TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION AND PURPOSE

The State of California is encouraging local entities to work collaboratively within a region, to establish common water resources management goals and objectives, and to develop a regional Planning Framework to integrate land, water, and habitat projects, plans, and programs. The Upper Kings Basin Integrated Regional Water Management Plan (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.

This Technical Memorandum is provided to document the Planning Framework that will be used by the Upper Kings Water Forum (Water Forum) to identify and evaluate projects, plans, and policies that may be included in the IRWMP. It also serves to document the preliminary design assumptions for IRWMP projects. The assumptions are to be updated during the subsequent feasibility study and engineering analysis and are to be based on local input and research.

The Planning Framework, which defines the integration strategy, was presented and discussed at the Projects Work Group on April 21, 2006, then at the Planning and Steering Committee (PSC) and Water Forum on April 27. Comments on the Planning Framework were originally to be submitted to the Kings River Conservation District (KRCD) by May 21, until the Water Forum requested additional time; the deadline was then extended to June 21. The Water Forum discussed its approach at a June 22 meeting and decided to move forward with the process and to identify projects.

The Planning Framework will help the Water Forum and IRWMP Region to be more competitive for state financial support. The purpose of this Planning Framework is to:

- Define how the Water Forum will work with the community to identify water management strategies and projects;
- Review and define 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.

PLANNING FRAMEWORK

The Planning Framework includes a process to identify projects and a strategy to integrate the projects into the IRWMP. The IRWMP and related projects will be evaluated in the context of

the statewide requirements in a highly competitive environment; the Kings IRWMP will need to be responsive to the state's preferences and priorities to increase the probability of success. The *State Guidelines* define the IRWMP requirements and standards (DWR, 2004). The *Proposal Solicitation Packages for Steps 1 and 2 for Proposition 50 Implementation Grants* (DWR, 2005, 2006) contain criteria used by the state to evaluate IRWMPs and project proposals. Attachment A presents briefing materials provided to the Water Forum that describe the statewide preferences and priorities. This briefing analyzes how the state's preferences and priorities might be applied to the Kings Region and the IRWMP. The Water Forum used this information to define the Planning Framework and integration approach for the Kings Region.

INTEGRATION OF WATER MANAGEMENT STRATEGIES AND PROJECTS IN THE KINGS IRWMP

The Water Forum adopted the *Upper Kings Basin IRWMP Vision, Problem Statements, Goals and Objectives* (Attachment E). The goals are broad statements of intent and purpose, while the objectives are detailed descriptions of how the goals will be met through an integrated approach. The prevailing theme of the Kings IRWMP is Conjunctive Use & Groundwater Management because groundwater overdraft of the basin[1] is the highest priority problem. The Water Forum determined that groundwater overdraft has the greatest potential to result in conflicts between water users and to impact the environment. All of the other strategies are integrated within the prevailing theme.

The Kings objectives are crafted specifically to integrate a range of projects and water management strategies. The state legislature and the California Department of Water Resources (DWR) Guidelines[2] define the *"water management strategies and elements"* that must be considered for inclusion in the IRWMP. The water management strategies are 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.

The Water Forum described and discussed each of the water management strategies in general terms (Attachment B). A separate Technical Memorandum (TM) for *Task 13, Water Management Strategies* provides a more detailed analysis of the strategies and opportunities to define projects in the Kings IRWMP Region.

[1] DWR Bulletin 118 identifies the Kings Basin as being critically overdrafted. The Basin Assessment Report (WRIME, 2003) and other technical studies document historical overdraft, and it is anticipated that the Kings Basin Integrated Groundwater Surface water Model will provide further technical evidence, quantification, and confirmation of the extent of overdraft.

[2] Proposition 50 Guidelines, Appendix A- Standard D

A consolidated list of water management strategies and elements is presented in Table 1 to show how the DWR Guidelines and California Water Code[3] requirements are related, and how the Water Forum combined the state's required management strategies into the five Kings IRWMP project categories. The IRWMP integrations approach is shown in Figure 1, which presents the five major project categories in the IRWMP. The project categories will be used to identify project linkages and interdependencies.

Table 2 is presented to show how Kings 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 for conjunctives use projects.

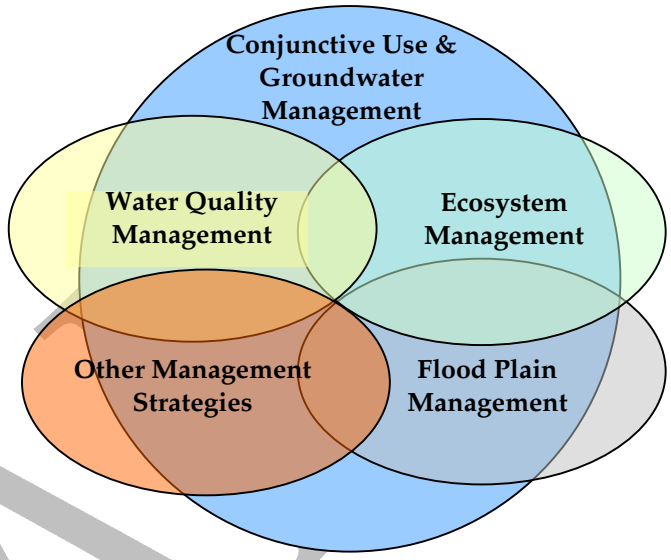


Figure 1. Kings IRWMP Project Categories and Integration Strategy

The water management strategies include structural and non-structural solutions. 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. Non-structural solutions also include the various plans or agreements needed to resolve conflicts or implement policy solutions. One examples is the Kings River Water Association (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.

[3] California Water Code § 79561 per Section III.C of Guidelines: Eligible Projects; § 79560; Guidelines, Appendix A- Standards

Table 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)	King IRWMP Project Category
Groundwater management*	Groundwater recharge and management projects	Conjunctive Use & Groundwater Management
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
Environmental and habitat protection and improvement*		
Wetlands enhancement and creation*		
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	Flood Plain Management
Storm water capture and management*	Storm water capture, storage, treatment, and management	
Water quality protection and improvement*	Demonstration projects to develop new drinking water treatment and distribution methods	Water Quality Management
NPS pollution control	NPS pollution reduction, management, and monitoring	
Watershed planning	Watershed management planning and implementation	
Land use planning		Other Mgmt. Strategies
Recreation and public access*		

* 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

Table 2. Kings IRWMP Objectives and Relation to Water Management Strategies

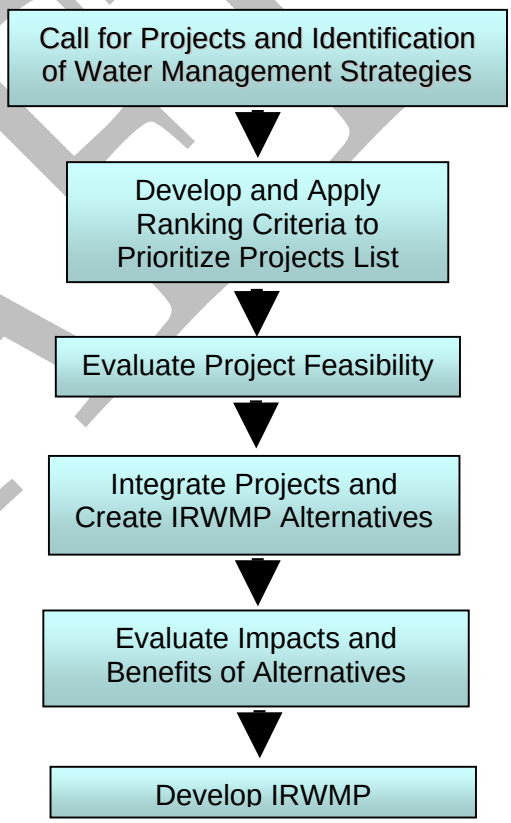
Kings Basin Water Resource Planning Objectives	Groundwater management*	Conjunctive Use	Water recycling*	Imported water	Surface storage	Water Treament	Wastewater treatment and Recycling	Water transfers	Coneyance	Desalination	Wetlands enhancement and creation*	Ecosystem Restoration*	Habitat Enhancements*	Water conservation*	Storm water capture and management*	Flood management*	Water quality protection and improvement*	Watershed planning	NPS pollution control	Land use planning	Recreation and public access*
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.	•	•		•		•	•	•	•		•	•	•		•						

PROJECT DEFINITION AND IDENTIFICATION

The project identification process is shown in Figure 2. The Water Forum is reaching out to other stakeholders in the IRWMP Region to identify potential projects, plans, and policies that may be included in the IRWMP. A "Call for Projects" will request that potential project sponsors complete Project Information Forms (Attachment C) available on the project web site. 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.

Figure 2. Planning Framework for Project Definition and Alternatives Evaluation



The Project Information Forms were designed so that information is obtained in a format that supports compliance with the statewide requirements and IRWMP evaluation criteria.

Once the project sponsors submit the information, the consulting team and the Water Forum will use the Project Prioritization Criteria (Criteria). The Criteria were developed in cooperation with the Water Forum and are presented in Attachment D.

