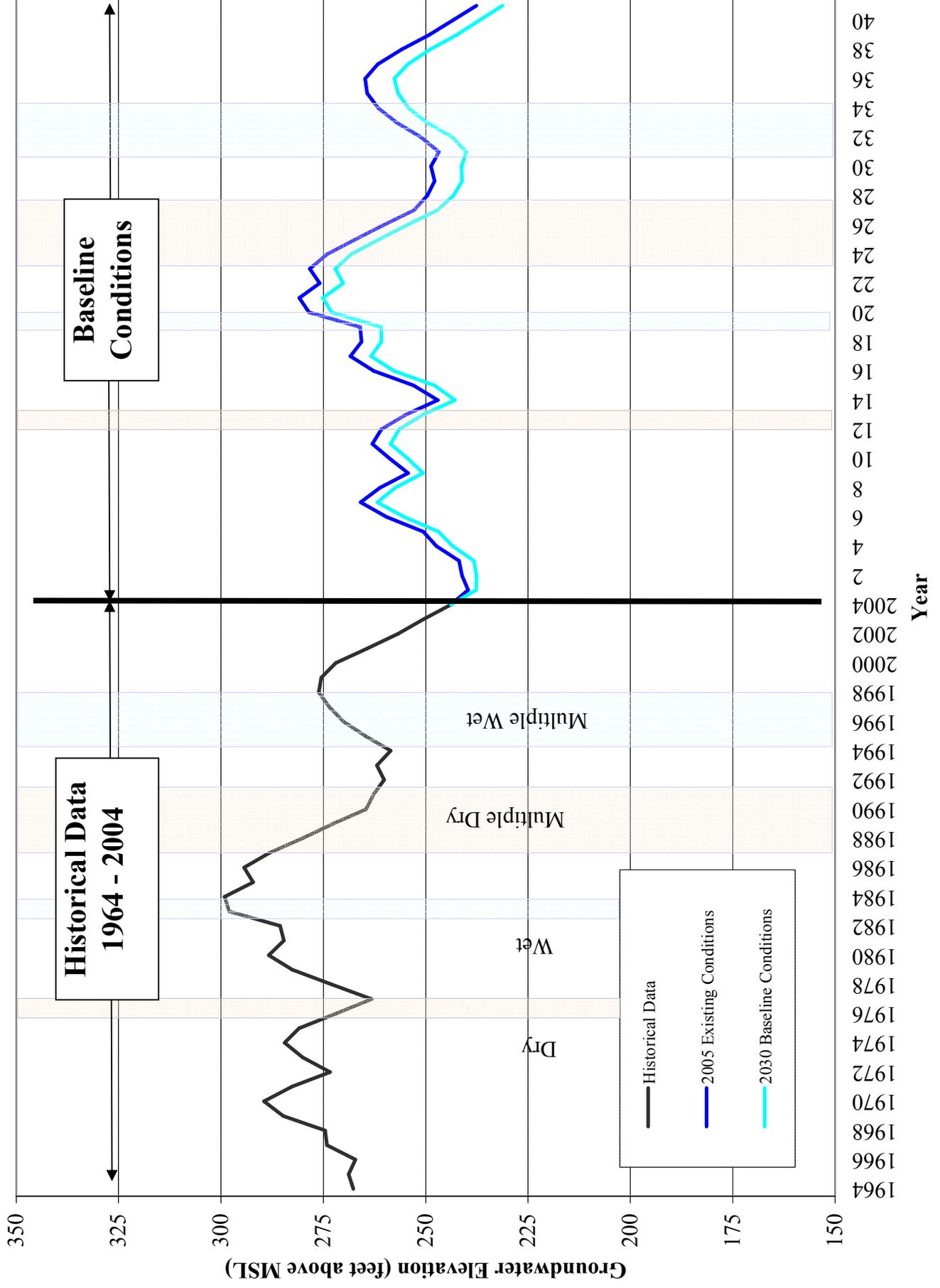
Annual Groundwater Levels in the Fall for Well 115



