INTEGRATED REGIONAL WATER MANAGEMENT PLAN

A COLLABORATIVE EFFORT OF STAKEHOLDERS WITHIN THE TULE RIVER BASIN

DRAFT

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TULE RIVER BASIN IRWMP GROUP

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TULE RIVER BASIN IRWMP GROUP

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CHAPTER 1
PLAN DOCUMENT DESCRIPTION

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN IRWMP GROUP

1.1 PURPOSE

The purpose of an Integrated Regional Water Management Plan (IRWMP) is to document and detail the approach of participants within a watershed as to their methodologies for coordinating and integrating management of available water resources. The IRWMP is to detail how an area's management methodologies will improve available water supplies, manage flood and drought related events, document existing water quality and methods to improve that water quality, conserve and enhance habitat and detail how efforts related to land use planning will be coordinated with water resources planning. In addition to providing written documentation of a region's water management goals and implementation procedures, the development of a written plan is in satisfaction of the requirements of funding programs which are designed to assist in the implementation of policies and projects seeking to improve water management.

This IRWMP is designed to address the need for a written document detailing an integrated approach to the management of water resources within the Tule Basin. For purposes of this document, the use of the term “Tule River Basin” is intended to include the Deer Creek Basin due to the water management efforts of DCTRA members as to natural flows of Deer Creek. The IRWMP recognizes the interconnections between land uses, social systems, economic forces and water resources specific to the subject region. The history associated with water management within the Tule River Basin provides an example of how seemingly different interests can work together to improve water management to the degree that the end result is a series of process outcomes which are of benefit to these seemingly disparate interests. Efforts within the Tule River Basin to address water management issues from a single-purpose perspective have long been left by the wayside, replaced by a collaborative process which takes into account differing perspectives, over time, as additional participants have been added to the mix of parties interested in improving water management objectives. One of the principal purposes of the IRWMP is to provide a flexible water management system which takes into account the ever changing hydrologic and governance parameters within the Tule River Basin. These changes not only include periodic significant changes in cropping patterns, but also changes in water quality objectives, agricultural to urban development trends and regulatory and environmental changes impacting the quantities of available surface and groundwater supplies.

1.2 COOPERATING PARTNERS

While the Deer Creek and Tule River Authority (DCTRA) has taken the initial lead role for a number of years in Tule River Basin water management related activities, including participation in the joint Kaweah River Basins/Tule River Basin IRWM Stakeholder Advisory Group, a number of other entities that manage water have expressed interest in being a member of Tule River IRWM Group. They have done so through participation in joint water management activities, with participation of the majority of the entities taking place prior to any external funding project activities occurring related to IRWM activities. The active participants of the Tule River IRWM Group currently include the County of Tulare, the Lower Tule River Irrigation District, the City of Porterville, the Pixley Irrigation District, the Porterville Irrigation District, the Saucelito Irrigation District, the Terra Bella Irrigation District, the Tea Pot Dome Water District, the Vandalia Water District, the Angiola Water District, and the Deer Creek Storm Water District. Additional participants include the Tulare County Flood Control District, Pioneer Water Company, and the Tule River Association. The Tule River Basin has prepared a Memorandum of Understanding for purposes of formally developing the IRWM Regional Water Management Group (RWMG).

A planning process of approximately five (5) years in length has occurred, coordinating each of the entities noted above, along with interested parties from a multiple number of disciplines. These have included representatives from Self-Help Enterprises, private non-profit groups representing disadvantaged communities, including the Community Water Center, Tulare Basin Wetlands Partners and representatives of

multiple agencies of jurisdiction from both the Federal and State levels. The representatives have formed an advisory group which has worked through the processes of governance, project submittal, project scoring, development of plan goals and objectives and defining purpose and needs. Agreement has been reached amongst all participants, on a consensus basis, with respect to the critical foundation issues related to the IRWM process.

1.3 ACKNOWLEDGEMENTS

The DCTRA wishes to acknowledge the countless hours invested by the Stakeholder Advisory Group in developing policies and procedures associated with expansion of area water management processes and procedures beyond those traditionally associated with management and delivery of water supplies for irrigated agriculture and urban consumption. It is with gratitude that the DCTRA acknowledges not only the number of hours which the representatives of the different interest groups and parties have dedicated to the process of the development of the outline of this written Plan, but also for having the patience and understanding to work through the various and disparate points of view which competing interests have when the topic of water management is at hand. By the very nature of the topics addressed in this IRWMP, the reader will soon appreciate the fact that the Plan addresses a number of issues, in detail, far beyond that of the typical agricultural or urban water management plan.

1.4 ACRONYMS/ABBREVIATIONS

AF – acre foot (of water)

AF/AC – acre-feet per acre

BMP – Best Management Practices

California/EPA – California Environmental Protection Agency

CD – Critically Dry (water year)

CDF – California Department of Forestry

CDFW – California Department of Fish and Wildlife

CFS – cubic feet (per second)

CERES – California Environmental Resource Evaluation System

CEQA – California Environmental Quality Act

CNDDB – California Natural Diversity Database

CVP – Central Valley Project

CWA – Clean Water Act

CWC – Community Water Center

DC – Disadvantaged Community

DCTRA – Deer Creek and Tule River Authority

DFW – State Department of Fish and Wildlife

DWR – State of California Department of Water Resources

EIR – Environmental Protection Agency (also referred to as United States EPA)

ESA – Endangered Species Act

FERC – Federal Energy Regulatory Commission

FS – Forest Service (United States Department of Agriculture)

FWS – Fish and Wildlife Service (United States Department of Interior)

GIS – Geographic Information System

HCP – Habitat Conservation Plan

IRWM – Integrated Regional Water Management

IRWMP – Integrated Regional Water Management Plan

JPA – Joint Powers Authority

KDWCD – Kaweah Delta Water Conservation District

KW – kilowatt

LCMMP – Land Cover Mapping and Monitoring Program

LMIC – Land Management Information Center

MGD – million gallons per day

MHI – median household income

MOU – Memorandum of Understanding

MW – mega watts

NEPA – National Environmental Policy Act

NGO – Non-Governmental Organization

NHI – National Heritage Institute

NPDES – National Pollutant Discharge Elimination System

NPS – Nonpoint Source (Pollution)

PAEP – Performance Assessment and Evaluation Program

PGE – Pacific Gas and Electric Company

PME – Protection, Mitigation & Enhancement

RCD – Resource Conservation District

ROD – Record of Decision

RWQCB – Regional Water Quality Control Board

SCE – Southern California Edison

SEIS – Supplemental Environmental Impact Statement

SHE – Self-Help Enterprises

SNC – Sierra Nevada Conservancy

SRT – Sequoia Riverlands Trust

SWAMP – California's Surface Water Ambient Monitoring Program

SWP – State Water Resources Development System (State Water Project)

SWRCB – State Water Resources Control Board

TRA – Tule River Association

USACOE – United States Army Corps of Engineers

USR – United States Bureau of Reclamation

USDA – United States Department of Agriculture

USFS – United States Forest Service

USFWS – United States Fish and Wildlife Service

USGS – United States Geological Survey

UWMP – Urban Water Management Plan

WTP – water treatment plant

CHAPTER 2
HISTORICAL PERSPECTIVE

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

2.1 BACKGROUND OF THE TULE RIVER BASIN IRWMP

2.1.1 Governance

The Deer Creek and Tule River Authority (DCTRA) is a joint powers authority covering approximately 289,448 acres in the County of Tulare. To date, DCTRA has acted as the lead agency in the coordinated management of water resources available to the Tule River Basin, particularly as they have applied to groundwater resources, droughts, and flood and storm waters control. Joining together with multiple agencies for management of pre-1914 water rights purposes, Central Valley Project water, groundwater management and development of a formalized Integrated Regional Water Management Plan (IRWMP) the DCTRA member entities have directed water management activities undertaken by the cooperating agencies within the Tule River Basin. Joining together with other agencies with similar goals, the DCTRA has provided formal notice to the public and agencies of jurisdiction of the preparation of an IRWMP.

Based on the approval of the outcome of the Regional Acceptance Process by the Department of Water Resources of the State of California, this IRWMP has been prepared in parallel to a plan for the Kaweah River Basin with the governing bodies of the two (2) IRWM areas electing to share a common Stakeholders Advisory Group. Acting as the lead agency for a coordinated group of participants with specific proposed water management projects, the DCTRA has executed a contract for the development of this IRWMP, in draft status. It is the intent of this IRWMP to document, in detail, all of the existing relationships, policies, procedures and agreements which have both been historically in place, as well as in place at the time of the submission of this IRWMP to DWR for acceptance through the Plan Review Process of said agency.

The governance of this IRWMP initially resided with the Board of Directors of the DCTRA. The Board of Directors is comprised of an elected official from each of the member entities. The Directors are in office until their successors are selected. Actions taken by the governing Board of the DCTRA are done in conjunction with input from the Stakeholders Advisory Group, as well as from the entities which are signator to the joint powers agreement. The original agreement was dated February 25, 1994, with subsequent amendments. A copy of these documents is presented in Appendix B.

As a joint power s authority of public agencies within the State of California, the business of the DCTRA is conducted pursuant to the provisions of the Brown Act wherein specific notice of meetings, topics to be discussed and actions proposed to be taken are contained in a published agenda and conducted in open session which is subject to public comment during a general comment period, as well as when a particular item is specifically taken up by the Board of Directors. Rules and procedures have been

developed for conduct of the public and input from the public and interested parties by the DCTRA. Meetings of the Board of Directors are held on a regular quarterly basis, at a minimum, in a facility which is fully compliant with the Americans with Disabilities Act standards.

Minutes of prior meetings are available to the public, upon request, as well as relevant documents pursuant to the DCTRA document request process.

The governance of the Tule River Basin IRWMP will transfer from the DCTRA to the parties identified within the Tule River Basin MOU once the Tule River Basin IRWM Group executes the MOU and has the initial organizational meeting.

2.1.2 Historical Plan

It is the opinion of the DCTRA member entities that they have acted as the lead agency in the development of IRWM policies and implementation of projects, in cooperation with other Tule River Basin partners, which have as their underlying nature, integrated regional water management. In the late 1930s, member entities began to take steps to formally establish partnerships and develop procedures and projects in cooperation with other participating water management agencies. A significant number of documents have been executed, over time, providing example of the integrated approach to water management within the Tule River Basin.

Presented, as Table 2-1, is the participation outline and elements of the current IRWM structure. The information provided is segmented into the various elements of the coordinated efforts of parties actively involved in cooperatively managing water resources within the Tule River Basin. A graphic presentation of the myriad of

relationships which currently exist is presented on Figure 2-1. Each of the agreements and elements detailed on the table and in the figure are current active components of the existing IRWM structure. This formal written and adopted IRWMP is structured around these agreements and activities and is augmented by additional elements developed by the Stakeholders Advisory Committee including efforts to address disadvantaged community needs and concerns into the DCTRA IRWM process, as well as candidate projects evaluation and scoring.

TABLE 2-1

PARTICIPATION STRUCTURE AND ELEMENTS

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

SURFACE WATER ELEMENT

Tule River Association Organization Agreement

Friant Water Authority JPA

State Water Project Water Users JPA

Tule River Improvement JPA

TBID/DCTRA Land Use Agreement

TBID/LTRID Water Exchange Agreement

TBID/SID/LTRID Resources Exchange Agreement

LTRID/City of Orange Cove Agreement

LTRID/J.G. Boswell Co. Agreement

LTRID/Pioneer Water Company Agreement

County of Fresno/LTRID

Pixley ID/LTRID/Angiola WD Cooperative Agreement for Groundwater Protection

LTRID/Vandalia ID Exchange Agreement

USBR Water Management Plans

AB 3616 Water Management Plans

Success Reservoir Storage Agreement

GROUNDWATER ELEMENT

- DCTRA GWMP
- Tulare Lake Basin Coordinated GWMP
- City of Porterville Urban Water Conservation Plan
- City of Porterville Development Impact Policy
- County of Tulare General Plan
- Groundwater Model Elements
  - Master Basin Model
  - Kaweah Basin Model Intertie

STORM WATER ELEMENT

- County of Tulare Agreements and Facilities
- City of Porterville Agreements and Facilities
- County of Tulare and LTRID Agreements and Facilities
- Tulare County Flood Control District and LTRID
- Tulare County License for Pumping with USBR
- LTRID 404 Permit
- LTRID 1601 Permit

WATER QUALITY ELEMENT

- Tule Sub-watershed Water Quality Coalition
- Southern San Joaquin Valley Water Quality Coalition
- City of Porterville WDRs

Strathmore P.U.D. WDRs

Terra Bella Sewer Maintenance District WDRs

Woodville P.U.D. WDRs/NPDES

Poplar C.S.D. WDRs

Tipton C.S.D. WDRs

Pixley P.U.D. WDRs

Earlimart P.U.D. WDRs

Richgrove C.S.D. WDRs

Woodville Farm Labor Camp WDRs

County of Tulare Abandoned Well Program

WEATHER INFORMATION ELEMENT

DCTRA CIMIS Station Agreement

ENDANGERED SPECIES RECOVERY/PROTECTION ELEMENT

Sierra-Los Tulares Land Trust Projects (Sequoia Riverlands Trust)

DCTRA Recharge Ponds Site

GOVERNANCE ELEMENT

Surface Water

Multiple Water Management Agency Boards of Directors

Multiple Water Management Agency Advisory Committees

Multiple Water Management Agency Technical Committees

Interbasin Water Management Coordinating Groups

Kings-Tule

Kaweah-Tule

Tule-Tulare Lake

Groundwater

GWMP Stakeholder Committees

DCTRA/City of Porterville Coordination Committee

Groundwater Model Technical Committee

Water Quality

Steering Committee

Technical Committee

Legal Committee

Proposition 84-IRWMP

Joint Efforts with the Kaweah River Basin Managers' Advisory Committee

2.1.3 Consistency with State of California Planning Efforts and Statutory Requirements

The Tule River Basin coordinated/integrated water management elements have never been acknowledged to be in a ‘deemed equivalent” status by the State of California The steps to memorialize the relationships which exist in the DCTRA planning area have been undertaken in a fashion to comply with the IRWM Plan Standards and are designed to fully comply with Part 2.2 of Division 6 of the California Water Code, commencing with Section 10530. This Plan will be submitted to DWR to be subjected to the 2012 IRWM Guidelines, including the Addendum to said guidelines issued in draft form in August, 2013. Specifically, the Plan Review Process detailed in Appendix H of said Guidelines was used as a cross-check instrument to ensure compliance with adopted IRWMP Guidelines.