The statewide evaluation criteria in the *Proposal Solicitation Package for Steps 1 and 2 of the Implementation Grant* were evaluated in order to establish the Criteria. The IRWMPs for other regions were also evaluated to compare their different approaches to project prioritization; to review which approaches best responded to statewide priorities and requirements as evidenced by success in obtaining implementation grant funding; and to develop the recommended Kings IRWMP approach.

The purpose of the Criteria is 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. The screening results will also allow for more detailed evaluation of engineering and economic feasibility; the greatest readiness to proceed (e.g., near-term projects

to be included in the next Proposition 50 application); the highest technical and scientific merit; and which projects would best meet IRWMP objectives.

Alta Irrigation District (AID), Fresno Irrigation District (FID), and Consolidated Irrigation District (CID) will sponsor separate workshops within their jurisdictions to explain to potential project sponsors the overall IRWMP planning process and the Project Information Forms. The target audience for the workshops will consist of representatives from the city and county public works and planning departments and other potential project sponsors, including non-governmental organizations and educational institutions that may recommend project or program concepts to the Water Forum.

The AID, CID, and FID will also hold internal design meetings with the consulting team and engineering staff to define regional conjunctive use projects. The emphasis of the meetings will be on developing larger regional groundwater management/conjunctive use facilities. The Projects Work Group and the Planning and Steering Committee will bring together all of the project concepts for discussion and integration.

IRWMP Alternatives and Implementation Plan

The individual projects will be integrated based on the project categories. The separate projects will be used to formulate IRWMP Alternatives, which will be further evaluated for local and regional benefits and impacts. The IRWMP will identify "common elements" that are part of all the alternatives, such as a regional groundwater monitoring program whose purpose is to evaluate progress towards meeting IRWMP objectives.

The IRWMP will include an implementation program. The integration of projects and plans within the IRWMP Region over the long term will occur at three levels and will include:

- Project category and planning processes integration, in which 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.
- Institutional and political integration, through which institutional and political alliances of water suppliers and governmental entities formulate, develop, finance, and implement integrated programs for the common benefit of the citizens. 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.
- Operational integration, providing for the coordinated management and operation of facilities and resources to generate the greatest possible benefit from the available resources.

To achieve the level of regional integration described above, a concerted 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 regionalization 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.

ASSUMPTIONS FOR THE NO PROJECT CONDITIONS

This section describes the No Project Conditions, defined as those conditions that would exist at the end of the planning horizon in the absence of the IRWMP. The No Project Conditions provide a basis for comparing the current 2005 baseline conditions to a set of assumed future conditions. Establishing the No Project Conditions includes making assumptions about land and water use; water supply and demand; groundwater and surface water diversion; surface water delivery and operations; and water management facilities. The assumptions defined in this section are based on preliminary data and will be refined with input from the Water Forum, and when additional feasibility level analysis is completed.

The IRWMP alternatives will also be evaluated and compared to the No Project Conditions from hydrologic and hydrogeologic, engineering, institutional, legal, and economic perspectives. The Kings Integrated Groundwater-Surface water Model (IGSM) will be used to evaluate the surface water and groundwater conditions resulting from the No Project Conditions or IRWMP alternatives.

The difference between the state of the basin under any of the IRWMP Project Alternatives and the No Project Conditions would indicate the impact or benefits of alternatives on the hydrologic conditions of the basin during dry, wet, and normal conditions, as well as extreme hydrologic conditions, such as the prolonged drought periods. The impacts of a scenario can be analyzed for the following areas:

- Regional and local groundwater levels,
- Regional and local groundwater flow rates,
- Groundwater storage,
- Streamflows, and
- Stream-aquifer interaction.

Preliminary planning assumptions, including design constraints and cost bases for design, are presented in Attachment F. Key assumptions are summarized and discussed further below.

PLANNING HORIZON

The levels of development often used in planning studies are the existing condition and build-out as defined for the cities and counties in the region. The planning horizon for the IRWMP is from 2005 to 2060. The year 2060 was chosen to be consistent with the planning horizon adopted for the Fresno Metro Plan and to provide a long enough period to support planning by the water districts, cities, and counties.

Table 3 shows the ending year for the planning horizon for the city and county general plans in the Kings Region.

Table 3. City and County General Plan Planning Horizon

City/County	Last Revision/ Adopted	Current Population	Build out Population	Planning Horizon
Clovis	2005	89,972	173,018	2030
Dinuba	2007	19,800	40,464	2040
Fowler	2005	3,979	7,200	2025
Fresno	2002	821,797	1,301,204	2025
Kerman	1993	8,551	15,000	2013
Kingsburg	1992	9,199	13,800	2012
Parlier		11,145		
Reedley	1993	20,756	55,201	2012
Sanger	2005	18,931	43,000	2025
Selma	1997	19,444	37,631	2015
Fresno County	2000	799,407		
Tulare County	2006	368,021		2025

HYDROLOGIC PERIOD

The proposed hydrologic time series that will be used to represent future hydrologic conditions is from 1964 to 2004. This 40-year period contains a number of wet years, dry years, and extended dry periods, and is representative of the water management conditions that have existed since Pine Flat Reservoir and all KRWA agreements were put into place.

NO PROJECT CONDITIONS—LAND USE AND WATER DEMAND

The planning horizon for the No Project Conditions for land and water use is based on the build-out level of development as defined in each of the adopted city and county general plans (i.e., the 2030 level of development) and in the adopted Urban Water Management Plans. Future land use assumptions include:

- The land use diagrams for adopted city and county general plans will be consolidated in the GIS and used to estimate urban land uses at build-out and to determine which lands are to be converted from agricultural to urban areas.
- Land annexed to the cities will be presumed to utilize groundwater unless surface water delivery facilities have been approved by the city or relevant utility and have been identified in an adopted general plan or capital facilities plan.
- Future agricultural land uses will assume the existing crop mix. The crop mix will be based on the most recent DWR land use surveys and held at a constant level for the entire 40-year simulation period.
- Where general plans do not extend to the 2060 planning horizon, population forecasts will be used to define future municipal land use as described below.
- The annual agricultural demand will be calculated using the same unit crop water requirements applied in the calibrated model and documented in the historical water demand and water supply technical memorandum (WRIME, 2006 a and b).
- The estimated 2060 urban water demand will be based on the water requirements for each specific land use as documented in the *Task 3—Historical Water Demand* report and applied in the calibrated IGSM.
- Population forecasts from the Department of Finance, General Plans, and Local Councils of Governments will be consulted and used to develop population forecasts and future water demands to the year 2060. The constant rate of growth from the adopted forecasts will be used to extend the data.
- Unit per capita water demand assumptions for each city will be based on approved Urban Water Management Plans. Where such plans are not available, an average of the per capita water requirements for the cities in the region will be used. Any differences between the population and land use–based water demand forecasts will be identified and reconciled to finalize the future water demand assumptions in cooperation with the Water Forum.
- The estimated 2060 population will be used to calculate future conversions from agricultural to urban land use. The amount of land to be annexed beyond the

adopted general plan will be estimated using the existing per capita urban density to calculate the amount of agricultural land that would be needed to accommodate the increased population. The 2060 population will also be used to calculate the increase in groundwater pumping and the associated reduction in surface water delivery to agriculture. The land will be equally distributed around the city within the model grid; urban boundaries will not be specifically mapped.

NO PROJECT CONDITIONS—SURFACE WATER SUPPLY

Water demands within the model area under the No Project Conditions will meet with surface water and groundwater supplies as described below.

- Surface water supply delivery for the 2060 No Project Conditions will be based on the land use estimates above. Agricultural-to-urban conversions will result in reduced surface water deliveries and increased groundwater pumping.
- For project planning purposes, the amount of water available for further development and recharge will be quantified. Kings River surface water supplies that are to be used for conjunctive use must be consistent with KRWA entitlements and policies.
- Specific water supply assumptions will need to be developed for the AID, CID, and FID areas. This task includes specific assumptions for:
  - Kings River surface water deliveries (flood waters, entitlement water, exchanges),
  - Local surface water delivery projects (i.e., the CID/Fresno surface water treatment plant), and
  - Central Valley Project (CVP) Friant Unit supplies (Class 1, Class 2, and 215 Flood waters).
- The mix of surface water and groundwater deliveries for the No Project Conditions will be determined in consultation with each of the separate water agencies after further evaluation of the water budgets using the Kings IGSM.
- As of January 2006, water supply facilities with approved California Environmental Quality Act (CEQA) documents and funding will be included in the future No Project Conditions.
- The Kings IGSM will be used to define initial No Project Conditions groundwater levels.
- The future without project Kings River stream flow will include fishery flows as defined by the Kings River Fisheries Management Program Framework Agreement (1999).

OTHER NO PROJECT CONDITIONS AND DESIGN ASSUMPTIONS

- Existing AID, CID, and FID canal conveyance capacities will not change from the 2005 baseline.

- All other engineered facilities are as defined in the *Baseline Conditions Technical Memorandum, Task 15* (WRIME, March 2006).
- Cost basis of design tables are preliminary and will be updated during feasibility level investigations and meeting with local water districts.

REFERENCES

DWR, 2004. *Integrated Regional Water Management Grant Program Guidelines Proposition 50, Chapter 8.* November 2004. California Department of Water Resources, California State Water Resources Control Board.

DWR, 2005. *Proposal Solicitation Package for Implementation Grants, Step 1 From Integrated Regional Water Management Grant Program Authorized Under Proposition 50, Chapter 8.* March 2005. California Department of Water Resources, California State Water Resources Control Board.