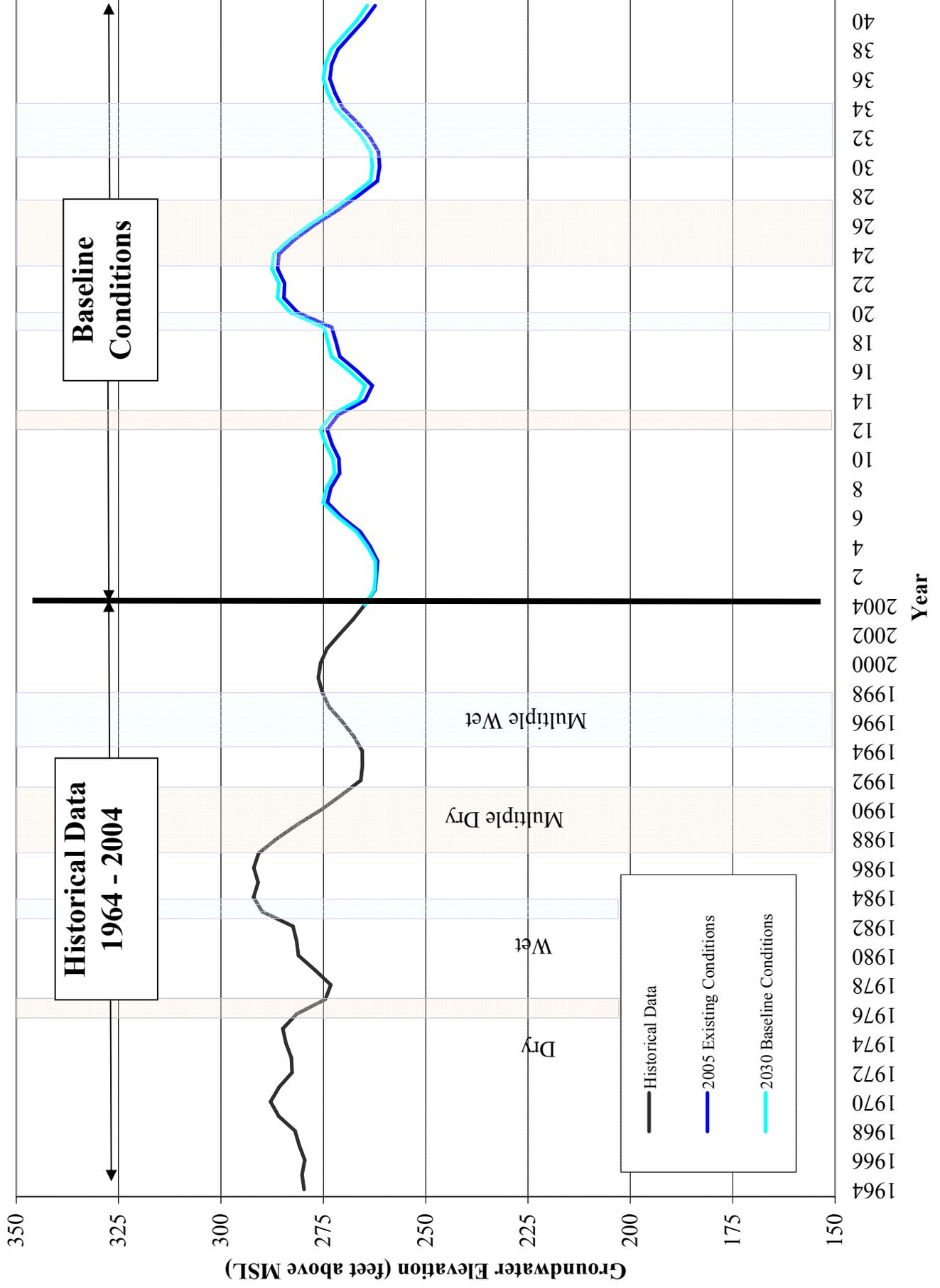
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