2.2 DEVELOPMENT OF A FORMAL, WRITTEN PLAN

2.2.1 Stakeholders Advisory Group

As a part of the initial effort to expand the outreach efforts related to IRWM planning, the joint Kaweah River Basin/Tule River Basin Stakeholders Advisory Group was expanded to include a number of parties specifically invited to participate in the water management planning efforts within the Kaweah River and Tule River Basins. A number of urban purveyors who had historically not participated in the planning efforts were invited, as well as a number of stakeholders and representatives of disadvantaged community areas and rural hamlet areas, underserved from the perspective of both adequate water supply and inadequate water quality. The group was also expanded to include the County of Tulare, which had historically participated from a flood control standpoint, but parties were added to specifically address public health concerns, including well construction and well abandonment.

2.2.2 Memorandum of Understanding

Based on the agreement with the Kaweah Delta Water Conservation District (KDWCD) to prepare a parallel IRWMP to the Kaweah River Basin, for the Tule River Basin, discussions took place with a stakeholder's group surrounding steps to formally develop a Memorandum of Understanding leading to an IRWMP for the Tule River Basin and addressing what form of governance a Regional Water Management Group would be based on. For the interim period, it has been determined to leave the plan organization with DCTRA as the lead and to add additional parties to the effort utilizing a

Memorandum of Understanding, which has been drafted and provided to additional parties.

The number of participants to the Memorandum of Understanding has yet to be determined, but current parties outside of the DCTRA member entities expressing interest include:

County of Tulare

City of Porterville

Poplar Community Service District

Tipton Community Services District

Deer Creek Storm Water District

Angiola Water District

2.2.3 Coordination with Kaweah River Basin Plan Development

For a number of years, the Kaweah River Basin IRWMP Stakeholders Advisory Group has included at least one (1) representative from the Tule River Basin. At times, there has been more than one, depending on the issue at hand and the specific elements of coordination to be accomplished. The normal attending party has been a representative of the DCTRA, with almost perfect attendance.

In addition to coordination with respect to water management issues, a principal matter of discussion was the potential for merging the Tule River Basin into a single IRWM with the Kaweah River Basin. Consideration of this issue and the discussions and governing Board meetings surrounding the issue culminated in a decision to prepare separate plans, each paralleling the other with respect to process, procedure and goals

and, most importantly, sharing a common Stakeholders Advisory Group. This process and the conclusions are discussed in greater detail in Chapter 9.

2.2.4 Coordination with Tulare Basin JPA Development

Based on a regional stakeholders meeting called by DWR and held at the office of the Semitropic Water Storage District, significant effort was put into the formation of a regional Joint Powers Authority. Meetings were initiated and have been held on a monthly basis since. These meetings are currently being held on the first Monday of each month in the offices of Provost & Pritchard Engineering Group in Visalia. Stakeholders from the region continue to attend with participation from the Kings River Basin, Kern County IRWM groups including the Poso IRWM, the Kaweah River Basin, the Tule River Basin and the Southern Sierra IRWM. There has been periodic attendance from parties considering formation of an organization covering the Tulare Lake bed area.

The initial efforts to form were pursued to the extent of developing a formal Joint Powers Authority with an outline for development of that Authority being developed and agreed to by the participants. A copy of that outline is presented in Appendix C.

This effort culminated in the preparation of a Joint Powers Agreement which was specific to Tulare Lake hydrologic region water-related entities. The initial formal parties to this agreement included the KDWCD, the Kings River Conservation District and the Semitropic Water Storage District. A copy of the subject JPA is included herewith as Appendix D.

Several parties having input to the participants to this proposed JPA have weighed the value of this broader regional effort and how it might improve, or reduce opportunities in the project evaluation process and whether it might pit one region within

the JPA area against another. Formal action has been taken by some participants to memorialize this position, while still providing instruction to participate in regional JPA related activities. Movement beyond the ad-hoc level which currently exists will probably be dependent, to a significant degree, on state-wide related funding activities, principal of which are those administered by the State Department of Water Resources.

2.2.5 Coordination with Southern Sierra Plan Development

Initiated at a later point in time than the valley floor IRWM efforts, the organizational efforts of the Southern Sierra IRWM have nonetheless been coordinated with the efforts of the Kaweah River Basin and the Tule River Basin. In addition to providing support to the development of an IRWMP covering the upper foothill and mountain area portions of the Kaweah River and Tule River watersheds, now approved, specific coordination has occurred with respect to boundary issues and joint planning efforts. While far greater effort is directed at integrated water management between valley floor water managers than that associated with private stock ditch companies located above the area's flood control reservoirs, there are a number of areas where specific water management efforts have been appropriate. Included in this array of areas of concern have been water quality, sediment generation management and brush clearing efforts. While brush clearing efforts take place in the foothill and lower mountain areas specifically for fire related purposes, the efforts yield water supply otherwise consumed by non-beneficial vegetation which can most often be put to beneficial use on the valley floor.

As previously noted, the Southern Sierra IRWM group representatives attend the monthly JPA coordination meetings, as well as the Stakeholders Advisory Group meetings. Encouragement for attendance and participation continues to date.

2.2.6 Technical Analyses

There have been numerous technical analyses and evaluations over time within the Tule River Basin that have been instrumental in shaping the direction, emphasis and priorities of water management activities of the DCTRA IRWM Plan. These studies have then contributed to the rationale of the DCTRA IRWMP objectives and their contribution to the Tule River Basin understanding from the perspective of science and management. The Stakeholder Advisory Group utilized this wealth of information in the establishment of objectives, in the decision of which water resource management strategies were incorporated into the DCTRA IRWMP and the evaluation method of projects that adequately address the DCTRA IRWMP needs. Although there have been numerous studies of this nature that have influenced development of the IRWMP, there are a few key efforts that should be emphasized by a summary of activities and contributions. Additionally, a table has been provided to list the variety of technical analyses that contributed to the IRWMP. (Each of the following technical analysis examples are noted throughout the IRWMP.)

The Water Resources Investigation (WRI): This is an ongoing process that began with the formation of the DCTRA and continues to date. The investigation has been structured as a series of facilitated excuses, along with supplemental

analyses, with the managers of the DCTRA member agencies. In general, the exercises have been structured around an analysis of assets and needs, water resources, specific for each member agency. The analysis exercises have been followed with resource/need matching exercises wherein the needs of one member agency are examined from the perspective of being satisfied with the assets of another member agency. The matching exercises have then been expanded to a project development phase, where efforts have been undertaken to determine if single-purpose or joint projects could be developed to address resource deficiencies of both single entities, or better yet, multiple agencies. Coming out of this process, as an initial success, was a better understanding of individual and collective resources and needs. Over time, resource exchanges have been extended in some cases and created in others. Joint projects have been identified with some having been developed. The project list to be created and approved as a part of the IRWM development process will use this project list as its starting point. The process has also provided the Tule River Basin, public water agencies and overlying landowners and water users with a better understanding of the Tule River Basin by answering questions related to the quantity of groundwater, the quality trends related to groundwater, sources and volumes of recharge and trends in water levels in the Tule River Basin. The investigations have provided an improved base on which to examine Tule River Basin hydrological and hydrogeological conditions and will assist in future quantification its water supply capability, or safe yield and degree of groundwater overdraft.

Additional member agency studies have been tiered off of these efforts and are leading to projects to allow for improved water management capabilities within the IRWMP.

Groundwater Modeling: At the turn of the century, the University of California, Davis, began development of a Numeric Groundwater Flow Model for the Tule River Basin. Development of the adjacent Kaweah River Basin model, a City of Visalia Numerical Groundwater Model and the Kaweah River Basin/Tule River Basin Model Intertie followed. The three models individually focus on different spatial scales, though all calculate storage changes and groundwater flow which enable a better understanding of surface water management and use options and the resulting impacts.

The initial models consisted of four tasks that resulted in the development of interactive groundwater models that have been effective in evaluating whether chosen scenarios of water supply and demand change could provide measurable benefits to local groundwater storage and water levels. As part of the model development process, the groundwater models were used to evaluate the impacts on basin groundwater resources under different scenarios of future water use and water supply availability. The conclusions were that the models could be applied to many other such scenarios to help guide implementation of groundwater management strategies and/or to evaluate impacts of various projects including various patterns of urban growth.

The Crop Water Use Model: The most recent of technical analysis resulting in useful information is the Normalized Difference Vegetation Index (NDVI) Crop Water Use Model initiated in 2011 by the KDWCD. A weak area in the use of the developed groundwater models has been the determination of crop water use and this valuable data has historically been estimated using sporadic crop data and previous study estimations in an equation to approximate the data. The NDVI Crop Water Use Model, performed by Davids Engineering, calculates evapotranspiration (ET) using reflective energy data from Landsat satellite imagery on a unit scale necessary to distinguish variations in vegetation types. This data is combined with simulation of irrigation events using a daily rootzone water balance model. The results are unique enough to correlate with agricultural usages as identified through available crop surveys. The crop water use model is expandable to the Tule River Basin through purchase of the appropriate panels of reflective energy data.

The modeling provides:

- Monthly cropping identification by crop type and acreage;
- Regionalized crop coefficients of water demands for agriculture occurring within the Southern San Joaquin Valley;
- Monthly crop water demands from years 1999 through 2009 and annually thereafter.

Groundwater Management Plan: Responding to then recent Groundwater Legislation, in 1995 the DCTRA and participating local entities formally adopted

the DCTRA's Groundwater Management Plan (GMP). The GMP was updated in 2012. The GMP states, "The purpose of the Groundwater Management Plan (Plan) is to evaluate the monitoring data and information collected compared to the management goals and objectives. The continued efforts for the Plan are to document the existing groundwater management activities of the DCTRA and to formalize other actions that will be used in implementing a monitoring and management program for conjunctive use, replenishment and preservation of the quantity and quality of groundwater within the Basin for long term beneficial uses." The GMP evaluates groundwater conditions and challenges, identifies solutions and establishes goals for the participating stakeholders to best manage this critical resource. Six elements currently shape the GMP:

1. Monitoring Program;
2. Resource Protection;
3. Sustainability;
4. Stakeholder Involvement;
5. Planning and Management; and
6. Information Dissemination.

At the core of the GMP is the recognition that the conjunctive management of water supplies within the GMP area must be continued and that achieving hydrologic equilibrium requires the management of both surface and groundwater supplies. The GMP is a vital element of the DCTRA IRWMP as it is one of the strongest stakeholder efforts and with proven results within the Tule River Basin.

Water Management Plans: Based on Friant Division, CVP contract requirements member agencies holding a contract from the United State Bureau of Reclamation (Reclamation) for Central Valley Project (CVP) water from the Friant-Kern Canal, have developed Agricultural Water Management Plans (WMP) in concert with Reclamation. The objective of each WMP is to evaluate, identify, establish and describe best management practices that will result in efficient use and best conservation/management of water by setting policy and practice of use of water related devices, equipment or facilities. These WMPs are reevaluated and updated every five (5) years in order to continually search for the best available cost-effective technology and best management practices to achieve the highest level of delivery water management.

Each of these technical analyses were directly influential in the development of this IRWMP in that they informed the stakeholders with key aspects of the Tule River Basin and defined effective objectives and resource management strategies based on science, instead of speculation and influenced the emphasis of the project scoring procedures developed by the Stakeholder Advisory Group.

SUMMARY OF DATA OR STUDIES FEEDING DCTRA IRWMP

*DCTRA IRWMP Desc.**	*Data or Study*	*Year Initiated*	*Results or Contribution*	*Use in DCTRA IRWMP*	*Source/ Provider*
Yes	Water Resources Optimization	1994	Core of hydrological & hydrogeological data for Basin	Refined water supply and demand facts for clarifying objectives	DCTRA/ Keller/Wegley Consulting Engineers
Yes	DCTRA Groundwater Management Plan	1995	Defines groundwater monitoring, protection, sustainability, involvement & management	Directly relates to defined objectives and selected RMS	Keller/Wegley Engineering and 4 Creeks
No	Tule River Basin Investigation – Feasibility Study, California	1996	Evaluation of the feasibility of the Lake Success Enlargement Project	Provided basis for water supply and lake management	US Army Corps of Engineers
No	Stormwater Master Plans: City of Porterville and Tulare County	Various	Identification of operations & physical works for stormwater management	Defined stormwater issues, capacities, abilities, project need	Multiple
Yes	Numerical Groundwater Flow Model the Tule River Basin	2000	Ability to simulate groundwater impacts based on water mgmt	Tool for evaluating potential projects & their benefits	University of California, Davis
Yes	Agricultural Water Management Plans	1995	Identifies best management of surface water	Provides basis for import water supply management	USBR Contractor and Keller/Wegley Engineering
Yes	Normalized Difference Vegetation Index (NDVI) Crop Water Use Model	2011	Estimates crop water use and improves extraction data accuracy	Refined water demand and use facts for clarifying objectives	KDWCD/ Davids Engineering
No	Tulare Lake Basin Disadvantaged Community Water Study	2012	Defines drinking water and wastewater needs of DAC's	Clarifies DAC needs. Validated DAC position	Tulare County/ Multiple Consultants

SUMMARY OF DATA OR STUDIES FEEDING DCTRA IRWMP (continued)					
Yes	Tule River Association Annual Reports	1961	Summarize beneficial diversion of quantitative Records of Diversion	Pre-1914 water rights	Tule River Association

*Yes, or No: has a summary description of this data or study been provided in this Technical Analysis section of the DCTRA KIRMP?

2.3 GOVERNANCE STRUCTURE

2.3.1 Memorandum of Understanding/Cooperative Agreements

The initial Memorandum of Understanding, now in preparation, will act as the principal document to expand the emphasis of DCTRA to include acting as the Tule River Basin lead fiscal and administration agency for IRWM related activities. It will contain initial organizational and governance directives and allow for modification to address the addition of new parties, based on such requests and approval in concert with the provisions of the Memorandum of Understanding. When completed and adopted, a copy of the Memorandum of Understanding will be presented in Appendix E. For now, a draft version of the MOU is included in Appendix E.

As shown in Table 1 and as an examination of Figure 2-1 indicates, there are a significant number of cooperative agreements which are a part of the IRWM structure. For the sake of publication, copies of these agreements are not reproduced in this document, but are available from the DCTRA, upon request. These cooperative agreements are the heart of day-to-day activities related to water management within the Tule River Basin. The specifics of the water management strategies embodied in these agreements will be presented in greater detail in Chapter 9.