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WRIME, 2006a. *Analysis of Water Demand in the Kings Basin. Technical Memorandum, Phase 1, Task 3.* May 2006. Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation District with support from the California Department of Water Resources.

WRIME, 2006b. *Analysis of Water Supplies in the Kings Basin. Technical Memorandum, Phase 1, Task 4.* May 2006. Prepared for the Upper Kings Basin Water Forum and the Kings River Conservation District with support from the California Department of Water Resources.

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.

ATTACHMENT A BRIEFING MATERIALS ON STATEWIDE PREFERENCES AND PRIORITIES AND APPLICATION TO THE UPPER KINGS IRWMP

This analysis was provided to the Planning and Steering Committee at the April 27 PSC meeting. The Kings Basin IRWMP will need to consider the statewide program preferences and priorities. These need to be factored into the process used to prioritize local projects and into the final IRWMP.

The purpose of this briefing is to support discussion of how the Kings IRWMP Water Resources Objectives are consistent with the State Priorities and Preferences defined in the *Proposition 50 Guidelines* (DWR, 2004). The relationship of the Kings IRWMP Water Resources Planning Objectives to the State's Preferences and Priorities is presented in Table A-1. The Kings Basin IRWMP will need to implement a strategy to integrate the statewide Program Preferences and Priorities.

ANALYSIS OF STATEWIDE PROGRAM 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 evaluation criteria and will be taken into consideration during the review process of the state when establishing funding priorities. Preference will be given to proposals that address the State's Program Preferences, which 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 (DACs).

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,

Table A-1. Kings IRWMP Objectives and Relation to State Preferences and Priorities

Kings Basin Water Resource Planning Objectives	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	Implementation RWQCB Watershed 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.	•	•	•		•								

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, Bulletin 118) and the Kings IRWMP is targeted towards resolution of overdraft. 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 Kings 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 multi-purpose 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. 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 Kings 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 Regional Water Quality Control Board (RWQCB) indicate that there are only a small number of constituents, primarily high Total Dissolved Solids, 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 Kings 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 economic justice is defined and met.

ANALYSIS OF STATEWIDE PRIORITIES

Statewide Priorities established by the DWR and the State Water Resources Control Board (SWRCB) are to be considered during the Kings 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 Total Maximum Daily Loads (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 Kings IRWMP Objectives and Statewide Priorities is discussed below.

REDUCE CONFLICT BETWEEN 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 between water users in the IRWMP Region, between geographic areas within the region, or between 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 present considerable challenges to water resource protection program elements of the Kings IRWMP. The State and Regional Water Boards have developed the Watershed Management Initiative (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 Kings 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 National Point Discharge Elimination System (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 Kings 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 State Water Project (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 alternatives 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 acre-feet of groundwater storage. The Kings 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 Kings IRWMP, but it has not been determined if these are near-, mid-, or long-term elements.

ATTACHMENT B DWR-REQUIRED WATER MANAGEMENT STRATEGIES AND ELEMENTS

Water Management Strategies are listed in the *DWR Guideline* (Appendix A- Standard D) which documents the range of water management strategies that should be considered by the Water Forum to meet the IRWMP objectives. The *DWR State Water Plan* and other DWR documents provide general definitions for many of the water management strategies identified in the Proposition and these are included below. Where specific definitions were not provided, other sources were referenced to provide a basic definition. The information is intended to support discussion of which strategies should be applied, and in what manner, in the Kings IRWMP Region.

ECOSYSTEM RESTORATION

Many of California's ecosystems cannot be restored to their natural states, nor is that degree of restoration desirable. Instead, ecosystem restoration focuses of rehabilitating ecosystems so that they supply important elements of their original structures and functions in a sustainable manner. Ecosystem restoration and protection can be viewed as the proper maintenance of California's natural infrastructure. Ecosystem restoration now typically involves the integration with water management to reduce conflicts, expedite permitting, and provide a more cost-effective solution.

Restoration can improve plant and animal life, increase diversity and connectivity of habitat, help endangered species, and improve watersheds. Restoration can rehabilitate natural processes to support native communities with minimal ongoing help. Restored habitats are likely to help sustain reproduction, foraging, shelter, and other needs of fish and wildlife species. By broadening restoration to the ecosystem level, rather than focusing on only a handful of species, we improve the chances for long-term success by incorporating species relationships, such as between predator and prey, physical processes, genetic variability, and other factors that we don't fully understand (*Bulletin 160-05,* Vol. 2 Chapter 9).

Within the Kings Basin, there have been a number of wetlands restoration efforts conducted through the U.S. Department of Agriculture Wetlands Reserve Program.

ENVIRONMENTAL AND HABITAT PROTECTION AND IMPROVEMENT

Whereas environmental restoration is to recreate habitat, environmental protection is intended to preserve existing conditions and environmental improvement is to make marginal enhancements to the current conditions. The Kings River Fisheries Management Program is an example of an improvement or enhancement program.

WATER SUPPLY RELIABILITY

The DWR defines water delivery reliability as the volume of water one can count on being delivered to a specific place at a specific time. For the Kings Basin, water demand and supply reliability are essentially synonymous, since surface water supplies can only be delivered when they are available.

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. Usually, a local water agency in coordination with the public it serves determines the acceptable level of reliability and plans for new facilities, programs, or additional water supply sources to meet or maintain this level of certainty. (DWR, *The State Water Project Delivery Reliability Report*, Final. 2002). In its simplest terms, water supply reliability depends on three general factors:

1. **Availability of water from the source.** This is the natural source or sources of the water from which the supplier draws—the particular watercourse or groundwater basin. In the Kings IRWMP Region, this includes the Kings Groundwater Basin and the Kings and San Joaquin Rivers. Availability of water from the source depends on the amount and timing of precipitation and runoff, or "hydrology," which provides water to the stream or groundwater basin, and the anticipated patterns of use and consumption of the source water by others, including water returned to the source after use. In addition, the water rights and entitlements are managed in accordance with the KRWA policies and guidelines.
2. **Availability of conveyance.** The means for conveying the water from the source via pumps, diversion works, reservoirs, canals, etc., to its point of delivery needs to be considered. The ability to convey water from the source depends on the existence and physical capacity of the diversion, storage, and conveyance facilities and also on any contractual, statutory, and regulatory limitations on the use of the facilities. This factor also describes the facilities available to capture and convey surface water or groundwater and the institutional limitations placed upon the facilities. The facilities and institutional limitations may be assumed to be those currently existing. Alternatively, predictions may be made regarding planned new facilities. Assumptions made about the institutional limitations to operation—such as legal, contractual, or regulatory restrictions—often are based upon existing conditions. Future changes in conditions that affect the ability to convey water usually cannot be predicted with certainty, particularly the regulatory and other institutional constraints on water conveyance.
3. **The level and pattern of water demand at the place of delivery.** The level of demand for water at the place of delivery is defined by the magnitude of the demand, types of uses, local weather patterns, costs, and other factors. Supply from a water system may be sufficiently reliable at a low level of demand but

may become less reliable as the demand increases. In other cases under increased demand, the water supply system may be able to deliver more water than in the past and maintain its reliability because use of the system's facilities had not previously been maximized. This factor includes the amount and pattern of demand upon the water system. Demand can have a significant effect upon the reliability of a water system.

Assumptions about the future will need to be made in each of these areas for the Kings IRWMP, and how reliability within the Kings Basin is to be defined is an important consideration when establishing planning assumptions for the future.

FLOOD MANAGEMENT

In the past, many flood management projects within floodplains were mostly developed to reduce property damage. They did not consider the importance of floods in maintaining a healthy environment. Likewise, some ecosystem restoration was conducted without considering long-term floodway maintenance. Multi-objective projects are more effective than single-purpose projects. The government and private sector are likely to gain public support for projects with many benefits. Planners now recognize the value of floodplains by directing development away from them, thereby avoiding or minimizing the need for major flood control structures. Floodplain management provides many safety, ecosystem, and economic benefits. By encouraging wise land use decisions along river corridors, floodplain management can save lives, improve ecosystems and reduce property and livestock losses. By making better land use decisions, more open space, such as agriculture and native habitats, could be maintained. Controlling development within the floodplain can significantly reduce potential future flood risk to people and property. Periodic flooding of the floodplain can provide rearing habitat that favors native fish over exotics. Reconnecting rivers to floodplains helps ecosystems and increases groundwater recharge, benefiting groundwater supplies. (*Bulletin 160-05,* Vol. 2 Chapter 10)

Flood plain management functions in the IRWMP Region involve numerous parties as described in the *Baseline Conditions Report* (WRIME, Draft 2006).

GROUNDWATER MANAGEMENT

Groundwater management, as defined by the DWR, is the planned and coordinated monitoring, operation, and administration of a groundwater basin or portion of a groundwater basin with the goal of long-term sustainability of the resource. There are three basic methods available for managing groundwater resources in California: (1) management by local agencies under authority granted in the California Water Code or other applicable state statutes, (2) local government groundwater ordinances or joint powers agreements, and (3) court adjudications. No law requires that any of these forms of management be applied in a basin, though the state

legislature has created an incentive for local agencies to develop groundwater management plans by providing funding for such plans and by making some funding contingent on the presence of such a plan. Management is often instituted after local agencies or landowners recognize a specific groundwater problem. The level of groundwater management in any basin or subbasin is often dependent on water availability and demand. (*Bulletin 118-03,* California's Groundwater)

Within the Kings Basin, groundwater management is practiced primarily by the AID, the FID, and the CID, with involvement of the cities and counties within their respective jurisdictions. The KRCD has supported development of the groundwater plan for the Lower Kings Basin, including the Raisin City Water District service area.