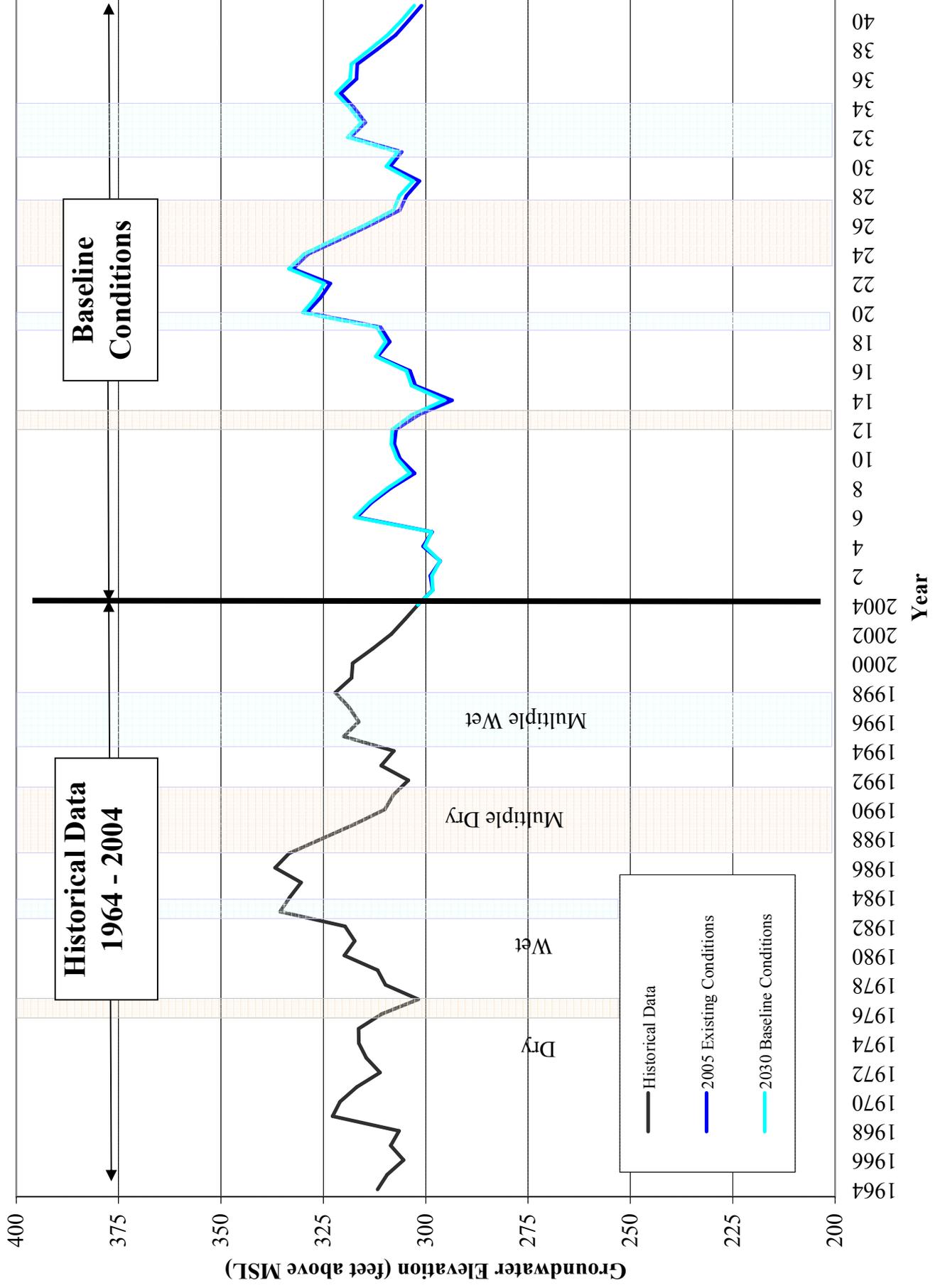
Annual Groundwater Levels in the Fall for Well 120