2.3.2 Governance Structure Evaluation

Consideration of the continuation of the DCTRA as the lead agency for IRWMP purposes will be revisited in the future. A process has been outlined in the IRWMP wherein MOU Participants and the Stakeholders Advisory Group will engage in a review

and evaluation process. The process calls for the preparation and submittal of the formal IRWMP by DCTRA with DCTRA as the lead agency. Meetings of the IRWM Stakeholders Advisory Group will be held, as necessary, in order to provide input to the Board of Directors acting as the Regional Water Management Group.

In the future, a thorough review of the current governance structure and a detailed evaluation of the alternatives to the current structure will be undertaken. The intent is to have a Tule River Basin IRWM MOU that provides governance for the IRWM, of which the DCTRA participants will be members.

2.3.3 Relationship to Future Tulare Basin Joint Powers Authority Governance Structure

The relationship of the DCTRA IRWMP efforts will continue to be coordinated with the balance of the area IRWM groups through the informal JPA organization which has been generated. The DCTRA continues to support the attendance and participation of all current entities attending the coordination meetings, with no change anticipated in the near-term with regard to pursuit of a formal JPA structure. The participation of the DCTRA in a formalized JPA structure will be addressed by the Board of Directors at such time as a change in current direction necessitates revisiting the participation issue.

2.4 FUNDING

2.4.1 IRWMP Funding

To date, the majority of funding activities directly related to the IRWMP have been born by the DCTRA. Organizational efforts and costs related to same associated with the Stakeholders Advisory Group have been at the call of KDWCD, with meetings being held at the office of said entity. All costs related to the preparation costs of this IRWMP have been funded by DCTRA with the use of the KDWCD IRWMP as the base document. The cost structure related to the IRWMP will be modified once the new MOU is adopted, in accordance with terms and conditions of the MOU.

2.4.2 Funding of Project Applications

Specific water management project funding is dealt with in a separate fashion from the IRWMP funding. Applicants for specific funding programs are required to fund their pro-rata share of the cost of development of project specifics and project funding applications. Each of the participants in these efforts, over recent history, have benefitted by cost sharing a number of common elements of applications which have been shared on an equal division basis. Specific agreements for obligation to cover such costs have been developed on a funding effort-by-funding effort basis with this arrangement anticipated to continue into the future. The draft Tule Basin MOU includes a provision for establishing the special project agreement to address these separate cost share agreements.

2.4.3 Projects Funding

On a parallel with project application funding, funding of the local matching share of individual projects has been a responsibility of the project advocate. In several cases, projects for which application has been made have more than one (1) beneficiary and, in such cases, a division of local share of costs occurs. The basis for this division of cost is founded in negotiations specific between the project advocates.

DCTRA, as the initially designated fiscal agent, actin on behalf of other Memorandum of Understanding participants, is anticipated to require financial assurance procedures prior to submittal of a funding application. In this fashion, both DCTRA, as the applicant agency and the body to which participation application is being made, can have reasonable assurance that the project applicant has the financial capability to satisfy the local share of funding requirements. The specifics of these funding procedures will be revisited on an application-by-application basis into the future.

CHAPTER 3
PLAN INTRODUCTION

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

3.1 PLAN OBJECTIVES

The intent of this section is to specifically establish the intent of the Tule River Basin Integrated Regional Water Management Plan (IRWMP). The intent is to demonstrate to the interested public and to agencies of jurisdiction which regional water management issues the IRWMP is designed to address. The objectives for this IRWMP were formulated in the multiple meetings of the Kaweah River Basin/Tule River Basin IRWMP Stakeholders Advisory Group meetings. These objectives have been ratified by the Board of Directors of the DCTRA, acting as the lead initial role in preparing the Tule River IRWMP, based on further recommendation of its Advisory Committee. Evidence of action with respect to these items is evident in the motions of the DCTRA Board of Directors, the annual budgets established by said Board of Directors and the nature of the projects undertaken within the IRWM planning area. These objectives were established independent of any specific project plans or plan related studies. Rather, the development

basis is in conjunction with the underlying basis for water management projects and studies leading to either the feasibility of or planning for water management projects. The objectives have not been established in any priority sequence, as flexibility has been demonstrated to exist between these items and issues based on either acknowledged current need for specific implementation of an element or a unique opportunity existing related to a particular objective such as a partnership opportunity or funding opportunity. In this random order, therefore, the objectives are set forth and described as follows, along with a specific example of the implemented objective:

3.1.1 Work Toward Achievement of Sustainable Balanced Surface and Groundwater Supplies

The issues of watershed conditions, water storage, water diversion, water delivery infrastructure and groundwater maintenance need to be addressed. As water demands are continuously evaluated, the need to augment naturally occurring groundwater recharge is evident and therefore additional water recharge capacity will be needed to meet future water demands. Existing diversion methodologies and delivery infrastructure will need to be as efficient as possible and balanced with conservation and recycling opportunities. Groundwater, the principal source of water supply for the entire Tule River Basin, is increasingly being pumped to meet agricultural, municipal and industrial demands. Included in this extraction process is that supply necessary to meet rural needs, both community and individual. Therefore, groundwater resources must be managed to ensure sustainability which is the expression of balance between extraction and recharge. As a

significant step in the pursuit of this objective, the DCTRA has developed and implemented a groundwater management plan which is SB1938 compliant.

3.1.2 Protect and Improve Water Resources through Land Use Practices

The nexus between land use planning, land use practices and water management, particularly with respect to water quality, is evident within the Tule River Basin. The issues of surface and groundwater contamination, flooding, groundwater overdraft, habitat alteration and erosion are all issues related directly to land use and land use planning. Pursuit of the objective to protect and improve water resources such as flows of the Tule River, sustaining historic levels of importation of Friant Division, CVP supplies, storm water and flood waters management, actions contrary to maintenance of the quality of ground and surface waters and decisions related to the location of housing stock are all of paramount importance. Improved land use practices, maintenance and enhancement of riparian habitats and farm practices and urban runoff practices which seek to minimize sedimentation associated with erosion, are elevated objectives. Sound land use planning which avoids placement of households and locations where the drinking water supply is known to be marginal with respect to quantity or non-compliant with State and Federal drinking water standards is being highlighted as a practice which needs improvement and more diligent implementation. Likewise, sound land use planning involves proper placement of industrial and commercial land uses that recognizes that improper placement could jeopardize the viability of a currently compliant and viable water supply. In pursuit of this objective, land use planning policies have been developed and included

in the recently completed Tulare County Disadvantaged Communities Study, an effort covering the counties of Fresno, Kings, Kern and Tulare. The report effort has been supported by significant citizen input including individuals in both elected and appointed positions involving significant interface with land use policy development and enforcement.

3.1.3 Protection of Life, Structures, Equipment and Property from Flooding

While devastating flooding, as experienced in 1955, has a potential to be significantly reduced as the result of construction of both Success Dam and the groundwater recharge basins of DCTRA and individual member agencies within the IRWM boundary, the potential for flooding still exists. Issues related to flooding are damage to infrastructure, equipment and property from flood flows from uncontrolled channels such as Frasier Creek and Deer Creek and land and habitat alteration associated with those flood flows. While outside of the IRWM boundary, projects designed and managed to provide flood control for downstream landowners extending into the historic Tulare Lake bed, are of significance. Planning is again underway to address the modification of Success Dam to address improved downstream flood protection.

3.1.4 Provide Multiple Benefits of Management of Water Resources and Related Diversion and Conveyance Infrastructure

The involvement of DCTRA as the lead agency in both initial investigations of the DCTRA Ponding Basin project, including habitat enhancement procedures and, in

recent history, development of specific projects designed to implement habitat improvement related objectives is a priority for DCTRA and its IRWM prospective partners. The specific goals within the Tule River Corridor structure include water management, habitat restoration and storm water control. Pursuit of these goals in each project developed related to management of water resources is an objective of this IRWMP. The DCTRA Ponding Basin Project and supplemental additions implements each of the elements of this Plan objective.

3.1.5 Reduction of Contamination of Surface and Groundwater Resources

Reducing contaminants throughout the Tule River Basin will depend on improved methods of materials application and use of pesticides and herbicides, improved treatment and reuse of domestic and industrial wastewater from POTW systems and land use and development practices that incorporate Best Management Practices to deal with issues such as disposal of wastes from septic tank treatment systems and urban and roadside runoff. Member agencies of DCTRA are participants in the Southern San Joaquin Valley Water Quality Coalition and the Tule Basin Water Quality Coalition. The principal purpose of said Coalitions is to identify and either reduce below a harmful level or eliminate sources of contamination which jeopardize beneficial uses of both surface water and groundwater resources.

3.1.6 Meet Applicable Regional Water Quality Control Board Basin Plan Objectives

The numeric standards and the narrative objectives contained in the Basin Plan for the Tulare Lake Basin are currently accorded significant status in project planning within the Tule River Basin. While all surface water directly diverted from the Tule River is diverted for beneficial purposes for either agricultural purposes or groundwater recharge, water quality parameters meeting beneficial use criteria are sought to be protected and enhanced by the water management planning activities conducted within the Tule River Basin. Improving and maintaining surface water quality requires coordination with procedures ongoing pursuant to the Irrigated Lands Regulatory Program of the Regional Water Quality Control Board and the implementation of Best Management Practices, both as they relate to irrigation related discharges and urban and County and State roadway systems related discharges. In addition, coordination with the County of Tulare and the City of Porterville with respect to solid waste management is necessary in order to satisfy Basin Plan standards and objectives.

3.1.7 Management of Recreational Activities to Minimize Impacts on Water Resources

Recent water quality testing has demonstrated frequent, elevated and increasing occurrence of coliform contamination within the surface waters arriving at and coursing through the waterways within the IRWM planning area. While not of historic priority relative to planning activities, increased emphasis by regulatory agencies regarding coliform contamination is elevating the need to begin to address human related impacts, such as those related to recreation, on surface water quality. It is anticipated that future

efforts related to this objective will focus on education. To this end, this topic has been added to the current educational outreach topics of the DCTRA.

3.1.8 Conserve, Enhance and Regenerate Riparian Habitats

One of the main objectives of the DCTRA's Deer Creek Basin Project area development is to conserve, enhance and create native habitats. As such, current projects under development by DCTRA member agencies have elements of conservation and enhancement of existing and development of new riparian habitats. Based on the likely development of a DCTRA-wide Habitat Conservation Plan and Natural Communities Conservation Plan, these objectives will continue to be in the forefront of the planning and construction activities related to water resources within the IRWMP planning area. The Work Plan documents related to both the Habitat Conservation Plan and the National Communities Conservation Plan and the Natural Communities Conservation Plan have yet to be developed, but are a long-term priority of DCTRA given the need to develop projects to address groundwater management and mitigation of the effects of settlement of litigation related to San Joaquin River Restoration.

3.1.9 Reduce Impacts and Optimize Benefits from Assisting Other Drought-Related Areas with Basin-to-Basin Transfers of Water

DCTRA member agencies which are signatory to the Tule River Association organization Agreement implement an unwritten policy related to impact reduction resulting from out-of-basin water transfers. While it is the policy of the Board of

Directors of TRA to assist other areas in need during times of extended drought, the member units examine transfers from the perspective of mitigation of impacts related to water transfers to out-of-basin entities. Adherence to this procedure and ensuring that adequate facilities exist to accept return transfers in above-normal and wet conditions is and remains an objective of this IRWMP. In the prior year of extreme drought, dry-year transfers of water were facilitated by DCTRA member agencies. This program benefited several Friant Division, CVP contract entities with a dry-year supplemental supply and will allow for the return of a multiple of the exchanged supply in future years, providing a supplemental benefit to the groundwater reservoir.

3.1.10 Evaluation of the Need for Supplemental Water Management Strategies Related to the Effects of Climate Change

The groundwater management efforts of the DCTRA are focused on the management of the variable flows from the Tule River watershed and Friant Division, CVP contract supplies. These flows range from extreme drought conditions, such as that which existed in 1977, to extreme flood conditions such as that which existed in 1983. The objectives of the planning activities conducted by DCTRA and its partners under this IRWMP are examples of methodologies to deal with the variability of the Tule River hydrology, not respecting the basis. From its inception in 1994, to date, the DCTRA member agencies have sought to implement projects which would augment groundwater supplies during less than normal to drought conditions and, in addition, to manage above-normal to extreme flood conditions which occur within the watershed. Whether the basis

is climate change, or variability of the hydrology of the watershed, it is the objective of the DCTRA and its IRWM partners to manage to both of the extreme conditions, as well as the intervening conditions. DCTRA member agencies currently have 28 groundwater recharge basins covering approximately 2,100 acres. In addition, there are approximately 60 miles of unlined Tule River channel, 40 miles of unlined Deer Creek channel, 16 miles of unlined Porter Slough channel and several hundred miles of unlined canals that are parts of irrigation distribution systems.

3.1.11 Optimize Efficient Use, Conservation and Recycling of Water Resources

Based on its founding purposes, DCTRA has sought to implement policies and procedures incorporating conservation as the main focus. Whether through education, demonstration such as objective groundwater recharge procedures, the DCTRA has sought out both policies and projects which optimize efficient use of available water resources, including conservation procedures. With respect to recycling, the DCTRA has and will continue to, pursue projects and programs with its partners and on behalf of its partners, which encourage recycling of both treated effluent and urban storm water related flow sources. For example, agencies within the IRWM boundary fully recycle treated wastewater effluent, thus reducing extraction of groundwater in storage to meet crop demand requirements.

3.1.12 Identify and Promote Strategies for Hydroelectric Generation Facilities

The Lower Tule River Irrigation District a member agency of DCTRA, has developed a 1.4 KW hydroelectric generating plant at Success Reservoir. Developed in 1989, the plant is identified as SPP1. The hydroelectric facility runs on the irrigation release schedules, generating electrical power based on the flow and head characteristics occurring on any given day. LTRID, as both an IRWM objective and as a partner in DCTRA, will continue to explore opportunities to enhance the production of hydroelectric power while protecting the beneficial use of the water employed in generating such power. In addition, to the extent possible, DCTRA members look to optimize power production through development of an enlarged Success Reservoir. It will be a continuing objective of DCTRA, through the implementation of the objectives contained in this IRWMP, to continue to seek those opportunities.