RECREATION AND PUBLIC ACCESS

Recreation and public access includes the management of lands and water resources by public agencies (local, state, and federal) 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. Overuse, misuse, and poorly planned uses 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 good or bad effect on recreation. Water managers should consider the effects of all their actions on all resource values, including recreation and ecosystem health. Increasing numbers of visitors pursuing outdoor recreation may threaten the proper functioning of ecosystems, disrupt and displace wildlife, and degrade the natural, environmental, and aesthetic qualities of an area and, ultimately, the very recreational experience being sought. (*Bulletin 160-05,* Vol. 2 Chapter 24)

STORM WATER CAPTURE AND MANAGEMENT

Storm water capture and management includes storage of floodwater that would otherwise be lost and diversion to a planning area through retention and detention. These same facilities could be used to provide multiple uses by including a recharge component. Within the Kings Basin there are a number of programs intended to provide multiple benefits to storm water capture and management. The Fresno Metropolitan Flood Control District and the cooperative program with the FID and the Cities of Fresno and Clovis are an example.

WATER CONSERVATION

Water conservation for agricultural and urban water users includes implementation of best management practices to ensure that the water put to beneficial use is used in the most cost effective and efficient way possible. The goal is to reduce use where such use would have a negative effect on the environment in terms of the diversion from a stream course or a contribution to overdraft of a groundwater basin.

WATER QUALITY PROTECTION AND IMPROVEMENT

The DWR's *Bulletin 160-05* 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 is more cost-effective than either end-of-the-pipe treatment of wastes or advanced domestic water treatment for drinking water. Pollution prevention measures are usually more cost-effective because they have lower initial capital costs, as well as less ongoing operations and maintenance costs, than traditional engineered treatment systems. However, because of the nature and sources of some contaminants, like bromide (introduced by seawater) and organic carbon (natural runoff from the watershed), a pollution prevention approach may not be possible, cost-effective, or even desirable in some instances. Small water systems, which generally lack technical and financial capacities, may be more reliant upon pollution prevention measures than other options available to larger systems, such as advanced treatment. Pollution targeted for prevention may include urban runoff, agricultural drainage, and natural sources. (*Bulletin 160-05,* Vol. 2 Chapter 13)

MATCHING WATER QUALITY TO WATER USE

For agricultural and in-stream uses, water quality matching is an integral part of water quality management because there is generally no treatment of these water supplies prior to their use. For drinking water, appropriately matching high quality source waters can reduce the levels of pollutant and pollutant precursors that cause health concerns in drinking water. In addition, less costly treatment options can be used when water utilities start with higher quality source waters, and water supply reliability can simultaneously be enhanced. (*Bulletin 160-05,* Vol. 2 Chapter 12)

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 purpose. It is also possible to inject the treated water back into the aquifer. Contaminated groundwater can result from a multitude of sources, both naturally occurring and anthropogenic. Remediation results in "an additional water source that would not be available without remediation" but "groundwater treatment is expensive and it can take years or decades to remediate contaminated groundwater sites. (*Bulletin 160-05,* Vol. 2 Chapter 11)

WATER RECYCLING

Water recycling, also known as reclamation or reuse, is an umbrella term encompassing the process of treating wastewater, then storing, distributing, and using the recycled water. Recycled water is defined in the California Water Code to mean "water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur. The primary benefit of water recycling is augmenting water supply. Rather than discharging and losing the water, recycled water can be reused as a new water supply." Recycled water is only a new water supply if the wastewater is discharged to the ocean or to salt sink; otherwise the wastewater would likely be used by downstream users. Using recycled water for irrigation can spare high quality potable water used for irrigation, making more potable water supply available. (*Bulletin 160-05,* Vol. 2 Chapter 16)

There are current and planned recycling projects in the Kings Basin. Examples include the planned uses in the City of Clovis and the water recycled for agricultural uses at the City of Fresno wastewater treatment plant.

WETLANDS ENHANCEMENT AND CREATION

See ecosystem restoration and floodplain management.

CONJUNCTIVE USE

Conjunctive management is the coordinated operation of surface water storage and use, groundwater storage and use, and conveyance facilities to meet water management objectives. Although surface water and groundwater are sometimes considered to be separate resources, they are connected by the hydrologic cycle. Conjunctive management allows surface water and groundwater to be managed in an efficient manner by taking advantage of the ability of surface storage to capture and temporarily store storm water and the ability of aquifers to serve as long-term storage. Conjunctive management is used to improve water supply reliability, to reduce

groundwater overdraft and land subsidence, to protect water quality, and to improve environmental conditions.

There are three primary components to a conjunctive management project when the primary objective is to increase average water deliveries. The first is to recharge groundwater when surface water is available to increase groundwater storage. In some areas this is accomplished by reducing groundwater use and substituting its use with surface water, allowing natural recharge to increase groundwater storage (also called in-lieu recharge). The second component is to switch to groundwater use in dry years 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. Together these components make up a conjunctive management project. Conjunctive management projects may have other objectives in place of or in addition to improving average water deliveries. These other objectives may include improving water quality, reducing salt water intrusion, and reducing groundwater overdraft. (*Bulletin 160-05,* Vol. 2 Chapter 4)

Conjunctive use is widely practices in the Kings IRWMP Region.

DESALINATION

Desalination is a water treatment process for the removal of salt from water for beneficial use. Desalination is used on brackish (low-salinity) water as well as seawater. In California, the principal method for desalination is reverse osmosis. This process can be used to remove salt as well as specific contaminants in water, such as trihalomethane precursors, volatile organic carbons, nitrates, and pathogens. The benefits of desalination are:

- Increased water supply,
- Reclamation and beneficial use of waters of impaired quality,
- Increased water supply reliability during drought periods,
- Diversification of water supply sources,
- Improved water quality, and
- Protection of public health.

Desalting groundwater allows groundwater of impaired quality to be adequately treated for potable use. Approximately 170,000 acre-feet per year of capacity is currently planned or projected to be constructed. Groundwater desalting may or may not be a new water supply, depending upon the water portfolio or balance in the area or region where it occurs. It is, however, providing water from a source that is not currently being used for beneficial purposes. (*Bulletin 160-05,* Vol. 2 Chapter 6)

Within the Kings Basin there are no cost effective methods or a defined need for desalination. The build-up of salts in the groundwater and surface water of the IRWMP Region and entire San Joaquin Valley are a concern.

IMPORTED WATER

Imported water includes water brought into a planning area from an outside surface water source or water delivered under contracts with the state or federal governments, and may include short- or long-term transfers and exchanges. Conveyance facilities must be in place to deliver and distribute the water from the source to the point of use.

Water is currently imported from the San Joaquin via the CVP. In the lower Basin, Delta Mendota CVP water is used.

LAND USE PLANNING

Effective urban land use management consists of planning for the housing and economic development needs of a growing population while providing for the efficient use of water and other resources. The ways in which we use land—the type of use and the level of intensity—have a direct relationship to water supply and quality. Impervious surfaces such as roads and parking lots result in more rapid and larger amounts of surface runoff. This change in runoff can alter streamflow and watershed hydrology, reduce groundwater recharge, increase stream sedimentation, and increase the need for infrastructure to control storm runoff.

Higher density development and more efficient land use can be encouraged through changes in consumer preferences and public policies to promote more compact development. In some of the most densely populated regions of the state, including the San Francisco Bay Area and Los Angeles, headway is being made to grow more compactly, provide jobs closer to housing, and provide transit to connect people with community resources.

Compact, mixed-use development can reduce water demand, even with moderate increases in density. As a rule of thumb, landscaping irrigation accounts for almost half of residential water use. An increase in residential density from four units per acre to five reduces the landscaping area by 20%, which should cut water usage by roughly 10% compared to the lower density development. A smaller urban footprint reduces impervious surfaces. This generates less surface runoff and minimizes intrusion into the watersheds and groundwater recharge areas which receive the runoff. (*Bulletin 160-05,* Vol. 2 Chapter 20)

Many of the prevailing land use plans recognize groundwater overdraft and the need to integrate land use and water supply planning activities.

NON-POINT SOURCE POLLUTION CONTROL

Control of NPS pollution is related to Pollution Prevention and Water Quality Protection and Improvement. Non-point source pollution originates from otherwise legal uses of land and is contributed to a waterway from widely dispersed sources and generally accepted societal practices and situations in which individual liability and responsibility are hard to determine. The purpose of the state's NPS Program Plan is to improve the state's ability to effectively manage NPS pollution and conform to the requirements of the Federal Clean Water Act and the Federal Coastal Zone Act Reauthorization Amendments of 1990. (SWRCB, *NPS Plan*, 2000)

The agricultural waivers program managed by KRCD is one example of an NPS control program at the local level.