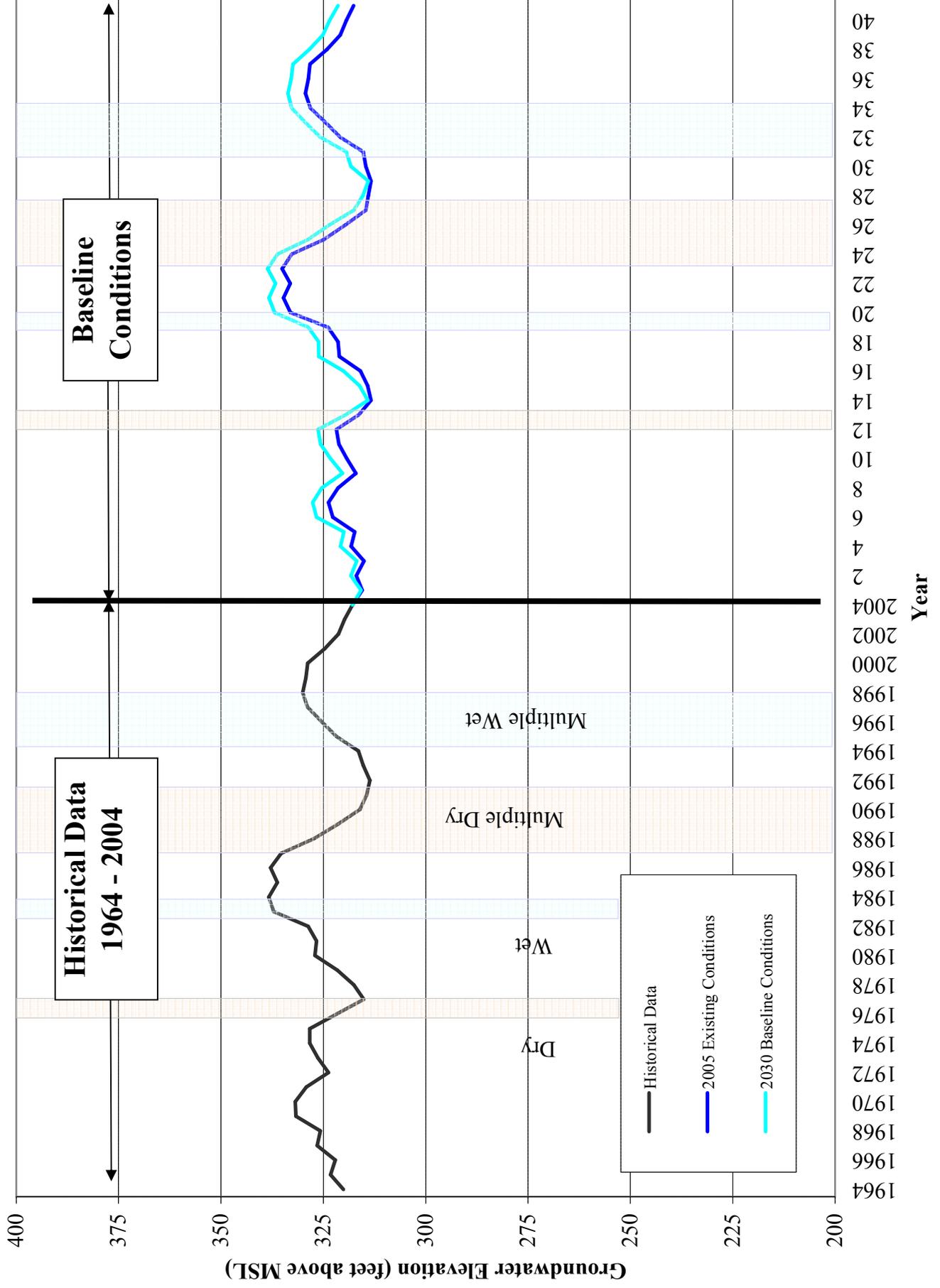
Annual Groundwater Levels in the Fall for Well 126