3.1.13 Evaluate and Modify Water Diversion and Conveyance Infrastructure

Many of the member agencies of the DCTRA utilize natural channels for water supply conveyance and distribution purposes. Several of the member units, such as the LTRID and the Pixley Irrigation District have undertaken significant distribution system improvements over the last several years. The Porterville Irrigation District has recently completed a system expansion study and is in the process of preparing to undertake expansion related projects. It is an objective of this IRWMP to continue to seek out and implement such evaluation and improvement opportunities.

3.1.14 Promote City, Community and Regional Storm Water Management Plans

In cooperation with the Tulare County Flood Control District and the incorporated City of Porterville, the DCTRA has as its objective the promotion of the creation and implementation of adequate storm water management plans. Directing agricultural, roadside and urban generated storm water flows to beneficial uses is an objective of this IRWMP. Planning related to evaluation of the impacts of pollutants carried with the storm waters is of ever increasing concern, particularly with respect to the potential beneficial use of the diversion of these waters for agricultural irrigation and also with regard to the impacts of the pollution on groundwater quality. It is an objective of this IRWMP to seek out reliable, cost-effective and pollution-reducing actions. The member agencies of DCTRA have assisted in the preparation of several stormwater management plans. In particular, the LTRID has contracted to receive waters from Strathmore and Frazier Creeks and properly manage the disposal of said waters utilizing both existing system elements and new additions.

3.1.15 Increase Knowledge Regarding Groundwater Related Conditions and Establish Groundwater Management Practices

The DCTRA has an adopted Groundwater Management Plan (GWMP). Both the KDWCD and the Tule River Basin have developed numeric groundwater models designed to offer a tool for management of water resources within each basin, to evaluate boundary conditions between the two (2) watersheds and to allow for specific impact analysis of proposed developments within the IRWMP boundary. It is an objective of

DCTRA to work with its IRWM partners to further enhance understanding of groundwater and to further develop the tools necessary to improve that knowledge base. Ongoing activities with the City of Porterville and discussions with serving utilities for several unincorporated communities are examples of opportunities to further enhance the groundwater modeling within the area, often specific to the land use and water planning efforts of IRWM partners. It is an objective of DCTRA to maintain the Tule River Basin numeric groundwater model, its related database and to share same with water management partners within the Tule River Basin for the benefit of the groundwater resource.

3.1.16 Conserve and Restore Native Species and Related Habitats

As documented in DCTRA Recharge Basin related efforts of DCTRA, significant habitat alteration and loss of habitat has occurred, particularly along the corridors of the Tule River and Deer Creek over time. Distinct objectives have been established by Board of Directors of DCTRA and augmented in IRWM related partnerships to reverse this trend and incorporate into water management related projects, project elements to conserve, enhance and generate new habitats. As a result, benefits are envisioned to accrue to species listed as both endangered and threatened as additional habitats will be developed, along with conserved areas for said species' use in both maintenance and augmentation of their levels of existence.

The established and operable DCTRA Recharge Basin objectives have three (3) principal components. These components build upon chosen property characteristics of being in the Tule River corridor, on soils with above-average to outstanding percolation

characteristics and capable of diverting water from and returning water to the River or one of its distributaries. The components consist of the site functioning as a groundwater recharge site, a flood impact reduction site and a habitat restoration location. The flood impact reduction function is not limited to urban and/or transportation facility flood/flood damage reduction capabilities, but extends to agricultural lands. Protection of permanent crops and maintenance of the soil mantle are the primary objectives in this case.

3.1.17 Sustain Agricultural and Urban Viability through Effective Water Management

Given the significant competition for available surface and groundwater supplies, meeting of future water demands for both agricultural and urban uses will require changes in the existing water supply system. These changes potentially involve storage mechanisms, modifications of delivery infrastructure and improved on-farm and urban use efficiencies. It is the objective of this IRWMP to act as a catalyst for continued evaluation of the efficiencies of the storage and delivery systems and further to act in a responsible agency role to encourage and implement improved on-farm and urban use efficiencies. As example, historical reclamation plans associated with sand and aggregate mine sites have focused on development of lakes. As the principal source of water supply for these impoundments is groundwater, the evaporative losses from the lake surface offset other efforts of DCTRA to import and recharge water to the groundwater reservoir. Through the CEQA process associated with the issuance of permits applied for under the Surface Mining and Reclamation Act, water supply interests have been able to have these sites developed as “dry” sites, thus eliminating evaporative losses. In addition, the sites

can then be utilized to capture non-storable storm and flood flows, detaining some until capacity develops in downstream recharge basins.

3.2 PLAN SCOPE

The purpose of this IRWMP is to delineate the pathways whereby potentially feasible opportunities, initiatives, programs or projects to improve water quality, augment water supply, conserve and improve habitat and deal with land use issues are presented in a fashion which represents the current manner in which these issues are being addressed. It is to further demonstrate the extent to which coordinated efforts take place in the implementation of local and State IRWMP goals and objectives.

The IRWMP further presents characteristics of the IRWMP area, its sub-watersheds, the geology and hydrogeology, the hydrology, the water storage and water delivery components information related to water demands, water quality and the underlying nature of water rights. The IRWMP also presents the manner in which present and potential future policies, programs and projects are brought forward and evaluated and the relationship of these policies, programs and projects to the preservation and enhancement of the water resources available in the IRWMP area.

3.2.1 Water Resource Management Strategies

As the objective of the DCTRA Board of Directors is to continue to have the water management process be dynamic in nature, the water resource management strategies element of this IRWMP is designed to not only include those management

strategies which are currently employed, but to look into the future as to both alternative and augmented strategies to optimize the management of available water resources. Specific details related to the vision for this process are as detailed in Chapter 9.

3.2.2 Evaluation of Water Supplies

The evaluation of water supplies takes on numerous forms within the IRWMP planning region. The DCTRA has an ongoing Tule River Basin-wide process, updated on an ad-hoc basis, utilizing its Advisory Committee. This process began in the late 1990's with a facilitated examination of assets and needs. As will be detailed specifically later in this IRWMP, considerable attention has been given to the land use inventory element of the groundwater model database which has resulted in improved accuracy of the water balance for the Tule River Basin. This updated land use instrument is currently being utilized by the consultant in the update to the Water Resources Investigation for the Kaweah River Basin, improvements pursued in order to allow for more accurate determination of the water balance conditions existing within a given groundwater management area.

3.2.3 Water Quality Protection and Improvement

Landowners within member agencies of the DCTRA, through the Tule Basin Water Quality Coalition (TBWQC), are members of the Southern San Joaquin Valley Water Quality Coalition (SSJVWQC). The efforts of the Coalitions are specifically structured to track and provide comment with respect to regulations and legislation being

generated related to both groundwater and surface water quality. In addition, the TBWQC has been the lead agency in the implementation of the Irrigated Lands Regulatory Program structured as a special project of the DCTRA. Said Coalition has obtained recognition as the third-party representative of the landowners/growers irrigating within the Tule River Basin and related upslope irrigated lands areas above the valley floor. This IRWMP will detail the efforts, goals and objectives of these parties as they pursue fulfilling their roles related to the various aspects of both surface and groundwater quality within the Tule River Basin.

3.2.4 Flood Control Planning

Along with groundwater management, a fundamental activity of DCTRA member agencies, in cooperation with the Tulare County Flood Control District and, where applicable, the City of Porterville, is management of the flood channels within the Tule River Basin boundaries and acting in defined roles relative to conservation space within Success Reservoir, which is principally a flood control facility. This IRWMP will detail the activities of the DCTRA member agencies with respect to channel maintenance, ancillary activities related to both regulated and non-regulated storm and flood flows, as well as its involvement with the County of Tulare through the Tulare County Flood Control District. In addition, work with the City of Porterville will be described, including those activities related to seeking to put to beneficial uses the waters generated in the form of urban storm water flows.

3.2.5 Planning Process, Public Education and Administration

Important to any regional water resources management structure are the considerations of the planning process, public education and plan administration. This IRWMP provides detail with respect to the planning process in a number of arenas. Be it adequacy of water supplies available to the Tule River Basin, both surface and groundwater related, processes related to land use planning or the planning of current and future activities, detail related to these activities are spelled out in specific sections of the chapters of this IRWMP. Likewise, efforts related to public education, both in planning and implementation are detailed herein. As one of the functions of the DCTRA is education related to water management, it is relegated to a position of significance within this IRWMP.

3.3 REGIONAL PLANNING PROCESS

3.3.1 Resource Management Strategies

While normally exercised in an integrated fashion as a matter of practice within the DCTRA IRWMP area, the DWR IRWMP guidelines and Plan Review Process mandate visiting Resource Management Strategies (RMS) as separate topics, prior to integration. As a result, the strategy specific to water management within the IRWM area will be visited within the IRWMP on both an individual, as well as integrated, basis. The RMS topics are structured by the referenced Guidelines around the California Water Plan Update. This IRWMP has been structured to satisfy the requirements of the referenced Guidelines with regard to the RMS, which are a part of current IRWMP activities.

3.3.2 Integration

Historically, the three (3) types of integration required by the IRWM Guidelines have existed within the conduct of the Tule River Basin IRWM structure. Specifically, IRWMP elements, being governance, stakeholder outreach, data management, project review or project selection, have been subjected to stakeholder and agencies of jurisdiction involvement, through a thorough dissection and summary of resources and project implementation. To date, the employed review and decision making processes are performed in accordance with the structure of the “deemed equivalent” IRWM structure as developed to date. Specifically, issues and items are brought to the table for discussion by DCTRA member agency staff and consultants and IRWMP Stakeholders Advisory Group members, with the issues being addressed to a satisfactory conclusion.

Recommendations then flow to the Board of Directors of DCTRA where adjustments to stakeholder and agency of jurisdiction inputs are considered in the IRWM structure and performance arenas. Similar pathways are established for issues related to RMS and project related funding and implementation procedures. It is the opinion of the Board of Directors of DCTRA that the IRWM Stakeholders Advisory Group continue forming, coordinating and integrating their separate positions and efforts to function in a unified basis in providing input and recommendation to DCTRA.

3.3.3 Study Grants

This IRWMP is being prepared by the DCTRA. It is being prepared in conjunction with a parallel plan for the Kaweah River Basin as many of the elements of the two (2) plans are common. Based on input from signator parties to the DCTRA organization and with the recommendation of the Stakeholders Advisory Group, a topic specific application was submitted for a planning grant. The DCTRA has received notice of non-award of said planning grant and, therefore, pursued completion of this document in conjunction with the efforts related to the development of the IRWMP for the Kaweah River Basin and is currently negotiating the contract related to same.

3.3.4 IRWMP's Relationship to Existing Water Management Plans

Additional coordination efforts take place on a frequent basis with the Kings River Basin group, the Pond-Poso group, the Southern Sierra group and the Kern Group. Adjustments in boundaries have recently taken place to insure adequate coverage for all

areas desiring such coverage, to address representation, to insure coordination regarding project related concerns and optimize benefits of proposed projects. Discussions occur on a regular basis with participating entities in the at-large IRWM process. Boundary adjustments have also occurred based on these specific areas where water management activities take place and, more particular, the specific source of the water being managed.

3.3.5 Consulting Team

Historically, review, modification and implementation of issues appurtenant to DCTRA IRWMP efforts have involved a number of consultants. DCTRA utilizes a number of consultants in addition to the University of California, Davis, which maintains both the database associated with the numeric groundwater model and runs the numeric groundwater model. Input from 4 Creeks, Inc., R.L. Schafer, and Keller/Wegley Engineering is employed on a regular basis, both with respect to policy development and input, as well as project development. Consulting activities are also undertaken by both firms with respect to DCTRA IRWMP activities and Tulare Basin JPA IRWM activities.

This documentation of the existing IRWM policies, procedures and actions was accomplished by Keller/Wegley Engineering. The preparation of this written plan involved documentation of that which is currently of record. Additional policies or procedures have been generated as a result of the requirements associated with an acceptable IRWMP.

3.3.6 Stakeholder Participation

As previously referenced earlier in this IRWMP and acknowledged with gratitude by the Board of Directors of DCTRA, literally hundreds of man hours have been invested by the IRWMP Stakeholders Advisory Group in addressing issues specific to the Kaweah River and Tule River Basins and in developing, for consideration of action by the Board of Directors of DCTRA, draft policies and procedures, actions related to participation and funding and project evaluation and ranking.

The standing joint KDWCD/TULE RIVER BASIN IRWMP Stakeholders Advisory Group consists of representatives from the following entities:

California Water Service Company
Center for Irrigation Technology, CSU-Fresno
City of Farmersville
City of Lindsay
City of Porterville
City of Tulare (administrative and public works representatives)
City of Visalia (resource management and Engineering representatives)
City of Woodlake
Community Water Center
County of Tulare (Environmental Health, Executive Officer and Resource Management Agency representatives)
Deer Creek & Tule River Authority / Tule River Association
Department of Fish and Wildlife
Department of Water Resources
Exeter Irrigation District
Ivanhoe Public Utility District
Kaweah Delta Water Conservation District

Keller/Wegley Engineering

Kings County Water District

Provost & Pritchard Engineering Group

Quad-Knopf Engineering

Regional Water Quality Control Board

Santa Rosa Tachi Tribe

Sequoia Rivers Land Trust

Self-Help Enterprises

Tulare Basin Wildlife Partners

Tulare Irrigation District

3.4 REPORT ORGANIZATION

Utilizing a number of other IRWM prepared plans as a basis and the State IRWMP Guidelines wherein specific plan elements are prescribed and the evaluation of draft IRWMPs are outlined, a draft IRWMP Table of Contents was developed. Over the course of several meetings of the KDWCD/TULE RIVER BASIN IRWMP Stakeholders Advisory Group meetings, the Table of Contents was worked on and there was consensus reached with regard to same. The organization of this IRWMP is based upon that agreed to Table of Contents.

CHAPTER 4
DESCRIPTION OF PLAN AREA

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

4.1 GENERAL DESCRIPTION

The Deer Creek and Tule River Authority (DCTRA) was formed in 1994 as a joint powers authority (JPA) of public agencies. The purposes enumerated in the JPA for DCTRA include conserving and storing waters of the Tule River, advocacy on behalf of and protection of the Friant Division, CVP contracts held by several member agencies and of conserving and protecting the underground waters of the Tule River Basin.