SURFACE STORAGE

Surface storage is the use of reservoirs to collect water for later release and use. Surface storage has played an important role in California where the pattern and timing of water use does not always match the natural runoff pattern. Most California water agencies rely on surface storage as a part of their water systems. Similarly, surface storage is often necessary for, or can increase, benefits from other water management activities, such as water transfers, conjunctive management and conveyance improvements. Some reservoirs contribute to water deliveries across several regions and some only contribute to water deliveries within the same watershed. Surface reservoirs can be formed by building dams across active streams or by building off-stream reservoirs where the majority of the water is diverted into storage from a nearby water source.

Many of California's reservoirs were originally built for the primary purposes of hydropower, flood control, and consumptive water use. Although the allocation of benefits for proposed surface storage can affect the occurrence and magnitude of different types of benefits, they generally can include the following:

- Water quality management,
- System operational flexibility,
- Power generation,
- Flood management,
- Ecosystem management,
- Sediment transport management,
- Recreation,
- Water supply augmentation, and
- Emergency water supply.

The presence of new surface storage could allow ecosystem and water managers the flexibility to take actions and make real-time decisions that would not be possible without the storage. Water transfers between regions could be easier if water could be released from upstream storage at appropriate times and the receiving regions had reservoirs to store the transferred water. Surface storage can improve the effectiveness of conjunctive water management strategies by more effectively capturing runoff that can ultimately be stored in groundwater basins. (*Bulletin 160-05,* Vol. 2 Chapter 18)

The KRCD, the KRWA, and the U.S. Army Corps of Engineers manage the Pine Flat Reservoir and upstream reservoirs provide some storage to KRWA members. Prior project proposals have included the Rogers Crossing, Dinkey Creek, and Pine Flat Afterbay storage projects.

WATERSHED PLANNING

Watershed management is the process of evaluating, planning, managing, restoring, and organizing land and other resource use 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 assumes that a prerequisite for any project is the sustained ability for the watershed to maintain the functions and processes that support the native ecology of the watershed. This does not imply that a goal is to return the watershed to an undisturbed condition. Instead it implies an integration of human needs and ecological condition that allows the watershed to sustain ecological integrity over time while providing for sustainable community needs. It is recognized that watersheds are dynamic and the precise makeup of plants, animals, and other characteristics will change over time. Watershed management seeks to balance changes in community needs with these evolving ecological conditions.

Underpinning watershed management is the need to understand ecological processes important to the local watershed. One approach to understanding these processes is to describe various ecological cycles and watershed traits, such as the hydrologic cycle, nutrient cycling, energy flow and transfers, soil and geologic characteristics, the role of fire, and animal's migration and utilization of habitat. Understanding these watershed processes allows for adaptively managing the watershed. In some cases the description of these processes will highlight that some infrastructure, programs, or projects are not sensitive to watershed processes. In these cases re-operation or redesign the infrastructure, programs, or projects may greatly improve their compatibility with the watershed processes. (*Bulletin 160-05,* Vol. 2 Chapter 25)

There is a limited amount of watershed planning occurring in the upper reaches of the Kings River because much of the land is under federal ownership and there have not been significant impairments to beneficial use.

WATER AND WASTEWATER TREATMENT

Water and wastewater treatment include infrastructure necessary to comply with state and federal requirements designed to protect public health and safety and the environment. This includes treating drinking water to meet standards and treating wastewater such that it can be safely discharged without impairing other water users or the environment.

WATER TRANSFERS

A water transfer is defined in the Water Code as a temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water rights. Many transfers, such as those among contractors of the State Water Project or Central Valley Project, do not fit within this definition. A more general definition is that water transfers are a voluntary change in the way water is usually distributed among water users in response to water scarcity. Transfers can be from one party with extra water in one year to another who is water-short that year.

Water transfers are sometimes seen as merely moving water from one beneficial use to another. However, in practice many water transfers become a form of flexible system re-operation linked to many other water management strategies, including surface water and groundwater storage, conjunctive management, conveyance efficiency, water use efficiency, water quality improvements, and planned crop shifting or crop idling. These linkages often result in increased beneficial use and reuse of water overall and are among the most valuable aspects of water transfers. Transfers also provide a flexible approach to distributing available supplies for environmental purposes. (*Bulletin 160-05,* Vol. 2 Chapter 23). There are transfers among KRWA members within the Kings IRWMP Region.

WATER MANAGEMENT STRATEGIES FOR KINGS IRWMP

CONVEYANCE

Conveyance provides for the movement of water. Specific objectives of natural and managed water conveyance activities include flood management, consumptive and non-consumptive environmental uses, water quality improvement, recreation, operational flexibility, and urban and agricultural water deliveries. Conveyance infrastructure includes natural watercourses as well as constructed facilities, like canals, pipelines and related structures, such as pumping plants, diversion structures, distribution systems, and fish screens. Groundwater aquifers are also used to convey water. Conveyance facilities range in size from small, local, end-user distribution systems to the large systems that deliver water to or drain areas as large as multiple hydrologic regions. Common water management objectives and evaluations do not show

consistent preference for either regional or interregional options. Determinations must be made at the project level.

The main benefit of conveyance to the urban, agricultural, and environmental water-use sectors are in maintaining or increasing water supply reliability, protecting water quality, augmenting current water supplies, and providing water system operational flexibility. For the environmental sector, benefits include in-stream flows, 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, by increasing system operational flexibility, conveyance capacity improvements can enhance reliability without augmenting supplies or reducing demand. (*Bulletin 160-05,* Vol. 2 Chapter 5)

There are extensive conveyance canals and infrastructure within the AID, the FID, and the CID. In the lower basin, some areas are exclusively reliant on groundwater and there are no delivery facilities.

LAND ACQUISITION

Land is needed to develop groundwater recharge project facilities. A land acquisition program to obtain control of lands through easement (for spreading) or purchase (for direct recharge facilities) would help overcome constraints to expanding conjunctive use, and would allow Water Forum participants to more quickly respond to opportunities when land comes onto the open real estate market. Easements and rights-of-way need to be acquired for conveyance of new facilities to move water to recharge sites. As part of the IRWMP feasibility analysis, favorable recharge areas will be identified, and environmental, legal or other potential constraints and impacts will be evaluated at a planning level. A land acquisition program will be evaluated and could be designed and reviewed at a programmatic level pursuant to the CEQA. Land can be precertified for acquisition under this approach and the environmental review process can be expedited. The purpose of this approach is to facilitate public agency procurement of property for specific recharge purposes.

There are regulatory, political, and economic constraints to protecting recharge areas. Funding mechanisms need definition, agreements between agencies need negotiation, and oversight and management responsibilities must be assigned. Acquiring land to build recharge ponds is a public project subject to review under the CEQA. The time needed for public agencies to comply with the CEQA can result in delays and lost opportunities when land is on the market. The strategy described above could reduce or eliminate this constraint. Land acquisition costs rise precipitously in areas of urban development. The Water Forum participants would need to develop a funding mechanism to generate capital to acquire land when it is on the market and to design recharge operations.

PROTECTION OF RECHARGE AREAS

The IRWMP is an opportunity to review strategies to acquire or protect lands that have a high recharge potential. Development pressure in urbanizing areas can result in loss of prime recharge areas to municipal land uses, resulting in increased runoff from impervious surfaces and reduced recharge from irrigation of applied surface water. 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. 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. Recharge areas need to be protected to allow for natural recharge, development of groundwater recharge facilities, and mitigation of the effects of land conversion. At minimum, the land use planning process and policies could be updated to account for the impact of new development on recharge zones, and mitigation of groundwater impacts could be required at the time of development review prior to project approval.

ATTACHMENT C PROJECT INFORMATION FORMS

Upper Kings Basin Integrated Regional Water Management Plan

Project Identification Form

Developed by: WRIME

Please enter your Username and Password to login

Username

Password

Login

Version 1.0, June 2006

- Alta Irrigation District
- Consolidated Irrigation District
- Fresno Irrigation District
- KRCD
- WRIME

This is a SSL (Secure Sockets Layer) certified site. Access is permitted only to designated WRIME Project Management Systemthrough secure user ID and password authentication. If you are not an authorized user, please leave this site.

Upper Kings Basin Integrated Regional Water Management Plan

Project Identification Form

Developed by: WRIME

Welcome: Sample User

My Projects | **Organization Information** | **Help**

Click Here to Fill up Organization Information First!

Submit Date	Organization Name	Project Title	Project Costs

Comments or Suggestions

Kings Scoring Criteria and Relation to Kings Project ID Form and State Criteria				
Kings Criteria	**Weighting Factor**	**Range of Points Possible**	**Score**	**Scoring Standard**
Support for Kings IRWMP — Adopted Resolution of Support and Participant in the Water Forum. *Scoring is based on the degree of support to the regional planning effort in terms of participation and funding.*	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; is seeking coverage under the IRWMP; is a partner in the IRWMP and has provided 'in- kind funding'; and has been an active participant in the Water Forum.
			3	A score of 3 will be awarded for a project that has formally adopted a resolution of support to the IRWMP; is seeking coverage under the IRWMP; is a participant in the IRWMP but has not yet provided 'in- kind funding'; and has been an active participant in the Water Forum. .
			2	A score of 2 will be awarded for a project that has formally adopted a resolution of support to the IRWMP; is seeking coverage under the IRWMP; and has 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 to applicants that have not been involved formally in the Water Forum in any fashion.
Collaboration and Multiple Stakeholders *Scoring is based on how well the project demonstrates regional partnerships and collaboration.*	1	1–3		A higher score will be assigned to projects that involve multiple stakeholders and participants in project development and funding.
Purpose/Need/Problems *Scoring is based on how well the project addresses the problems identified by the Water Forum and if the projects help avoid or resolve conflicts.*	1	1–5		A higher score will be assigned to projects that address the major water-related problems and conflicts identified by the Water Forum.
Goals and Objectives *Scoring is based on how well the specific project objectives integrate with the Regional Water Resources Goals and Objectives.*	1	1–5		A higher score 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.