Annual Groundwater Levels in the Fall for Well 138



Annual Groundwater Levels in the Fall for Well 146



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1. Project Information Form; and
2. Project Ranking and Evaluation Form.



Upper Kings Basin Integrated Regional Water Management Plan
Project Identification Form

Developed by: 

Welcome: Matt Zidar

Kings Basin Project Identification Report

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Project Information

Regional Goals & Strategies

Relationship to Existing Plans

Project Cost & Schedule

Statewide Evaluation Criteria

Save Preview

1. Project Information

Project Title:

Other partners or project sponsors: (list all that are collaborating on the project)

Add New

Project Description

Please enter your response here.

Purpose/Need/Problems

Please describe the project purpose and need and the primary problems to be addressed. Document any potential conflicts that are resolved or are avoided by the project:

Please enter your response here.

Project Goals and Objectives

Please enter your response here.

Total Project Costs:

Project Location

Description:

Site Address (if relevant)

Street 1:

Street 2: (For long addresses)

City: State: Zip: County:

Phone: Email: **Mapped Location**

Please attach project map if available. Enter path and file name or Browse to find the file.

 Work Plan

Has a detailed project work plan been prepared?

 Yes NO**Disadvantaged Community**Is your community a disadvantaged community? Yes NO**Project Benefits**

1) Quantitative: Please be as specific as possible and quantify amounts and anticipated benefits of the proposed project (e.g.: acre feet of water produced or treated, millions of gallons of water treated to standards, volume of water recharged).

Please enter your response here.

2) Qualitative: Please describe the anticipated, non- quantifiable benefits anticipated from the project.

Please enter your response here.

3) Please describe the negative consequences if the project is not implemented.

Please enter your response here.

Engineering and Scientific Basis of the Proposed Project

List any feasibility or technical studies that have been completed or that document the project's technical merit.

Please upload any electronic files for the listed studies if available.

Pre-requisite or pending investigations. Please list planned or pending investigations or studies that will support the proposed project.

Environmental Review

Has your project undergone environmental review pursuant to the California Environmental Quality Act?

 Yes NO**Permits**

Have permits been obtained?

 Yes NO**Prior Experience**

Has your organization implemented similar projects in the past?

 Yes NO

Water Quality

For proposal affecting water quality, provide a discussion of water quality problems that the proposal addresses including specific pollutants.

Please enter your response here.

Save Preview



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Project Information

Regional Goals & Strategies

Relationship to Existing Plans

Project Cost & Schedule

Statewide Evaluation Criteria

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2. Regional Goals & Strategies

Relationship to IRWMP Goals & Objectives

Listed are the IRWMP Goals. Please mark which of the IRWMP goals your project supports.

Supported IRWMP Goals

- Halt and ultimately reverse the current overdraft and provide for sustainable management of surface and groundwater
- Increase the water supply reliability, enhance operational flexibility, and reduce system constraints
- Improve and protect water quality
- Provide additional flood protection
- Protect and enhance aquatic ecosystem and wildlife habitat

Project Water Management Elements

Please check all of the water management strategies that apply to the proposed project.