DCTRA is located in the south-central portion of the San Joaquin Valley of California and, as shown on Figure 4-1, identified as the DCTRA Location Map, lies within Tulare County. The total land surface area of the JPA is about 289,448 acres. The DCTRA boundaries are, for the most part, coincident with the Department of Water Resources Tule Sub-basin (Number 5-22.13) which is a subset of the larger San Joaquin Valley Hydrologic Unit. The Tule Basin groundwater unit boundaries are generally similar to the DCTRA boundaries, except for areas to the south and a small portion in the

northwest corner near Corcoran, which falls within the Tulare Lake groundwater basin. It should be noted that the DCTRA boundaries are administrative and political in nature. They fall for the most part along township lines, county lines and adjacent surface water distribution entity boundaries. For the most part, they have no hydrogeologic significance. For purposes of this IRWMP, it should be noted that the IRWM functions are carried on outside of the boundaries of DCTRA, as certain potential signators to the IRWM Memorandum of Understanding, such as the County of Tulare have boundaries which are external to the boundaries of the DCTRA. Figure 4-1 presents the current boundaries of the Tule River Basin IRWMP participants along with the DCTRA Boundary.

Lands within the IRWMP boundary are primarily agricultural in nature, although the City of Porterville constitutes a significant area of urbanization. Smaller unincorporated rural communities include Poplar, Woodville, Tipton, Pixley, Terra Bella and Teviston. A high degree of development exists in the District with approximately 228,660 acres presently devoted to the production of a variety of irrigated crops and in excess of 13,352 acres of urbanized land.

U.S. Highway 99 is a principal traffic artery through the San Joaquin Valley. It crosses DCTRA in a west-central axis in a north-south direction. The main line of the Union Pacific Railroad similarly crosses in a north-south direction, adjacent to Highway 99. The main line of the Atchison-Topeka and Santa Fe Railroad lies west of the west boundary of DCTRA and runs in a north-south direction near its westerly boundary, with Highway 65 traversing north-south in the easterly portion of the DCTRA.

The boundaries of DCTRA encompass the alluvial fans of the Tule River and Deer Creek, extending about 28 miles in a westerly direction from the foothills of the Sierra Nevada Mountains on the east, to the Kings County line, easterly of the Tulare Lakebed, on the west. The service area of the Angiola Water District lies at the west boundary of DCTRA and the Delano-Earlimart Irrigation District adjacent to the south. Its maximum dimension in the north-south direction is about 18 miles.

From Success Reservoir, located immediately to the east of the eastern DCTRA boundary and about 6 miles east of the City of Porterville, diversions from the Tule River begin.

Numerous public and private entities within the DCTRA divert water for irrigation from the Tule River and its distributaries, as well as from Deer Creek and, with exception of certain lands within the Porterville and Pixley Irrigation Districts, the majority of the Agricultural acreage within DCTRA has access to surface water supplies from either the river system or Deer Creek. Because of the erratic nature of flows of either source, each of which varies substantially in magnitude from month to month and from year to year, nearly all of these lands obtain supplemental irrigation supply from groundwater and a significant portion from imported CVP supplies. Municipal and industrial uses within the DCTRA are supplied with both groundwater and treated surface water depending on the specific location.

Success Dam and Reservoir, located on the Tule River at the east boundary of the DCTRA, was completed on 20 January 1961 by the U.S. Corps of Engineers. This project was constructed for purposes of flood control at the confluence of the middle and south

forks of the Tule River with the North Fork feeding upstream into the Middle Fork. The dam and related reservoir project also provides river control for irrigation purposes outside of the flood control months. The dam is an earth filled structure about 142 feet in maximum height, 3,490 feet long with a pre-sedimentation reduction gross pool reservoir capacity of about 85,400 acre-feet. The Tule River Association, acting as lead agency on behalf of the parties contracting for conservation space in the reservoir has satisfied the terms and conditions of Contract No. 14-06-200-211019, dated 30 April 1965, with the United States for repayment for the portion of the project costs allocated to conservation purposes. Consideration of enlargement of the reservoir was requested several years ago to improve both the flood control and irrigation benefits which the facility offers. Initiation of study efforts led to an initial conclusion of seismic concerns and efforts of the United States were diverted from an enlargement focus, to a safety of dam focus. Following several years of study significant expenditure of funds and no construction related efforts, seismic concerns have been determined to be already properly addressed and renewed focus on enlargement efforts has been rekindled. Significant delay, increased capital costs and reduced reservoir benefits resulted in the interim.

The Friant-Kern Canal, a feature of the Federal Central Valley Project (CVP), traverses the easterly portion of DCTRA, delivering San Joaquin River water stored in Millerton Lake, located to the north. Potential IRWM related entities which are contractors within the Friant Division, CVP include the Porterville Irrigation District, the Lower Tule River Irrigation District, the Saucelito Irrigation District, the Terra Bella Irrigation District, the Lindmore Irrigation District and the Lindsay-Strathmore Irrigation

District. The Pixley Irrigation District, the Saucelito Irrigation District and the Lower Tule River Irrigation District have the capability to receive delivery of water from the Friant-Kern Canal as contractors for an in-delta supply from the Sacramento-San Joaquin Rivers Delta, a portion of which can be delivered to these entities by means of exchange agreements. This delivery is enabled by virtue of ownership of capacity in the Cross Valley Canal and its appurtenant pumping facilities and by virtue of a wheeling agreement for the in-delta supply with DWR.

In common with other areas along the east side of the San Joaquin Valley, the lands within the IRWM boundary historically have experienced the anomaly of flood control problems, coupled with water deficiency. From time-to-time, flows in both the Tule River and Deer Creek reach damaging levels within the DCTRA boundaries, with substantial volumes of water escaping to flood vulnerable agricultural land in the Tulare Lake Bed. Since the construction of Success Reservoir, a high degree of river control has been achieved, thus substantially reducing the frequency of flood damage and by regulating seasonal runoff to satisfy peak summer irrigation demands. As previously noted, requests have been made to enlarge the capacity of Success Reservoir to the end of improving its flood damage reduction capabilities, while improving the yield of the river for conservation purposes. The flood control system has not been developed to a level where it will achieve a base 1 in 100 year return frequency level of protection.

4.2 RELATED COUNTY STUDY AREAS

For land use planning purposes, the County has developed several areas of differing geography for which they have developed land use plans. Two (2) of these areas interface with the DCTRA IRWM planning process. The first of these is the valley floor area which consists of the significant majority of the IRWMP area. This area includes all of the valley floor up to the 660 foot contour. The County of Tulare planning area immediately above the 660 foot contour is designated as the Foothill Growth Management Area. The County has prepared a specific land use plan with its own established set of rules and procedures to deal with land use proposals in these foothill areas. The DCTRA IRWMP currently does not contain any lands in planning areas other than these which are noted. The IRWMP for the Southern Sierra Nevada IRWM area interfaces with the balance of the land use planning instruments which the County has created and adopted. The boundaries of the DCTRA IRWM area and that of the Southern Sierra Nevada IRWM have been developed to coincide and leave no area between the IRWM areas unrepresented.

4.3 BASIS FOR NON-AGRICULTURAL WATER DEMANDS

For purposes of this IRWMP, the basis of water demands remains identical to that developed by DCTRA for each of their adopted management plan elements. Whether the Groundwater Management Plan or the Needs Analysis associated with each CVP contractor, for example, is the plan-at-hand, the basis for non-agricultural water demands remains consistent.

This non-agricultural demand basis is divided into three (3) specific categories. It is noted here that each of these three (3) categories utilizes groundwater as either the sole, or principal source of supply. The first of these categories is urban demand. This demand has been defined as that which occurs in the incorporated City of Porterville and previously referenced unincorporated communities. Currently the Terra Bella Irrigation District is the only entity which incorporate treated surface water into their delivered supply.

The second category is that of public water system demand. The basis for the analysis of water demand for this category is the records of the County of Tulare and the Division of Drinking Water of the State Water Resources Control Board. Each of the water purveyors in this category has a water supply permit from the State and is required to report total amounts of water produced from their various sources. With the exception of the rural unincorporated communities noted above, each of the remainder systems have groundwater as their sole source of supply. As with the treated surface water suppliers, detailed records are kept of water produced and delivered for each of these entities.

The balance of the non-agricultural demand falls into the category of rural domestic water demand. This demand consists of that from residences not served by a municipal connection, a mutual water company or another small public water system. Most such residences are served by small-capacity individual wells. Work has been accomplished, principally in the DCTRA Groundwater Model, to determine the number of rural residences in this category. While this work has resulted in an approximation of the water demand, work remains to be accomplished to refine this number to a level which can be considered to be an accurate estimate. At the current level of work accomplished, the information can, at best be categorized as satisfactory.

4.4 TOPOGRAPHY

The DCTRA IRWMP area is located on the east side of the south-central portion of the San Joaquin Valley. The area is characterized by low topographic relief, with variations rarely exceeding 10 feet except in stream channels. Elevations of the IRWMP area vary from about 660 feet above sea level at the boundary with the Southern Sierra Nevada IRWM planning area, to about 200 feet at the westerly boundary. Lands within the IRWM planning area generally slope in a southwesterly direction at about 10 feet per mile, with this slope lessening as the westerly boundary is approached.

The southern end of the San Joaquin Valley, also identified as the Tulare Basin, is a closed feature without external surface drainage, except for extreme flood event occurrences. Tributary streams drain to depressions, the largest of which is the Tulare Lake bed, located west of the IRWMP boundary. The Kings, Kaweah and Tule Rivers

and, on occasion, the Kern River discharge into the Tulare Lake Bed. These discharges occur at times when flows exceed the capacity of foothill reservoirs, the groundwater recharge basins and irrigation delivery systems and satisfaction of what irrigation demand exists during those event periods.

The east side of the San Joaquin Valley constitutes a broad plain formed by large coalescing alluvial fans of streams draining the western slope of the Sierra Nevada. On the north, Elk Bayou separates the Kaweah River fan from the Tule River fan. Deer Creek, an intermediate stream between the Tule River and White River discharges onto the inter-fan area of the Tule River area. The Tule River fan is characterized by a limited network of natural channels identified as Tule River distributaries, as well as numerous canals constructed for irrigation purposes.

4.5 CLIMATE

The climate of the DCTRA IRWMP planning area is typical of the San Joaquin Valley, that being semi-arid and characterized by mild winters and hot, dry summers. Mean annual temperature for the City of Porterville is 61.0 degrees Fahrenheit. The average annual minimum and maximum temperatures are 46.8 and 75.8 degrees, respectively. For a central location within the IRWM planning area, such as the City of Porterville, the average yearly rainfall is 8.58 inches. Climate information appurtenant to the IRWMP is presented in Table 4-1.

TABLE 4-1
CLIMATE DATA
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULARE RIVER AUTHORITY

	Jan	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Annual*
Avg. Precip.	1.44	1.41	0.85	1.02	0.47	0.00	0.01	0.00	0.06	0.36	0.84	2.11	8.58
Avg Temp.	44.8	49.1	54.6	57.8	67.3	73.8	79.4	76.4	71.3	61.0	51.2	45.0	61.0
Max. Temp.	55.7	61.7	68.4	72.0	83.1	90.0	95.6	93.5	89.4	77.9	65.5	56.3	75.8
Min. Temp.	35.4	37.4	40.7	43.2	50.7	56.3	62.9	59.9	54.7	46.7	39.1	35.0	46.8
ETo	1.19	1.87	3.66	4.72	6.83	7.64	7.90	7.12	5.34	3.38	2.98	1.10	4.48

Weather station ID CIMIS #169 *Data period: Year* 2001 1/05 *to Year* 2010 12/10

Average wind velocity 3.0 *Average annual frost-free days:* 261

4.6 LAND USE

Of significant value in water management planning, accurate data related to land use and, in particular, cropping types and number of crops per year are of extreme importance. Historically, the basis for computation of water demand for agricultural areas has been the information generated periodically by the State Department of Water Resources (DWR). The last verified land use inventory for the DCTRA IRWMP planning area was accomplished in 2007. Presented, as Table 4-2, is land use data for the DCTRA for 2012. A differential between permanent and annual crops has been provided. There were a total of 136 dairy milk barns in permitted operation.

TABLE 4-2
LAND USE DATA
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Land Use Category	Acres (1)
Irrigated	
Permanent	77,640
Annual	138,282
Conservation/Recharge/Pasture	35,504
Idle or Fallow (including roads and canals)	13,403
Urban	
Residential	23,072
Commercial/Industrial	1,547
Total:	289,448

(1) 2012 data.

Due to the importance of this information to an accurate determination of total irrigation demand and its related linkage to total groundwater extracted in satisfaction of that demand, the KDWCD recently undertook a sensitivity investigation principally dealing with field and row crops and a determination of the number of crops per year grown of each type. This investigation was undertaken in an attempt to resolve an issue of regional concern and resulted in a determination that the historic basis of agricultural water demand computation utilizing of DWR land use data is not reflective of actual land use characteristics and is the principal reason for water demand computations not reflecting observed groundwater conditions within either IRWMP planning area. The sensitivity analysis procedures utilized satellite imagery, with a significant level of ground truthing, to determine if this alternative basis would result in a more accurate

determination of agricultural demands and thus a more accurate determination of groundwater conditions within both the DCTRA and KDWCD IRWMP areas. This sensitivity analysis was completed in 2013 and resulted in additional work to determine if utilization of satellite imagery would result in more accurate information being available on a year-to-year basis, not just the single year which was initially evaluated. The conclusion of the second level of investigation was that it appeared that such accuracy and continuum of data would exist. Steps are underway to insure that sufficient budget capability exists to secure the information on a continuous basis.

4.7 ANCILLARY WATERSHEDS

While the Tule River and its distributaries are the dominant water feature in the DCTRA IRWM planning area the IRWM planning area is influenced and impacted by other watersheds. A separate watershed is located on each side of the Tule River watershed. The Deer Creek watershed is located such that the fetch is exclusively in a rainfall area with snowfall typically not a regular occurrence and when occurring, limited to the upper several hundred feet of the tops of the watersheds. At times, the Kaweah River watershed, a tributary of the Tule River develops sufficient flow that the flows of said River are added to the flows of Tule River and discharge to the historic Tulare Lake Bed area while combined for State Water rights management purposes, each river remains separate for purposes of flow scheduling and apportionment. Flows occurring in Deer Creek are likewise managed separately, but according to the type of water right and senior/junior priority based on post-1914 appropriative license procedure.

4.8 GEOLOGY

The rocks that crop out in the DCTRA IRWMP planning area include a basement complex of pre-Tertiary age consisting of consolidated metamorphic and igneous rocks and unconsolidated deposits of Pliocene, Pleistocene and recent age, all of which contain fresh water. Consolidated marine rocks of Pliocene age and older do not crop out in this area, but are penetrated by wells in the subsurface. Because the water from these wells generally is brackish or salty, the marine rocks are not considered as part of the fresh-water reservoir and constitute the effective base of fresh water or, what is commonly referred to, as permeable sediments. Most of the groundwater pumped within the DCTRA IRWMP area is from the unconsolidated deposits.