Kings Scoring Criteria and Relation to Kings Project ID Form and State Criteria				
Kings Criteria	**Weighting Factor**	**Range of Points Possible**	**Score**	**Scoring Standard**
Water Management Strategies and Integration *Scoring is based on how well the project integrates a water management strategy.*	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.
Disadvantaged Community *Scoring is based on whether the Local Project is located in a disadvantaged community.*	1	0–3		A score of 3 will be assigned if the project is in a disadvantaged community. A score of zero (0) will be assigned if the project is not in a disadvantaged community.
Plans Integration and Relation to Local Planning *Scoring is based on the relationship of the project to the prevailing land use plan.*	1	1–4	4	A score of 4 will be assigned 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 3 will be assigned 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 2 will be assigned if not specifically identified in the city or county General Plan, but is identified in a Capital Facility Plan.
			1	A score of 1 will be assigned if not identified in a city or county General Plan or in an existing capital facility plan.
Plan Integration—Urban Water Management Plan (UWMP). *Score will be pass or fail based on state requirement to have an UWMP for cities servicing 3000 or more connections.*			0 or 5	Pass= 5; Fail = 0
Plan Integration—Groundwater Management Plan (GWMP) *Scoring will be based on whether the project is consistent with an existing or adopted GWMP.*	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 *Scoring will be based on whether the applicant has presented a detailed and specific work plan that adequately documents the proposal.*	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 identifies specific actions, tasks, studies (ongoing or planned) by which the project will be implemented.

Kings Scoring Criteria and Relation to Kings Project ID Form and State Criteria				
Kings Criteria	**Weighting Factor**	**Range of Points Possible**	**Score**	**Scoring Standard**
Funding *Scoring will be based on whether the IRWM Plan describes a feasible program of financing for implementation of projects.*	2	2–10		A higher score will be assigned based on the plan's documentation of firm financial commitments and defined and/or multiple sources of funding; clear resource commitments for ongoing maintenance and operations; and a defined local match.
Budget *Scoring will be based on whether the applicant has presented a detailed and specific budget that adequately documents the project.*	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 are reasonable; and (c) all the costs shown in the budget are supported by documentation.
Schedule *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.*	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 *Scoring will be based on whether the project clearly and fully describes the local and regional impacts and benefits of the proposed project.*	1	1–5		Higher scores will be assigned to projects that have 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 *Scoring will be based on whether the local project is based on sound engineering and scientific and technical analysis.*	3	0–9	3	A score of 3 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 has some technical studies and analysis that document the project's engineering or technical merit and feasibility, and if there is a plan describing the additional work needed to complete the project design and work plan.
			1	A score of 1 will be assigned based on the submittal of a work plan, budget, and schedule for implementation of technical studies and analysis needed to document the project's engineering or technical merit and feasibility.
			0	A score of zero (0) will be assigned if there is no plan or no technical studies.

Kings Scoring Criteria and Relation to Kings Project ID Form and State Criteria				
Kings Criteria	**Weighting Factor**	**Range of Points Possible**	**Score**	**Scoring Standard**
Environmental Compliance and Permitting *Scoring will be based on whether the project has received CEQA clearance and permits have been obtained.*	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 *Scoring will be based on prior experience in developing and implementing similar projects.*	1	1–3		Higher scores will be assigned to those projects in which the proponent has demonstrated experience in designing, developing, and implementing similar projects.
Water Quality *Scoring will be based on the project's ability to resolve defined water quality problems.*	1	1–3		Higher scores will be assigned to those projects in which the water quality problem is clearly defined and that will provide clear benefits in protecting water or enhancing water quality.
Statewide Priorities and Preferences	TBD	TBD		For Discussion

(1) relation to state evaluation criteria based on PSP Step 2 (See Standard and Review Criteria.doc for numbering)
(2) included Forum Comments from 4/27 meeting. Additional comments were to be received by 5/21, extended to 6/21. No comments received by the KRCD or WRIME. Discussed again at 6/22 Forum meeting.
PSC 6/8 recommended going forward

ATTACHMENT E UPPER KINGS BASIN VISION, PROBLEM STATEMENTS, GOALS AND OBJECTIVES

Last Revised April 28, 2006

Vision

The vision for the Upper Kings Basin Water Forum is a sustainable supply of the Kings River Basin's finite surface and groundwater resources through regional cooperation, planning and implementation of projects that are balanced and beneficial for the environment, quality of life, economy, and future generations.

Water Management Planning Process and Framework

Planning is the art and science of deciding what to do and how to get it done. The Kings Basin Integrated Water Resources Management Plan (IRWMP) will define projects and programs to manage and develop the surface water and groundwater supplies in a sustainable manner. The IRWMP will be 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.

The Upper Kings Basin Water Forum (Water Forum) is a multi-stakeholder group tasked with coordinating the overall planning process on behalf of the IRWMP partners. Representatives of local water districts, cities, counties, and other interest groups comprise the Water Forum. It provides the wide array of input and support needed so regional benefits are achieved and priority issues are addressed. Water Forum participants realize that water, land use, and environmental resource issues are interrelated and of regional scope, and that both local and regional solutions are required. This ensures that responses to one issue do not result in undue impacts on other issues.

Most Water Forum participants have been working together since 2001 to address the critical water resources issues facing the region. Now, Water Forum participants plan to adopt Resolutions that commit to completion of the IRWMP by January 2007. The IRWMP must be completed by this date to meet state requirements and qualify for state bond funding that is available to implement capital projects. During the next two years about $380 million in funding from Proposition 50, Chapter 8 will be provided to support the development and implementation of projects identified in IRWMPs that meet the State's standards.

This briefing is intended to support the adoption of Resolutions of Cooperation and Support by highlighting key IRWMP issues, goals, and objectives. The preliminary water resources objectives will be refined through the IRWMP process, and will be finalized upon adoption by those participating in the IRWMP process.

A number of sources have been consulted in crafting IRWMP goals and objectives including:

- The original Memorandum of Understanding (MOU) adopted in May 2001 by the California Department of Water Resources (DWR), Kings River Conservation District (KRCD), Alta Irrigation District (AID), Consolidated Irrigation District (CID), and Fresno Irrigation District (FID);
- The Water Forum Concept Paper (2004);
- Basin Assessment (WRIME, 2004); and
- IRWMP Guidelines (DWR, November 2004).

Clear problem statements have been developed to generate a consensus on the purpose and need for the IRWMP, and provide a basis for setting goals and objectives. **Regional Planning Objectives** have been established to guide the development of the IRWMP and the planning process. These objectives also help define how the Upper Kings Basin stakeholders will integrate other community values into the process to define water management strategies. Preliminary **Water Resources Objectives** have been developed to address regional water resources issues more specifically.

Regional Problems and Issues

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

Groundwater Overdraft. Overdraft of the groundwater resource is the primary problem to be addressed in the 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 basin was in overdraft (WRIME, 2004), concluding that the primary water management goal should be to "halt and ultimately reverse the current overdraft of the groundwater aquifer," clearly stating that attainment of the goal would "lead to overall maintenance or improvement in the quantity, quality and cost of development of groundwater resources in the region." Overdraft is evidenced by declining groundwater levels, increased pumping costs, and loss of groundwater supply in some areas in the eastern part of the planning area. 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.

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. Some areas are totally reliant on groundwater. All groundwater pumpers are contributing to the regional overdraft. Long- term sustainability and reliability of the surface and groundwater supply must be addressed. To increase supply reliability there is a defined need to improve the capture of and storage of storm water and surface water both annually (winter storage for summer use), and during multi- year climatic variations (wet year surface or groundwater storage to meet dry year demands), and for further conjunctive use of the available surface and groundwater supply and storage. 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 develop a consensus solution for creating sustainable water supplies with minimum environmental impact.

Degradation of water quality. Water quality problems can be a result of natural or man made conditions. Migration of poor quality water is a factor in the operation of the groundwater basin. Degradation of water quality in parts of the planning region has the potential to reduce the available supply or increase treatment costs, and existing water quality needs to be maintained or improved to ensure that there is water of sufficient 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 provide benefits to the region.

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, 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.

Protection of Water Rights. The existing agreements, rights and entitlements must be acknowledged and will provide the basis for further basin planning and management. This system and the associated agreements were put in place to resolve long standing historical conflicts. Protecting existing rights is a premise for the planning effort and is required to avoid conflicts. A complex system of water rights exists and is managed by the Kings River Water Association (KRWA) on behalf of its 28 members. The agreements demonstrate that local interests can solve and manage conflicts at a local level. Overlying groundwater rights must also be protected to avoid conflicts. Agreements similar to those that direct surface water management need to be developed for the operation of the groundwater basin and any potential groundwater management facilities for recharge and storage.