Management Strategies

- | | |
|-------------------------------------------------------------------------------|------------------------------------------------------------|
| <input type="checkbox"/> Ecosystem restoration | <input type="checkbox"/> Conjunctive use |
| <input type="checkbox"/> Environmental and habitat protection and improvement | <input type="checkbox"/> Desalination |
| <input type="checkbox"/> Water Supply Reliability | <input type="checkbox"/> Imported water |
| <input type="checkbox"/> Flood management | <input type="checkbox"/> Land use planning |
| <input type="checkbox"/> Groundwater management | <input type="checkbox"/> NPS pollution control |
| <input type="checkbox"/> Recreation and public access | <input type="checkbox"/> Surface storage |
| <input type="checkbox"/> Storm water capture and management | <input type="checkbox"/> Watershed planning |
| <input type="checkbox"/> Water Conservation | <input type="checkbox"/> Water and wastewater treatment |
| <input type="checkbox"/> Water quality protection and improvement | <input type="checkbox"/> Water transfers |
| <input type="checkbox"/> Water recycling | <input type="checkbox"/> Wetlands enhancement and creation |

Please describe how the Local Project integrates the strategies

Please enter your response here.

Save Preview



**Upper Kings Basin Integrated
Regional Water Management Plan**
Project Identification Form

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[Project Information](#)

[Regional Goals & Strategies](#)

[Relationship to Existing Plans](#)

[Project Cost & Schedule](#)

[Statewide Evaluation Criteria](#)

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[Preview](#)

3. Relationship to Existing Plans

Local General Plan

Is your project consistent with and/or identified in the applicable City or County General Plan?

Yes NO

Capital Facilities Plan

Is your project specifically identified, in or associated with an adopted Capital Facilities Plan?

Yes NO

Urban Water Management Plan

Is your project specifically identified, in or associated with an Urban Water Management Plan?

Yes NO

Groundwater Management Plan

Is your project specifically identified, in or associated with a Groundwater Management Plan?

Yes NO

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Project Information

Regional Goals & Strategies

Relationship to Existing Plans

Project Cost & Schedule

Statewide Evaluation Criteria

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4. Project Cost & Schedule

Cost Summary and Funding Sources

Local:

State:

Federal:

Other Sources:

Total:

Has funding been committed?

Yes NO

Budget

Have project costs and detailed budgets for project development and implementation been prepared?

Yes NO

Schedule

Planned Start Date (MM/DD/YYYY):

Planned Completion Date (MM/DD/YYYY):

Time Line

Ready now 1-6 months 6-12 months 12-24 months Greater than 2 years

Project Status

What phase is the project currently in or what work has been completed? (Mark all that apply)

	Date Completed	Start Date *	(Planned) End Date *
Project development/Conceptual Design	<input type="text"/>	<input type="text"/>	<input type="text"/>
Feasibility study	<input type="text"/>	<input type="text"/>	<input type="text"/>
Detailed Design	<input type="text"/>	<input type="text"/>	<input type="text"/>
Plans and Specifications/Bid Documents	<input type="text"/>	<input type="text"/>	<input type="text"/>
Permitting and Environmental Review	<input type="text"/>	<input type="text"/>	<input type="text"/>
Approval by Lead Agency	<input type="text"/>	<input type="text"/>	<input type="text"/>

(*) If not completed.

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Upper Kings Basin Integrated Regional Water Management Plan
Project Identification Form

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5. Statewide Evaluation Criteria

Describe how your project addresses the following criteria. Respond to all that are required

a. Describe how your project provides **regional** environmental, recreation and other multiple benefits.

Please enter your response here.

b. Describe how your project provides **local** environmental, recreation and other multiple benefits.

Please enter your response here.

c. Describe how the project will contribute to the long-term attainment and maintenance of water quality (or will eliminate or significantly reduce pollution into impaired water and sensitive habitats.)

Please enter your response here.

d. Describe how the project will support and improve local and regional water supply reliability.

Please enter your response here.

e. Please describe performance measures you will use to determine the effectiveness of the project and how the monitoring will integrate into statewide monitoring efforts.

Please enter your response here.

f. Please describe how ongoing operating and maintenance will be financed and managed.