Geologic units that affect the occurrence and movement of groundwater in the DCTRA IRWMP planning area are generally classified and described as follows:

1. Basement Rocks: Non-water bearing granitic and metamorphic rocks;
2. Marine Rocks: Non-water bearing marine sediments including the San Joaquin Formation;
3. Unconsolidated Deposits: Non-marine, water bearing material comprised of the Tulare Formation and equivalent units;
4. Alluvial Deposits: Coarse-grained, water bearing alluvial fan and stream deposits including older oxidized and reduced units and younger alluvium; and

5. Lacustrine and Marsh Deposits: Fine-grain sediments representing a lake and marsh phase of equivalent continental and alluvial fan deposition.

A summary of the main geologic and hydrogeologic units adapted from a variety of sources is provided as Table 4-3.

TABLE 4-3
Geologic and Hydrologic Units, San Joaquin Valley
Integrated Regional Water Management Plan
Deer Creek and Tule River Authority

Generalized section of geologic units. Reported maximum thickness, in feet, is in parenthesis (adapted from Page 1986, table 2)		Hydrologic unit used in many reports such as Polan and Lofgren (1984)	Layers in digital flow model (Williamson and others, 1989)
Quarterly	**Flood basin deposits (100)** – Primarily clay, silt and some sand; include muck, peat and other organic soils in Delta area. Restrict yield to wells and impede vertical movement of water. **River deposits (100±)** – Primarily gravel, sand, and silt; include minor amounts of clay. Among the more permeable deposits in valley.	Upper water bearing zone[1]; unconfined to semiconfined Principal confining unit (modified E Clay) — Absent	**Layer 4** Many wells tap this layer; unconfined storage
Tertiary and Quarterly	**Lacustrine and marsh deposits (3,600±)** – Primarily clay and silt; include some sand. Thickest beneath Tulare Lake bed. Include three widespread clay units – A, C and modified E clay. Modified E clay includes the Corcoran Clay Member of the Tulare Formation. Impedes vertical movement of water **Continental rocks and deposits (15,000)** – Heterogeneous mix of poorly sorted clay, silt, sand and gravel; includes some beds of mudstone, claystone, shale, siltstone and conglomerate. Form major aquifer system in valley.	Lower water-bearing zone semiconfined to confined. Extends to base of freshwater which is variable. **Base of Freshwater**	**Layer 3** Many wells tap this layer; elastic and inelastic confined storage **Layer 2** Some wells tap this layer; elastic and inelastic confined storage
Tertiary	**Marine rocks and deposits** – Primarily sand, clay, silt, sandstone, shale, mudstone and siltstone. Locally yield fresh water to wells, mainly on the southeast side of the valley, but also on the west side near Kettleman Hills.	Below the depth of water wells. In many areas, post-Eocene deposits contain saline water	**Layer 1** No wells; elastic confined storage

[1]The upper and lower water-bearing zones are undifferentiated where the modified E clay exists (includes Corcoran Clay Member of the Tulare Formation)

4.8.1 Basement Complex

The basement complex of the pre-Tertiary age consists of metamorphic and igneous rocks. They underlie the Sierra Nevada and occur as resistant inliers in the alluvium and as linear ridges in the foothills east of the IRWMP planning area. In the subsurface, they slope steeply westward from the Sierra Nevada beneath the deposits of Cretaceous age and younger rocks that compose the valley fill. Information is in the Tule Basin Groundwater Model GIS database indicating the altitude above or below sea level at which bedrock (presumably basement complex) has been reported by drillers or interpreted from electric logs. Additional database information indicates escarpments that are interpreted as buried fault scarps associated with the Rocky Hill fault. West of the escarpments, the slope of the basement complex steepens. In the Tulare Lake area, an oil-test well failed to penetrate the basement complex at 14,642 feet below sea level (Smith, 1964).

The basement complex is at shallow depths in the Terra Bella, Strathmore and Porterville areas and in the intermontane valleys where it is penetrated by many water wells. In the Poplar, Tipton and Pixley areas, the basement complex forms a broad, gently westward-sloping shelf overlain by 100 to 1,000 feet of unconsolidated deposits.

4.8.2 Marine Rocks

Along the east border of the San Joaquin Valley, Tertiary rocks, mainly of marine origin, overlap the basement complex and underlie the unconsolidated deposits. Croft (1968) suggests this unit may locally include beds of continental origin in the upper part.

Inside the IRWMP boundary, the marine rocks do not crop out. The Tertiary marine rocks have locally been penetrated by oil- and gas-test wells in localized areas of the east part of the planning area, range in age from Eocene to late Pliocene and consist of consolidated to semiconsolidated sandstone, siltstone and shale. They have traditionally been locally divided into several formations by geologist (Park and Weddle, 1959), but they generally contain brackish and saline connate or dilute connate water unsuitable for most uses.

4.8.3 Unconsolidated Deposits

The unconsolidated deposits in the IRWMP planning area are divided into several geologic units. In the Kettleman Hills, west of the DCTRA planning area, Woodring et al. (1940) divided the unconsolidated deposits into the Tulare Formation and into older and younger alluvium. The Tulare Formation in the Kettleman Hills overlies the upper Mya zone (Woodring et al., 1940, p. 13), a fossil horizon at the top of the San Joaquin Formation. The Mya zone is reported in well logs beneath Tulare Lake bed and is a prominent marker bed outside of the DCTRA that separates the marine rocks from overlying continental deposits. The base of the unconsolidated deposits is projected by electric log correlation from the upper Mya zone beneath Tulare Lake bed, eastward to the top of marine rocks. The unconsolidated deposits of this report are equivalent to the continental deposits from the Sierra Nevada of Klausing and Lohman (1964) and to the unconsolidated deposits as used by Hilton et al. (1963).

The unconsolidated deposits thicken from zero along the western front of the Sierra Nevada to a maximum of about 10,000 feet at the west boundary of the DCTRA planning area. The unconsolidated deposits are divided into three (3) stratigraphic units: continental deposits, older alluvium and younger alluvium.

In the subsurface, the younger alluvium interfingers and/or grades laterally into the flood-basin deposits and into alluvium, undifferentiated. The older alluvium and continental deposits interfinger and/or grade laterally into the lacustrine and marsh deposits or into alluvium. In the subsurface, the older alluvium and continental deposits are also further subdivided into oxidized and reduced deposits on the basis of environment of deposition.

Unconsolidated deposits, which locally crop out at the IRWMP east boundary and extend beneath the valley floor, were eroded from the adjacent mountains, then transported by streams and mudflows and deposited in lakes, bogs, swamps or on alluvial fans. The lithologic and water-bearing characteristics of the deposits are dependent upon several controlling factors, which include 1) environment of deposition, 2) the type of rock in the source area and 3) competence (or energy) of the streams.

According to Davis et al. (1957), oxidized deposits generally represent subaerial deposition and reduced deposits generally represent subaqueous deposition. Oxidized deposits are red, yellow and brown, consist of gravel, sand, silt and clay and generally have well-developed soil profiles. Reduced deposits are blue, green or gray, calcareous, and generally are finer grained than oxidized deposits and commonly have a higher organic content than the oxidized deposits. In some cases, the separation between the

oxidized and reduced deposits can be identified on well logs based on lithologic color. Such delineation can of course be highly subjective. The coarsest grained reduced deposits were laid down in a flood plan or deltaic environment bordering lakes and swamps. Because of a high water-table in some parts of the east side of the IRWMP planning area, the sediments have not been exposed to subaerial weathering agents. The finest grained reduced deposits were mapped as flood basin, lacustrine and marsh deposits.

The oxidized deposits underlie the older and younger alluvium and throughout most of the DCTRA, the oxidized deposits are 200 to 500 feet thick. Based on work by Croft (1968), a structural contour map of the approximate base of the oxidized deposits has been prepared and published.

The oxidized deposits consist mainly of deeply weathered, reddish brown, calcareous sandy slit and clay and can, in most well completion reports, be readily identified when present. Beds of coarse sand and gravel are rare, but where present, they commonly contain significant silt and clay. The highly oxidized character of the deposits is the result of deep and prolonged weathering. Many of the easily weathered minerals presumably have altered to clay and, as such, are poorly permeable.

4.8.4 Lacustrine and Marsh Deposits

The lacustrine and marsh deposits of Pliocene and Pleistocene age consist of blue-green or gray gypsiferous silt, clay and fine sand that underlie the flood-basin deposits and conformably overlie the marine rocks of late Pliocene age. In the subsurface beneath

parts of Tulare Lake bed, these beds extend to about 3,000 feet below land surface. Where the equivalent beds crop out in the Kettleman Hills on the west side of the valley, they were named the Tulare Formation by Anderson (1905, p. 181). The lacustrine beds and fossils of the Tulare Formation were mapped and described in detail by Woodring et al. (1940, p. 13-26) who considered the top of the Tulare Formation to be the uppermost deformed bed. Therefore, by this definition, all the deformed unconsolidated deposits would form the Tulare Formation.

In the subsurface around the margins of the Tulare Lake bed, the lacustrine and marsh deposits form several clay zones that interfinger with more permeable beds of the continental deposits, alluvium, undifferentiated and older alluvium. Because of contained fossils and stratigraphic relations to adjacent deposits, these clays are considered to be principally of lacustrine origin. Clay zones are generally indicated by characteristic curves on electric logs and thereby facilitate some areal correlations between adjacent logs as shown in hydrogeologic cross sections. Although as many as six (6) laterally continuous clay zones have locally been defined in the southern San Joaquin Valley, only the most prominent of these clay zones, known as the “E” Clay (or Corcoran Clay member) of the Tulare Formation, is found within the IRWMP boundaries. Clay deposits are nearly impermeable and yield little water to wells and that which is obtained is generally of poor chemical quality.

The E Clay is one of the largest confining bodies in the area and underlies about 1,000 square miles west of U.S. Highway 99. The beds were deposited in a lake that occupied the San Joaquin Valley trough and which varied from 10 to 40 miles in width

and was more than 200 miles in length (Davis et al., 1957). The first wide-scale correlation of the Corcoran Clay was made by Frink and Kues (1954).

The E Clay extends from Tulare Lake bed to U.S. Highway 99. It is about 140 feet thick near Corcoran and the average thickness is about 75 feet. The deposits near Corcoran are probably the thickest section in the San Joaquin Valley.

4.8.5 Reduced Older Alluvium

As previously mentioned, the reduced older alluvium is a moderately permeable arkosic deposit that is not exposed in the IRWMP planning area. It overlies the continental deposits, interfingers with lacustrine and marsh deposits beneath Tulare Lake bed and interfingers with alluvium, undifferentiated, north of the Tulare Lake bed. Around the margin of Tulare Lake bed, the reduced older alluvium interfingers with lacustrine deposits.

The reduced older alluvium consists mainly of fine to coarse sand, silty sands and clays that were probably deposited in a flood plain or deltaic environment. Gravel that occurs in the oxidized older alluvium is generally absent. The deposits are sporadically cemented with calcium carbonate, according to logs of core holes made by geologists of the Bureau of Reclamation. Those descriptions imply, however, that the calcium carbonate is probably less abundant than in the underlying reduced continental deposits.

4.8.6 Oxidized Older Alluvium

The oxidized older alluvium unconformably overlies the continental deposits. The beds consist of fine to very coarse sand, gravel, silt and clay derived for the most part from granitic rocks of the Sierra Nevada. Beneath the channels of the Kaweah, Tule and Kings Rivers, electric logs indicate that the beds are very coarse. In the interfan areas, metamorphic rocks and older sedimentary units locally contributed to the deposits and, in those areas, the beds are probably not as coarse as the beds beneath the Kaweah, Tule and Kings Rivers. Fine-grained deposits occur in the channel of Elk Bayou.

East of U.S. Highway 99, the contact of the older alluvium with the underlying oxidized continental deposits is well defined in electric logs. Structure contours, based on electric log data, show the altitude above or below sea level of the base of the unit. The older alluvium thickens irregularly from east to west and probably has filled gorges cut by the ancient Tule River in the underlying oxidized continental deposits near Porterville. The base of the deposits occurs 195 feet below land surface near Poplar and declines to 430 feet below land surface near Tipton.

4.8.7 Younger Alluvium

Younger alluvium consists of gravelly sand, silty sand, silt and clay deposited along stream channels and laterally away from the channels in the westerly portion of the DCTRA. Younger alluvium is relatively thin locally, reaching a maximum depth below ground surface of perhaps 100 feet. Except in the extreme easterly portion of the IRWMP

area, it is generally above the water table and does not constitute a major water-bearing unit.

Soils developed on younger alluvium show little or no profile development and are generally free of underlying clay subsoil or hardpan. Because percolation rates through the younger alluvium are moderate to high, this deposit serves as a permeable conveyance system for recharge to underlying water-bearing materials.

4.9 GEOHYDROLOGY

In cooperation with the DWR, the member units of DCTRA measure, tabulate and publish water level data for hundreds of water wells. Records for some wells extend back to the 1920s with most records for wells included in the DCTRA's groundwater monitoring program beginning in the 1950s. The quality of the data is considered excellent. From these data, changes in groundwater and storage can be estimated along with an analysis of water level conditions and trends within the DCTRA IRWM planning area.

A GIS database has been constructed, principally to be utilized in the operation of the DCTRA numeric groundwater model wherein calculations of storage changes and groundwater flow can be accomplished by integrating groundwater level elevation contour maps with specific yield data, aquifer properties and specific surface water delivery information by hydrologic unit area. A tabulation of the GIS layers is presented in Table 4-4. The DCTRA IRWMP benefits from a long-term water level measurement program of key wells in the IRWM planning area. Information from the DCTRA

participating agencies monitoring program is provided to DWR for use in preparation of spring, unconfined aquifer system contour maps which are a routine DWR publication. DCTRA maps are produced from the information, as well, including comparative data between selected years.

The water level database is posted both on the DWR DCTRA websites and allows downloading of compiled hydrographs of key wells in the DCTRA IRWMP area for purposes of graphical display and analysis.