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.

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 can increase runoff and the associated impacts to 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.

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 need to also 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 subject to schedule delays, cost overruns or abandonment.

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 resources conflicts in the region. The Water Forum consulted and elaborated on the original goals and objectives developed by the Basin Advisory Panel. 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
- Protect and enhance aquatic ecosystems and wildlife habitat

Regional Planning Objectives

The following regional planning objectives are intended to guide Water Forum during the development of the IRWMP planning 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 include:

- Use the Kings Basin Water Forum to help:
  - Create a framework for ongoing regional collaboration and conflict resolution,
  - Increase public understanding
  - 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
- Collect and compile much needed 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.
- Avoid environmental impacts during planning and project design where possible.
- Develop an integrated hydrologic model to evaluate water budgets, define how the basin operates, evaluate and compare alternatives, and support decision making.
- Coordinate needed environmental review of the final alternative projects and programs.
- Generate locally-based water demand and needs analyses through water districts and local government.
- 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.

Preliminary Water Resources Objectives

Preliminary water resources objectives were specifically crafted to address the priority water supply problems, and begin integrating land, water, and environmental management strategies in order to provide multiple benefits and the greatest return on investment. In developing the water resources objectives, resolving groundwater overdraft is still a primary purpose and unifying theme for the IRWMP. The preliminary water management objectives include:

- 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.

ATTACHMENT F PRELIMINARY PROJECT ASSUMPTIONS

PRELIMINARY ASSUMPTIONS FOR NO PROJECT CONDITIONS
(Subject to review and update)

No.	Criteria/Category		Values	Notes
1	No Project Conditions			
1.1	Planning Horizon		2005-2060	
1.2	Hydrologic Period		1964-2004	
1.3	Land Use			
	1.3.1	Urban	Adopted General Plans, 2060 land use adjusted per population forecasts for each city	
	1.3.2	Ag	Existing 2005 crop mix, Refer to Task 2 Technical Memorandum, Water Demand (Task 2 TM)	
	1.3.3			
1.4	Water Demand			
	1.4.1	Urban	Refer to Task 2 TM for unit water demands based on land use and per capita demands	
	1.4.2	Ag	Unit land use values and per capita demands from Task 2 TM	
	1.4.3	Future Ag-Urban conversions	All future urban demands to rely ongroundwater	
	1.4.4	Conservation	Per existing and adopted UWMP	
1.5	Water Supply			
	1.5.1	AID, CID, FID water delivery operations	Diversions based on KRWA Blue Book schedule of entitlements; 2005 crop mix; 2060 land use diagram; and approved projects.	1.1
	1.5.2	Water Available for Recharge	Priority based on developing:1) Kings River flood water, 3) Kings River entitlement water, 4) CVP Friant contracts 5) 215 Flood Water, 6) imported, transfers or exchanges	1.2, 1.3
	1.5.3	Kings River water rights and entitlements	Per KRWA Blue Book, Decision 1290, and Baseline Conditions Technical Memorandum for Task 15 (Baseline TM)	
	1.5.4	CVP Contracts	City of Fresno: 60,000 afy Class 1 FID:75,000 afy Class 2	
	1.5.5	Fishery Flows	Kings River Fisheries Management Program Framework Agreement, Exhibit C or D	1.4
	1.5.6	San Joaquin River	Based on historical releases or as redefined by San Joaquin Settlement Agreement accepted by Court *(NRDC v. Rogers)*	

PRELIMINARY ASSUMPTIONS FOR NO PROJECT CONDITIONS
(Subject to review and update)

No.	Criteria/Category	Values	Notes
2	Recharge Design Assumptions/Constraints		
2.1	Planned additional diversion to recharge	250 to 500 cfs (preliminary)	
2.2	Recharge rate	.5 af/acre	
2.3	Preliminary land use requirements	500 to 2000 acres	
2.4	Available groundwater storage volume	To be determined with calibrated IGSM	
2.5	Maximum groundwater elevation	10 feet below ground surface	
2.6	Minimum balance prior to withdrawl	Recharge must occur prior to any withdrawl, no negative balances are permitted	
2.7	Retention in storage	Initially assumed that 100 percent of recharge volume is available for extraction	
2.8	Operations Assumptions- Kings River		
	North Fork/South Fork Flood Flows	First 4500 cfs diverted to North Fork at Army Weir; next 4500 cfs to South Fork; flows above 9000 cfs are split equally	
2.9	Diversions	Based on Pre- Piedra flows as defined in the diversion/entitlements schedule in Blue Book	
	2.9.1 AID average annual	206,799 af/yr	
	2.9.2 CID average annual	303,959 af/yr	
	2.9.3 FID average annual	521,355 af/yr	
2.10	Overdraft	AID= 22,000 af/y CID= 53,000 af/y FID= 10,000 to 20,000 af/y	2.1
3	**Facility Assumptions**		
3.1	Diversion/Canal Capacities	Baseline TM	3.1
	3.1.2 AID Operational	Alta Main = 800 cfs	3.2
	3.1.3 CID Operational	Consolidated Canal = 2600 cfs	
	3.1.4 FID Operational	Gould Canal = Fresno Canal =	
3.2	Losses		
	3.2.1 Pipelines	5%	
	3.2.2 Canals	Vary based on assumptions in IGSM, data from IDs	3.1
	3.2.3 Rivers	Varies based on water management practices and hydrology. Utilize IGSM for each alternative.	

PRELIMINARY ASSUMPTIONS FOR NO PROJECT CONDITIONS
(Subject to review and update)

No.	Criteria/Category		Values	Notes
3.3	Sizing Criteria			
	3.3.1	Pipelines - force mains	Velocity: 2 fps minimum for sustained flow pipelines 3.5 fps minimum to re-suspend solids in intermittent pipelines 8 fps maximum, although a maximum headloss of 8 ft/1000 ft of pipe is a better criteria. Roughness: Hazen-Williams formula with CH = 80 for unlined concrete 00 for unlined steel or ductile iron 140 for PVC 130 for cement morter lining.	
	3.3.2	Pipelines - gravity	Velocity: 2 fps minimum for sustained flow pipelines 3.5 fps minimum to re-suspend solids in intermittent pipelines 10 fps maximum for gravity mains. Roughness: same as force mains, assuming full pipe flow.	
	3.3.3	Tunnels	Size: Minimum 6 ft diameter for hand excavation and 8' for machine boring. Velocity: 2 fps minimum for sustained flow tunnels, 3.5 fps minimum to re-suspend solids in intermittent tunnels, 10 fps maximum. Roughness: Manning equation with n = 0.014 for concrete lining, 0.035 for unlined rock.	
	3.3.4	Canals	Velocity: 2 fps minimum for sustained flow canals 3.5 fps minimum to re-suspend solids in intermittent lined canals 3.5 fps maximum in earth canals 7 fps in lined canals Side slopes: 2.5H to 1V Minimum b/h ratio: 2. Roughness: Manning equation with n = 0.015 for concrete lining, 0.020 for gunite lining, and 0.025 for unlined but maintained. Freeboard: 2' up to 100 cfs, 2.5' up to 200 cfs, 3' up to 500 cfs, 3.5' up to 1000 cfs	
	3.3.5	Canal embankments	Topwidth = 12', water-side slope = 2.5H to 1V, outboard slope = 2H to 1V.	

PRELIMINARY ASSUMPTIONS FOR NO PROJECT CONDITIONS
(Subject to review and update)

No.	Criteria/Category		Values	Notes
	3.3.6	Levee embankments	Topwidth = 12' for minor creeks, 16' for larger waterways, water-side slope = 3H to 1V, outboard slope = 2H to 1V, foundation treatment per State Reclamation Board Standards.	
	3.3.7	Recharge and detention/retention basin	Side slope 5H to 1V, basin depth based on inlet pipe or depth to percolating soils, 20' wide gravel road surrounding basin with chainlink fence where near urban area, basin floor sloped 0.005 and/or stepped to facilitate staged drying.	
	3.3.8	Fish screens	Not Applicable	
	3.3.9	Pump stations	Redundancy: largest pump out of service. Backup power: none for non-potable service. Pump type: vertical turbine pumps in sump or cans for most applications.	
	3.3.10	Ag wells	1,000 gpm/well	
	3.3.11	Urban wells	2,500-3,500 gpm/well, 600' depth, and 60' static depth to groundwater for new wells.	
	3.3.12	Injection wells	Discharge capacity same as for urban wells. Recharge capacity 2/3 of discharge capacity.	
4	Capital Costs (6/05 dollars)			
4.1	Pipelines			
	4.1.1	Force mains	$10-13/diameter inch/ft, plus $2/dia in/ft if pipe is in a street, plus $3/dia in/ft for rock excavation	
	4.1.2	Gravity	$10-13/diameter inch/ft, plus $2/dia in/ft if pipe is in a street, plus $3/dia in/ft for rock excavation	
	4.1.3	Dewatering add-on	$100,000/mile	
	4.1.4	Waterway, highway, or RR crossing add	$25/dia in/ft add-on to pipe cost for length of bore	
4.2	Pump stations			
	4.2.1	Overall efficiency	75%	
	4.2.2	Pump stations based on MGD	Construction cost ($M) = 550,000 (capacity in mgd)^0.75	
	4.2.3	Pump cost base on horse power		4.1
		0 to 400	$2,000	
		400 to 800	$1,800	
		800 to 1200	$1,600	
		1200 to 4000	$1,400	