Please enter your response here.

g. Describe how the project will directly benefit disadvantaged communities.

Please enter your response here.

h. Reduce conflict between water users or resolve water rights disputes, including interregional water rights issues.

Please enter your response here.

i. Implementation of Regional Water Quality Control Board Watershed Management Initiative Chapters, plans, and policies or Non-Point Source program plan.

Please enter your response here.

j. Implementation of recommendations of the floodplain management task force, desalination task force, or recycling task force.

Please enter your response here.

k. Address environmental justice concerns.

Please enter your response here.

Save Preview

Project Ranking and Evaluation Form

Kings Scoring Criteria and Relation to Kings Project ID Form and State Criteria				
Kings Criteria	Weighting Factor	Range of Points Possible	Score	Scoring Standard
<p>Support for Kings IRWMP - Adopted Resolution of Support and Participant in the Water Forum.</p> <p><i>Scoring is based on the degree of support to the regional planning effort in terms of participation and funding.</i></p>	2	0-8	4	A score of 4 will be awarded if the project proponent has formally adopted a resolution of support to the IRWMP; are seeking coverage under the IRWMP; are a partner in the IRWMP and have provided 'in-kind funding'; and been an active participant in the Water Forum.
			3	A score of 3 will be awarded for project that have formally adopted a resolution of support to the IRWMP; are seeking coverage under the IRWMP; are a participant in the IRWMP but have not yet provided 'in-kind funding'; and have been an active participant in the Water Forum. .
			2	A score of 2 will be awarded for a project that have formally adopted a resolution of support to the IRWMP; are seeking coverage under the IRWMP; and have been an active participant in the Water Forum.
			1	A score of 1 will be awarded for a project that is proposed by an active participant in the Water Forum
			0	A score of 0 will be awarded for applicants that have not formally been involved in the Water Forum in any fashion.
<p>Collaboration and Multiple Stakeholders</p> <p><i>Scoring is based on how well the project demonstrates regional partnerships and collaboration.</i></p>	1	1-3		A higher score will be assigned to projects that involve multiple stakeholders and participants in project development and funding.
<p>Purpose/Need/Problems</p> <p><i>Scoring is based on how well the project addresses the problems identified by the Water Forum, and if the projects helps avoid or resolve conflicts.</i></p>	1	1-5		A higher score indicates that the project addresses the major water related problems and conflicts identified by the Water Forum.
<p>Goals and Objectives</p> <p><i>Scoring is based on how well the specific project objectives integrate with the Regional Water Resources Goals and Objectives</i></p>	1	1-5		A higher scores will be assigned to projects that demonstrate a clear relationship to the IRWMP goals and objectives as established by the Water Forum; the local objectives are clearly stated.
<p>Water Management Strategies and Integration</p> <p><i>Scoring will be based on how well the project integrates a water management strategy.</i></p>	1	1-5		A higher score will be assigned to those projects that include multiple strategies and demonstrate how these strategies are integrated to meet local and IRWMP objectives.