Table 4-4
Contents of GIS Database
Integrated Regional Water Management Plan
Deer Creek and Tule River Authority

Theme	Source	Scale
County Boundary	USGS	1:100,000
Land Use(1)	CA DWR	1:24,000
District Boundaries	DCTRA	Unknown
Urban Areas	TIGER(2)	Varies
Roads	TIGER	Varies
Water Features (arc)	USGS	1:100,000
Water Features (poly)	USGS	1:100,000
Soils (STATSGO)	NRCS(3)	1:250,000
Soil Survey Geographic Database (SSURGO)	NRCS	1:24,000
Precipitation	USGS/NWS	1:1,000,000
Precipitation Stations	NWS	1:1,000,000
Well Sites	CA DWR	Unknown
Wildcat Sites	UC-Davis	Unknown
Aerial Imagery	UC-Davis	N/A
Groundwater Basins	CA DWR	1:250,000
Cal Water Watersheds	CA DWR	1:24,000
Public Land Survey (sec)	CA DWR	1:100,000
Public Land Survey (t/r)	DCTRA	1:100,000
Elevation	USGS	1:24,000
Topographic Map	USGS	1:100,000
Topographic Map	USGS	1:250,000
Bovine Operations	Tulare County	Various
Poultry Operations	Tulare County	Various
Goat Operations	Tulare County	Various
Swine operations	Tulare County	Various
Dairy Operations	Tulare County	Various

(1) Land use data available from Tulare County for several years
(2) TIGER: United States Census Bureau TIGER file
(3) NRCS: Natural Resources Conservation Service

4.9.1 AQUIFER CHARACTERISTICS

4.9.1.1 Availability of Data

Hydrogeologic parameters of the aquifers and aquitards in the DCTRA IRWMP planning area include average specific yield values for the upper 200 feet of sediments and numerical values of transmissivity, hydraulic conductivity and specific capacity. For the most part, reliable coefficients of aquifer storage (storativity) can only be generated from controlled pumping tests with observation wells; few such data exist within the IRWMP boundaries and fewer yet with any recent drought vintage history.

Regional aquifer system numerical properties can be found in reports by Bertoldi et al. (1991), which provides average hydraulic conductivity values and storage coefficients for the entire Central (San Joaquin) Valley. For the most part, such data provide a broad range of aquifer numerical values that can be used for comparative purposes only. Within the DCTRA, focused studies at the Woodville and Tea Pot Dome Landfill Sites for Lower Tule River Irrigation District canal lining, for aggregate mining applications and studies of the adjacent Tule Basin area (Naugle, 2001) provide a more applicable and narrower range of aquifer parameters. Harter (2002) also analyzed Southern California Edison (SCE) data (efficiency tests) for several hundred wells within the Tule and Kaweah River Basins and converted well-specific capacity data (typically based on a 1-hour pump test) to transmissivity using a conversion factor of 1,500 (Driscoll, 1987).

For purposes of calculating the seasonal volumes of subsurface groundwater flow within the IRWMP boundaries, the aquifer parameter of interest is that of horizontal hydraulic conductivity, typically expressed in feet per

day (ft/day) or gallons per day per square foot (gpd/ft^2). For an area as large as the IRWMP, which contains a heterogeneous mixture of aquifers, aquitards and aquicludes, the published values fall within several orders of magnitude (particularly considering the aquitard deposits). A summary of reference hydraulic conductivity values (or permeability) is provided in Table 4-5 - Summary of Aquifer Hydraulic Conductivity Values.

Table 4-5
Summary of Aquifer Hydraulic Conductivity Values
Integrated Regional Water Management Plan
Deer Creek and Tule River Authority

Reference	**Aquifer System**	**Representative Horizontal Hydraulic Conductivity Values (gpd/ft^2)**
CH2M Hill/Fugro West, Inc. (in Dames & Moore, 1999)	Semiconfined	750
Naugle (2001)	Alluvial unconfined Continental deposits, confined	70 to 1,000 7 to 80
Croft & Gordon (USGS, 1968)	Alluvial unconfined Continental deposits, confined	10 to 100 1 to 270
Alta Irrigation District Groundwater Model (Kings River Conservation District, 1992)	Semiconfined aquifer	80 to 1,270
USGS Central Valley Model (Bertoldi et al. 1991)	Confined aquifer	About 20
Ludorff & Scalmanini (in Jones & Stokes, 1997)	Alluvial unconfined	15 to 20
Schmidt (1994)	Semiconfined	10 to 200
Harter (2002)	Unconfined to Confined	1 to 750
Southern California Edison (July 2002)	Unconfined to Confined	About 100 to 1,000

As indicated in Table 4-5, the horizontal hydraulic conductivity values range from about 1 gpd/ft^2 for the confined aquifer found in hydrologic units west of U.S. Highway 99 to as high as 1,000 gpd/ft^2 in the easterly part of the IRWMP area. The published values are clearly gross estimates of this aquifer parameter.

Specific yield volumes for the DCTRA IRWMP area range from about 6.5 to as high as 13.7 percent. Calculations of the annual changes of groundwater in storage under the IRWMP planning area rely on these values. Estimates of the *total* volumes of groundwater in storage were similarly based on work by Davis, weighted according to the thickness and distribution of aquifers and aquitards throughout the DCTRA planning area. The application of such "average" values is considered an approximation only.

4.9.1.2 Aquifer Numerical Values

Most wells within the DCTRA member agency water level measurement program provide excellent records of both Spring and Fall water level conditions and many contain measurements that extend back to the 1950s.

Harter, in work published by the University of California – Davis, as part of the Tule River Basin groundwater model development, provides some distinction between unconfined and confined water elevation surfaces within the Tule River Basin. The basis for such separation and which wells were used for contouring is not clearly detailed. The work also notes that it was found that many of the wells measured drew from more than one aquifer system and water level measurements therein reflected a composite of the water levels. As noted by Bertoldi et al. (1991), the regional groundwater flow pattern in the Central Valley is strongly influenced by numerous clay and silt lenses. Two (2) concepts of flow are advanced that apply to the DCTRA IRWM area. The concepts of flow

consider: 1) an unconfined and confined aquifer system separated by a regional aquitards (such as the Corcoran clay) and 2) a flow system consisting of a single heterogeneous aquifer with varying vertical leakage. The latter concept is accepted to prevail based on the hydraulic response of the aquifers to pumping.

Most wells in the IRWMP boundary west of U.S. Highway 99 penetrate and perforate aquifers above and below the Corcoran clay and provide significant vertical leakage and hydraulic communication, which affects the pattern of groundwater movement and rates of regional recharge and discharge. An example of the significance of such direct leakage and communication between aquifers can be found in Malcolm Pirnie, Inc. (2001). The natural groundwater flow system has also been greatly altered by large-scale diversions and redistribution of surface water and conjunctive use programs.

For that portion of the DCTRA west of U.S. Highway 99, confined and semiconfined groundwater conditions also exist and, to the extent the piezometric surface in the confined aquifer (beneath the “E” clay or Corcoran clay) differs significantly from the unconfined water level surface, the total change of groundwater in storage considers storage changes in the confined (pressure) aquifer. The DWR prepared annual “pressure” system water level maps for the San Joaquin Valley through 1988. Pressure system contours were drawn by the DWR for the area surrounding and north of Corcoran; typically, only several

pressure system contour lines were present for each year in this area. The Tule River Basin groundwater model's database information supports a more or less common water level between the two (2) aquifer systems. Considerable interaquifer groundwater flow must exist between the two (2) systems (via wells with perforations in both systems). Storage change calculations for the unconfined system are accepted as appropriate for both systems and for the purpose of the water balance and perennial yield calculations.

4.9.1.3 Water Level Fluctuations

Specific to the DCTRA, aquifers occur in unconfined and confined states. Water levels in an unconfined aquifer system coincide with the top of the zone of saturation, where hydrostatic pressure is equal to atmospheric pressure. Seasonal water level variations in such systems are typically subdued. In confined or artesian aquifers, waterbearing materials are completely saturated and are overlain by confining materials of low permeability, such as clay and fine silt, and water within the aquifer is under hydrostatic pressure. The hydrostatic head, or pressure, in such an aquifer is reflected by the height above the confining stratum to which water will rise in a well drilled to the aquifer. With the exception of the eastern portion of the IRWMP area, water level variations display some degree of confined aquifer responses.

Because the alluvial and continental deposits in the DCTRA IRWM area are characteristically heterogeneous in composition, containing individual strata

of low permeability that generally exhibit little or no continuity, most aquifer systems are, in fact, semiconfined. Such aquifers respond to pressure changes over short periods of time, but hydrostatic heads reach equilibrium with unconfined water table over extended periods of static, nonpumping conditions.

For the Kaweah River Basin, B&E (1972) provides a discussion of average coefficients of hydraulic conductivity values for “typical” aquifer systems in the KDWCD. These aquifer systems include the younger alluvium and older alluvial deposits associated with Kaweah River fan deposits and continental deposits both above and below the Corcoran clay (E-clay). Average coefficients of horizontal hydraulic conductivity in gpd/ft^2 were derived by B&E from a tabulation of pump test data from various sources including the USGS and from an independent review of SCE pump efficiency or hydraulic efficiency tests for about 200 wells in the KDWCD. The locations of such wells used by B&E are not provided. The USGS data referenced by B&E presumably derive from Croft and Gordon (1968). Aquifer parameter values used to evaluate subsurface flow in both the Kaweah River and Tule River basins are provided below in Table 4-6 – Aquifer Numerical Values.

Table 4-6
Aquifer Numerical Values
Tule River Basin
Integrated Regional Water Management Plan

Basin Area	Aquifer System	Average Thickness of Saturated Aquifer (feet)	Average Coefficient of Permeability (gpd/ft^2)
East	Older alluvium (oxidized)	150	750
	Older alluvium (residual)	50	500
Central	Older alluvium (oxidized)	250	500
	Older alluvium (residual)	250	250
	Younger continental deposits	150	150
	Older continental deposits	800	70
West	Older alluvial deposits	150	250
	Younger continental deposits	150	150
	Older continental deposits	800	70

The values above were used with the KDWCD and Tule River Basin GIS databases to calculate volumes of subsurface flow.

4.10 ECOLOGICAL PROCESSES AND ENVIRONMENTAL RESOURCES

4.10.1 Aquatic Sensitive Species

As the Tule River system is an ephemeral system, no fishery of any type exists in the river system below Success Dam. As the eastern boundary of the DCTRA IRWMP begins near Success Dam, aquatic species are limited to invertebrates inhabiting the River system and the manmade water distribution systems existing on the valley floor. As a part of the DCTRA's prior management of the requirements of the Irrigated Lands Regulatory Program, routine samples have been taken of sediments throughout the IRWMP area and tested for toxicity. While these invertebrate species can tolerate some degree of physical disturbance, they have a very low tolerance for chemical molestation which has generated the need for periodic toxicity testing.

Throughout the entire historical test period extending from July, 2004 to date, a single location within the entire River distributary system has been identified as to having had a toxicity problem effecting invertebrates. It has been tentatively determined that the toxicity occurrence was not as a result of irrigated agriculture operations, but rather roadside herbicide application programs related to the County of Tulare. A study has been submitted to the Regional Water Quality Control Board with respect to the source(s) of the contamination.

4.10.2 Freshwater Habitats

As previously noted, the climate characteristics of the DCTRA IRWMP area are semi-arid. This fact, coupled with the ephemeral stream nature of the Tule River system,

has led to freshwater habitats being virtually non-existant. No significant sand, gravel or hard rock mine areas in their reclamation phase exist to provide the most significant freshwater habitat.

The second form of freshwater habitat which exists within the DCTRA IRWMP area is that related to golf course water hazards. The acreage of these hazards is very small and in some cases, these hazards are dried up in all but wet years due to the cost of the water to place in the hazards, as well as being a Best Management Practice as delineated in a particular area's Urban Water Management Plan.

4.10.3 Areas of Special Biological Significance

A few areas of special biological significance exist within the DCTRA IRWMP area. Notably amongst these is the DCTRA Ponding Basin Area managed by DCTRA. This area is a restoration of an element of the Pacific Flyway for migratory waterfowl. Complimenting that area is the Pixley National Wildlife Management Area owned and managed by the United States. It is a remnant of the dry, upland habitat which existed in the area. It is home to the blunt nosed leopard lizard, the Tipton Kangaroo rat and the giant garter snake.

The area is a critical element in the recovery plan developed by the U.S. Fish and Wildlife Service for each one of those species.

The final example of an area biological significance is the 725 acre J.K. Herbert Wetlands Prairie which is located south of the Tulare-Lindsay Highway owned and maintained by the Sequoia Riverlands Trust. This area is described as a Wetland Prairie

Grassland Habitat which also contains, in the southeastern portion, a number of vernal pools. This area is just to the north of the north boundary of the DCTRA IRWMP Planning area.

4.11 NATURAL HAZARDS REQUIRING EMERGENCY PLANNING

4.11.1 Severe Storms and Flooding

Compared to the balance of the continental United States, the IRWMP area is blessed with few natural disaster based events. Flooding events, however, do occur and are attenuated through two (2) basic management techniques. The first of these is the construction of Success Reservoir and its related dam which has reduced the flooding impact on the Tule River fan to an infrequent and reduced – damage basis. Uncontrolled stream group related flooding, such as occurs during significant rainfall events on the Deer Creek, Frasier Creek, and Lewis Creek watersheds brings rise to the call for assistance from the State Office of Emergency Services coordinated with the like services division of the County of Tulare. The DCTRA member agencies are in alert mode during these events along with the Tule River Association which operates the release of flows to the valley floor natural channel system.

4.11.2 Earthquakes

While the DCTRA IRWMP planning area experiences a periodic ground trembler, there are no identified active faults within the IRWMP boundary. Reliance on the early warning system and post-event notification process of the U.S. Geologic Survey

is the most noted service related to earthquake based events. As with the flood events, emergency steps taken in response to damaging earthquakes would be coordinated through the Office of Emergency Services.

4.11.3 Fire

While the area easterly of the east boundary of the DCTRA IRWMP is subject to fire threat and periodic fires of both human and natural origin, the actual IRWM area sees household and business structure fires and a periodic stacked hay fire. These events are controllable without area-wide catastrophic effects as would be experienced if the area were forested. Services of the County of Tulare through their county based system, as well as the State of California through the CalFire Division are the principal responders for suppression of fires within the area.