PRELIMINARY ASSUMPTIONS FOR NO PROJECT CONDITIONS
(Subject to review and update)

No.	Criteria/Category		Values	Notes
		4000 to 8000	$1,280	
		8000 to 15000	$1,130	
		15000 to 30000	$1,000	
		Intakes	45% of pump station cost	
	4.2.4	Fish screens	Not Applicable	
	4.2.5	Electric transmission	$20,000-40,000/mi	
4.3	Storage tanks		$1/gal	
4.4	Canal turnouts		Assume $25,000 for a simple 18-24" gravity turnout.	
4.5	Wells			
	4.5.1	Ag	$60,000/well	
	4.5.2	Urban	$1M/well, not including land. Wells are normally placed on City property or dedicated land.	
	4.5.3	ASR	$1.2M/well, not including land. Wells are normally placed on City property or dedicated land.	
4.6	Excavation			
	4.6.1	Topsoil (scrapers, deposit at local stockpile)	$3/cy	
	4.6.2	Unclassified (scrapers, deposit at local stockpile)	$2-3/cy	
	4.6.3	Unclassified (excavator, deposit at local stockpile)	$6/cy	
	4.6.4	Rock (ripping, scraper or loader, deposit at local stockpile)	$60/cy	
	4.6.5	Rock (blasting, loader, deposit at local stockpile)	$120/cy	
4.7	Hauling		$1.50/cy/mi	
4.8	Fill (pick up, place, compact)			
	4.8.1	Compacted Earth (haul from local stockpile)	$13/cy	
	4.8.2	Aggregate base (imported)	$55/cy	
	4.8.3	Rock/riprap (imported)	$90/cy, or $130/cy grouted	
	4.8.4	Topsoil (haul from local stockpile)	$6/cy (Minimal compaction)	
4.9	Other earthwork			
	4.9.1	Hydroseeding	$0.30/sy	
	4.9.2	Clearing/grubbing	$500/ac	
4.10	Tunnels (rock)		$2,100/LF for 13' dia tunnel	
4.11	Concrete			
	4.11.2	Walls	$800/cy	
	4.11.3	Slab	$600/cy	
	4.11.4	Mass	$300/cy	
	4.11.5	Canal lining	$1.50/sf	

PRELIMINARY ASSUMPTIONS FOR NO PROJECT CONDITIONS
(Subject to review and update)

No.	Criteria/Category		Values	Notes
4.12	Fencing (chainlink)		$18/LF	
4.13	Treatment plants			
	4.13.1	Surface water	Construction cost ($M) = 4.7842(capacity in mgd)^0.699	
	4.13.2	Groundwater	$3.0M/1,500 gpm well or $5.4M/3,000gpm well for arsenic removal; $1.8M/1,500 gpm well or $3.2M/3,000gpm well for nitrate removal;$1.4M/1,500 gpm well or $2.4M/3,000gpm well for TCE removal	4.2
	4.13.3	Wastewater	Secondary treatment = $6.8/gal; tertiary add-on = $1.8/gal	
4.14	On-farm irrigation systems			
	4.14.1	Furrow	$100/ac/yr (annualized capital cost)	
	4.14.2	Drip	$200/ac/yr (annualized capital cost)	
4.15	Water conservation programs (includes O&M)			
	4.15.1	Urban-moderate		
	4.15.2	Urban-aggressive	Metering would cost $800/meter, which equates to about $500/acre foot saved.	
	4.15.3	Agriculture-moderate	$50-100/AF saved	
	4.15.4	Agriculture-aggressive	$200-300/AF saved for the margin between moderate and aggressive	
4.16	Land (fee title)			
	4.16.1	Pasture	$5,000/Ac	
	4.16.2	Field and row crops	$12,000/Ac	
	4.15.3	Trees	$25,000/Ac	
	4.16.4	Vines	$40,000/Ac	
	4.16.5	Urban fringe	$400,000/Ac	
	4.16.6	Urban	$500,000/Ac	
	4.16.7	Easement/fee ratio	100%; Land use would be restricted, so easements and land purchases cost the same.	
4.17	Restoration			
	4.17.1	River/Creek	Major river restoration $3 - 4M/mile. Creek restoration $100-500k/mile.	
	4.17.2	Wetland	Wetland mitigation through the San Joaquin County Habitat Conservation Program is $36,000/ac.	
4.18	Engineering		10% of construction cost	
4.19	Special Engineering Investigations		Construction cost multipliers: surveying 2%, geotechnical 2%, corrosion 1%	
4.10	Construction Management		10% of construction cost	

PRELIMINARY ASSUMPTIONS FOR NO PROJECT CONDITIONS
(Subject to review and update)

No.	Criteria/Category		Values	Notes
4.11	Environmental Document		$100k small projects (up to $5M construction), $500k medium projects ($5-25M), $2M major projects ($25+M)	
4.12	Special Environmental Investigations		Costs for species surveys, biological assessments/relocations, cultural resource assessments/relocations are project-specific.	
4.13	Permitting		$50k small projects, $150k medium projects, $500k major projects	
4.14	Administration & Legal		5% of construction cost	
4.16	Financing front-end costs		3% of construction cost	
4.16	Construction Contingency		25% of construction cost	
4.17	Factor for Items Not Included		20% of construction cost	
5	Operation & Maintenance Costs (6/05 dollars; does not include replacements)			
5.1	Electricity			
	5.1.1	Capacity charge	$23.50/kw/mo	
	5.1.2	User fee (rate)	$0.13/kwhr	
5.2	HCP - aquatic habitat		First 2 yr covered in construction cost, then zero cost thereafter.	
5.3	Pipelines (maintenance only)			
	5.3.1	Force mains	$2,100/mi/yr to exercise blowoffs and valves, plus $1,000/mi every 10 yr for corrosion testing	
	5.3.2	Gravity	$4,000/mi/yr to remove sediments	
5.4	Pump stations			
	5.4.1	Pump stations (maintenance only)	5% of construction/yr	
	5.4.2	Intakes	5% of construction/yr	
	5.4.3	Fish screens	5% of construction/yr	
5.5	Wells			
	5.5.1	Ag	$40/AF	
	5.5.2	Urban	$50/AF	
	5.5.3	ASR	$20/AF	
5.4	Canals			
	5.4.1	Unlined	$10,000/mi/yr	
	5.4.3	Lined	$10,000/mi/yr	
5.5	Levees		$10,000/mi/yr	
5.6	Recharge/drainage basins		$600/ac/yr	
5.7	Tunnels		1.5% of construction/yr	
5.8	Dams		1.5% of construction/yr	
5.9	Treatment plants			
	5.9.1	Surface water	$1.2M/yr for 5mgd, $2.0M/yr for 10mgd, $4.1M/yr for 25mgd, $7.5M/yr for 50mgd	

PRELIMINARY ASSUMPTIONS FOR NO PROJECT CONDITIONS
(Subject to review and update)

No.	Criteria/Category		Values	Notes
	5.9.2	Groundwater	$0.32M/yr for 1500gpm or $0.56M/yr for 3000gpm arsenic or nitrate removal; $0.22M/yr for 1500gpm or $0.39M/yr for 3000gpm TCE removal	
	5.9.3	Wastewater	$600k/yr per mgd for 2mgd, $250k/yr per mgd for above 10 mgd	
5.10	On-farm irrigation systems			
	5.10.1	Furrow	$75/ac/yr (annualized capital cost)	
	5.10.2	Drip	$100/ac/yr	
6	Economic Analysis			
6.1	Basis of Comparison		Annualized cost	
6.2	Interest		0.05	
6.3	Construction cost escalation		10%/yr through 2012, 8% through 2020, 3%/yr thereafter	
6.4	O&M cost escalation			
	6.4.1	Labor dominated features	0.05	
	6.4.2	Materials dominated features	0.1	
	6.4.3	Energy dominated features	0.05	
6.5	Useful life			
	6.5.1	Pipelines	100 years	
	6.5.2	Wells (not including mechanical & electrical)	40 years	
	6.5.3	Earthwork	100 years	
	6.5.4	Concrete	80 years	
	6.5.5	Mechanical/electrical	20 years	
6.6	Salvage value		0	
7	Habitats/Mitigation Requirements		To be determined based on local data	

1.1 City of Fresno and Clovis surface water treatment plants at planned capacity
1.2 Needs to be evaluated during feasibility investigations
1.3 Must be consistent with KRWA policies
1.4 Kings River Fisheries Management Program Framework Agreement, Exhibit C-Kings River Fisheries Flow Requirements and Division of Flow Downstream; and Exhibit D- Kings River Fish Flow Goals for Implementation by Oct 1, 2005.
2,1 Average annual. Based on GWMPs or other published sources, number will be updated with IGSM
3.1 Being updated based in information from the water districts where available
3.2 approximate design capacity
4.1 Costs from 1995 and need to be brough forward and checked
4.2 Recent treatment cost update provided for Fresno Metro Plan (Carrollo Engineers, 2006)