Kings Scoring Criteria and Relation to Kings Project ID Form and State Criteria

Kings Criteria	Weighting Factor	Range of Points Possible	Score	Scoring Standard
Disadvantaged Community Scoring will be based on whether the Local Project is located in a disadvantaged community	1	0-3		A score of three will be assigned if the project is in a disadvantaged community. A score of zero will be assigned if the project is not in a disadvantaged community.
Plans Integration and Relation to Local Planning <i>Score is based on relationship of project to prevailing land use plan.</i>	1	1-4	4	A score of four is awarded if the proposed project is consistent with the City or County General Plan and is identified in an existing capital facilities plan
			3	A score of three is awarded if the proposed project consistent with the City or County General Plan but is not specifically identified in an existing capital facilities plan
			2	A score of two is awarded if not specifically identified in the City or County General Plan, but is identified in a Capital Facility Plan
			1	A score of one is awarded if not identified in a City or County General Plan or existing capital facility plan
Plan Integration- Urban Water Management Plan (UWMP). <i>Score is pass fail based on state requirement to have and UWMP for cities servicing 3000 connections or above.</i>			0 or 5	Pass= 5; Fail = 0
Plan Integration- Groundwater Management Plan (GWMP) <i>Scoring will be based on whether the project is consistent with an existing or adopted GWMP.</i>	1	1-5		A higher score will be assigned if the project is in an area with an adopted GWMP and if the project is identified in a GWMP.
Work Plan <i>Scoring will be based on whether the applicant has presented a detailed and specific work plan that adequately documents the proposal.</i>	1	1-5		A higher score will be assigned if the work plan is submitted in digital formats; provides adequate detail and completeness so that it is clear that the project can be implemented; and if the work plan identifies specific actions, tasks, studies (ongoing or planned) by which the project will be implemented.
Funding <i>Scoring will be based on whether the IRWM Plan describes a feasible program of financing for implementation of projects.</i>	2	2-10		Higher score based on documentation of firm financial commitments and with defined and/or multiple sources of funding; clear resource commitments for ongoing maintenance and operations; and a defined local match.
Budget <i>Scoring will be based on whether the applicant has presented a detailed and specific budget that adequately documents the project.</i>	1	1-5		A higher score will be assigned if there is a) a summary budget provided for the project proposal; b) the detailed costs shown for each project reasonable; and c) all the costs shown in the budget are supported by documentation

Kings Scoring Criteria and Relation to Kings Project ID Form and State Criteria

Kings Criteria	Weighting Factor	Range of Points Possible	Score	Scoring Standard
Schedule <i>Scoring will be based on whether the project proposal has presented a detailed and specific schedule that adequately documents the Proposal and on the readiness to proceed with the Proposal.</i>	1	1-5		A higher score will be assigned if detailed and quantified project benefits are provided; quantitative benefits are adequately explained; and potential negative consequences of no action are explained.
Local and Regional Impacts and Benefits <i>Scoring will be based on whether the project clearly and fully describes the local and regional impacts and benefits of the proposed project.</i>	1	1-5		Higher scores will be assigned to projects that quantitative local and regional benefits; describe in detail the qualitative local and regional benefits; and discuss the negative consequences if the project is not implemented.
Technical Analysis, Engineering, and Scientific Merit <i>Scoring will be based on whether the Local Project is based on sound engineering, scientific and technical analysis.</i>	3	0-9	3	A score of three will be assigned based on the submittal of detailed technical studies and analysis that document the project's engineering or technical merit and feasibility.
			2	A score of 2 will be awarded for a project that have some technical studies and analysis that document the project's engineering or technical merit and feasibility, and there is a plan describing the additional work needed to complete the project design and work plan.
			1	A score of one will be assigned based on the submittal of a work plan, budget, and schedule for conduct of technical studies and analysis needed to document the project's engineering or technical merit and feasibility.
			0	A score of zero will be assigned if there is no plan or no technical studies
Environmental Compliance and Permitting <i>Scoring will be based on whether the project has received CEQA clearance in permits have been obtained</i>	1	1-5		Higher scores will be assigned to projects that have CEQA clearance or are in the process of obtaining clearance; and if projects have identified and begun to obtain permits.
Prior Experience <i>Scoring will be based on prior experience in developing and implementing similar projects.</i>	1	1-3		Higher scores will be assigned to those projects where the proponent has demonstrated experience in designing, developing and implementing similar projects.
Water Quality <i>Scoring will be based on projects ability to resolved defined water quality problems</i>	1	1-3		Higher scores will be assigned to those projects where the water quality problem is clearly defined and the project will provide clear benefits in protecting water or enhancing water quality.
Statewide Priorities and Preferences	TBD	TBD		For Discussion

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“We are what we repeatedly do. Excellence, then, is not an act, but a habit.”

–Aristotle