4.11.4 Drought

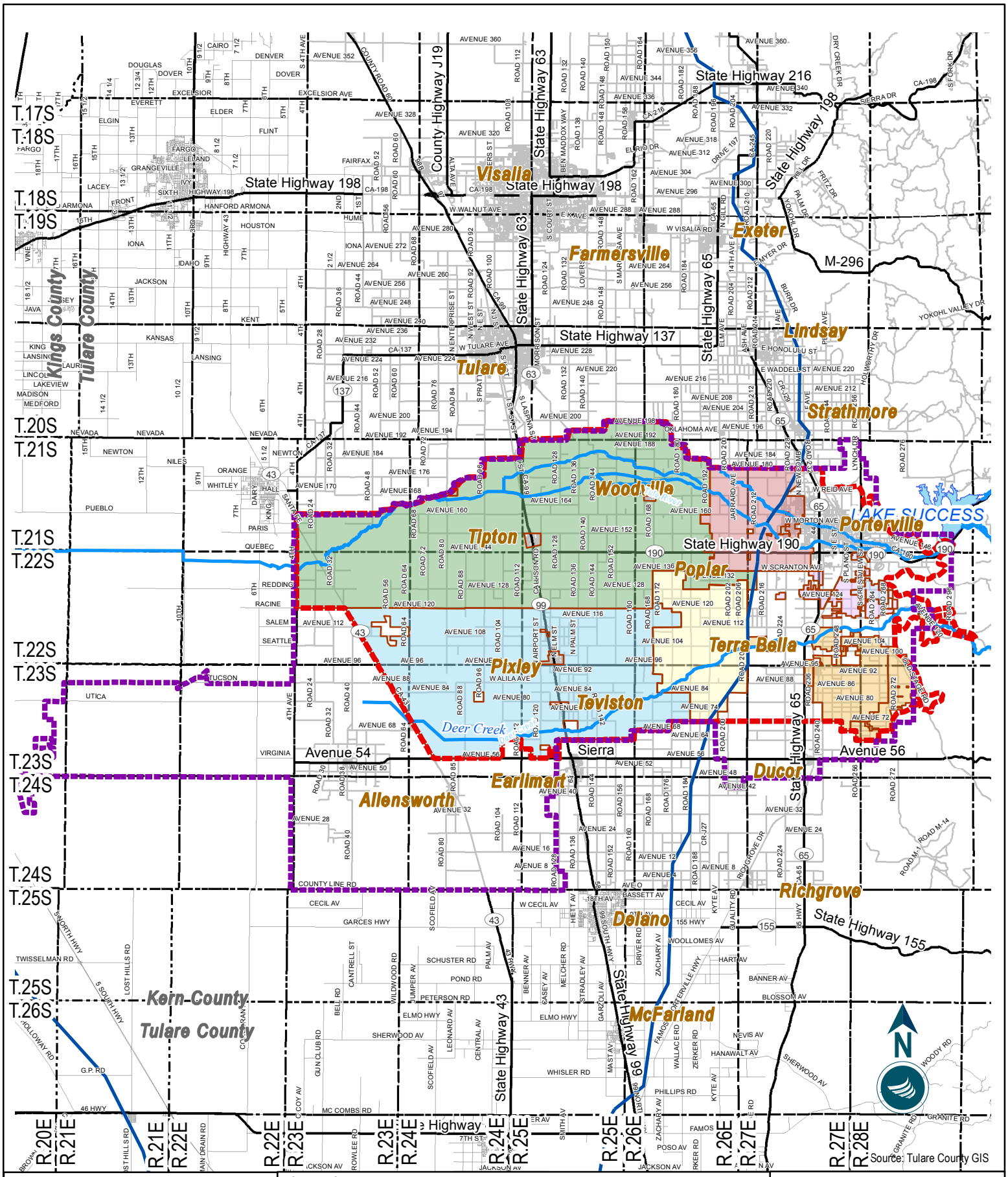
As is currently being demonstrated, the only proactive responders to drought conditions, from a management perspective, are local water management agencies and the County of Tulare. Assistance is provided to the IRWMP service area by several State agencies based on the Governor's declaration of a drought situation. In addition, low interest loan financing for agricultural operations is available. The majority of drought related planning is the advance groundwater recharge efforts which are undertaken by the water management agencies within the IRWMP boundaries seeking to mitigate the

effects of drought by having the maximum volumes of water in storage in the groundwater reservoirs during the drought condition period.

Consideration of lack of surface water supply is typically only taken into account with respect to the individual agricultural operator, as there is no land use planning in the agricultural segment by an agency of jurisdiction which considers the adequacy of water supply as a management consideration.

Only recently and based on invoking State-level legislation, has the issue of adequacy of water supply for subdivision, commercial and industrial development proposals been a consideration. Current requirements call for indication to be given to land use planning decision makers with respect to the adequacy of water supplies for proposed developments, prior to development plan approval.

Instruments currently exist, thought to be of adequate capability, to be incorporated into local groundwater management plans to address water supply adequacy issues during drought conditions. It is only of late that serious discussion has taken place with regard to initiating an evaluation of the adequacy of the base from which groundwater control decisions would be made by local governing agencies. It is specifically for this reason that the DCTRA Board of Directors has embarked on improved methodologies for estimating water use and water balance within the Tule River Basin and look to provide additional information to water users within the Tule River Basin with respect to water use and water balance.



Source: Tulare County GIS

0 1.5 3 6 Miles

4CREEKS

2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

Legend

- IRWM - Tule Region (430,487 Ac.)
- DCTRA Boundary (289,448 Ac.)
- Waterways
- LakeSuccess
- Lower Tule River ID (103,034 Ac.)
- Pixley ID (69,014 Ac.)
- Porterville ID (16,997 Ac.)
- Saucelito ID (19,702 Ac.)
- Tea Pot Dome WD (3,481 Ac.)
- Terra Bella ID (15,053 Ac.)
- Vandalia ID (1,379 Ac.)
- Townships
- Roads

Figure 4-1

IRWM Boundary

Integrated Regional Water Management Plan

CHAPTER 5

HISTORY OF WATER AND WASTEWATER MANAGEMENT

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

5.1 KEY WATER MANAGEMENT MILESTONES

5.1.1 Success Reservoir

Success Reservoir is located on the Tule River about 6 miles east of the City of Porterville. Success Dam, completed in 1961 by the U.S. Army Corps of Engineers (USACOE), provides flood protection and irrigation water storage for downstream water rights holders. The earthfill dam is 142 feet high and has a gross pool elevation of 652.5 feet mean sea level (m.s.l.), originally providing 85,400 acre-feet of storage capacity. Success Reservoir inundated approximately 2,406 acres at gross pool, flooded nearly 3.5 miles of river and had a spillway design flood pool of 202,800 acre-feet.

The Southern California Edison Company and the Pacific Gas and Electric Company each owns and operates a small hydroelectric plant upstream from Success Dam. In addition, the Lower Tule River Irrigation District operates a 1.4 kilowatt hydroelectric power plant which was retrofitted to Success Dam in 1989.

Success Dam was authorized by the 1944 Flood Control Act. The total gross reservoir capacity at construction was 85,440 acre-feet with 700 acre-feet of dead storage 5,000 acre-feet to store sediment. When constructed, the spillway design inflow peak of Success Dam was 200,000 cfs with a spillway design outflow peak of 126,000 cfs.

Efforts have been underway for several years to increase both the flood control capability of the facility and the conservation storage volume.

5.1.2 Friant Division, CVP

In 1933-34, when the State of California could not find enough takers to buy revenue bonds to complete the California Central Valley Project Act, it went to Washington seeking assistance. The passage of the Rivers and Harbors Act of 1935 by the Congress put funding under Federal direction and construction under the USACOE. By order of the President, $20 million was transferred from the Emergency Relief Act Fund to the Department of the Interior, Bureau of Reclamation (Reclamation), for construction of Friant Dam and other initial features on September 10, 1935. The President signed the Act later that year.

Between 1935 and 1940, the population of the San Joaquin Valley exploded: Tulare County increased by 38.4 percent, Kings County by 38.5 percent and Kern County by 63.6 percent. Reacting to a wartime demand, cotton became California's outstanding crop by the mid- 1940s, displacing citrus. The lands of the Friant Division were no different, as cultivating and picking cotton drove each of the four counties' economies.

Almost a half-century later, by the 1990s, approximately 15,000 small farms, averaging 63 acres each, were spread throughout the Friant Division.

Estimated cost of the Friant Dam and Reservoir came in at $14 million, the Friant-Kern Canal came in at $26 million and the Madera Canal was $3 million. The Water Project Authority represented the State of California in negotiations with the Federal Government. In March, 1936, the Authority signed a cooperative agreement with the United States creating three (3) divisions, including Friant, for the Central Valley Project. Six (6) months later, the Authority approved Reclamation's prospective location of the Friant Dam and the Bureau's design of the dam and canals. Central Valley Project legislation was reauthorized as the Rivers and Harbors Act of 1937. Along with Friant Dam and the Friant-Kern and Madera Canals, initial major features authorized were Shasta and Keswick Dams, the Tracy Pumping Plant and the Delta-Mendota Canal. The amendment transferred a $12 million authorization from the 1935 Rivers and Harbors Act earmarked for flood control and navigation to Department of the Interior. More importantly, the 1937 Act placed the CVP under Reclamation law. Additional funding under the Rivers and Harbors Act of 1940 allowed for improvement of certain rivers and harbors in the interest of national defense.

To capture and control the San Joaquin River, Reclamation, in the mid- 1930s, designed a straight, 319-foot high concrete gravity dam that would have impounded a half-million acre-feet of flows from the River. The first surveys for the Friant Dam commenced in November 1935 and studies of where to excavate for two (2) delivery canals followed in early 1936.

Because of the dual complexities of moving water from one watershed to another and diverting the natural flow of the San Joaquin, a number of water rights claims had to be settled before construction progressed. California water law provides for riparian rights entitling a land owner on a stream to the full beneficial use of the stream's natural flow. Reclamation could not divert water away from a stream until it settled the question of downstream water rights. Reclamation settled negotiations with the holders of the largest water rights claims on the San Joaquin in the spring of 1939.

Friant Dam was located on the San Joaquin River, 25 miles northeast of Fresno, California. Completed in 1942, the dam is a concrete gravity structure, 319 feet high, with a crest length of 3,488 feet. The dam controls the San Joaquin River flows, provides downstream releases to meet requirements above Mendota Pool and provides flood control, conservation storage and diversion into the Madera and Friant-Kern Canals. It allows for delivery of water to a million acres of agricultural land in Fresno, Kern, Madera and Tulare Counties in the San Joaquin Valley. The reservoir, Millerton Lake, first stored water on February 21, 1944. It has a total capacity of 520,528 acre-feet, a surface area of 4,900 acres and the River is inundated at full storage for approximately 15 miles long. The amount of flood control storage space is dictated by a USACOE Reservoir Regulation Manual.

In the Friant Division, there are three (3) separate river and canal outlets: the river outlet works, the Friant-Kern Canal and the Madera Canal. The river outlet works consist of four (4) 110-inch-diameter steel pipes through Friant Dam that are controlled by four (4) 96-inch-diameter hollow-jet valves at the outlet ends. The valves release water down

a chute and into a stilling basin, which dissipates the water's energy. The capacity of the four (4) hollow-jet valves is 16,400 cfs, however, prior to discharge of Settlement Flows, the flow through the valves seldom exceeded 100 cfs. Small releases to the River flow through two (2) 24-inch-diameter steel pipes branching from Penstocks 3 and 4. Releases are controlled by two (2) 18-inch-diameter needle valves at the outlet ends.

The Friant-Kern Canal carries water over 151.8 miles in a southerly direction from Millerton Lake to the Kern River, four (4) miles west of Bakersfield. The water is used for supplemental and new irrigation supplies in Fresno, Tulare and Kern Counties. Construction of the canal began in 1945 and was completed in 1951. The canal has an initial capacity of 5,000 cubic feet per second that gradually decreases to 2,000 cubic feet per second at its terminus in the Kern River.

More than 350 overhead and underground telephone lines, telegraph lines, power lines, and oil and gas lines were moved to higher elevations or relocated during construction of the Friant-Kern Canal. Heavy crawler tractors and bulldozers that were equipped with attachments to cut roots below the surface burrowed through vineyards and orchards. Along a 113-mile reach between the dam and the White River, more than 500 different structures, including overchutes, drainage inlets, irrigation crossings and turnouts were built. During construction, placement of concrete lining was aided by the use of a traveling gantry. Almost 85 percent of the canal is concrete-lined. In those sections, the canal's maximum top width is 128 feet, decreasing to a bottom width of 24 feet, with water depth dropping from 19.9 to 11 feet. In the earth-lined sections, water depth varies and the canal bottom width ranges from 64 to 40 feet.

5.1.3 State Water Project

The California State Water Project, commonly known as the SWP, is a state water management project under the supervision of the California Department of Water Resources (DWR). The SWP is the world's largest publicly built and operated water and power development and conveyance system. It provides water for drinking purposes to more than 23 million people and generates an average of 6.5 MWh of hydroelectricity annually. It is also the largest single consumer of power in the State with a net usage of 5.1 MWh.

The SWP collects water from the Feather River in Northern California and conveys it to water scarce, but populous areas to the south through a network of aqueducts, pumping stations and power plants. Approximately 70 percent of the water provided by the SWP is used for urban areas and industry in the Southern California and the San Francisco Bay areas. The remaining 30 percent is used for irrigation in the Central Valley and the Central Coastal Range. The SWP shares several facilities with the Federal CVP. Water is often interchanged between SWP and CVP facilities, as needed, to meet peak requirements for the separate project constituents.

With construction beginning in 1960, the SWP required the construction of 21 dams and more than 700 miles of canals, pipelines and tunnels. To date, the SWP has only delivered an average of 2.4 million acre-feet annually, as compared to total contractual entitlements of 4.23 million acre-feet. Environmental concerns caused by the

dry-season removal of water from the Sacramento-San Joaquin Rivers Delta have often led to further reductions in water delivery declarations.

In development for a number of years, ground was broken for Oroville Dam in 1961 and, in 1963, work began on the California Aqueduct and San Luis Reservoir. First deliveries to the South Bay area were made in 1962 with irrigation deliveries to the San Joaquin Valley by 1968. In 1973, the pumps and East and West branches of the California Aqueduct were completed and the first water delivered to Southern California. A Peripheral Canal which would have carried SWP water around the Sacramento-San Joaquin Rivers Delta, was rejected in 1982 by voters due to a combination of environmental and economic concerns. The Coastal branch was completed in 1997.

5.2 HISTORY OF WASTEWATER MANAGEMENT

5.2.1 Cities

In the late 1940s and early 1950s, population concentrations and single-family residential adjacencies worked to create a basis for review of use of septic tanks and subterranean disposal systems for the purpose of wastewater treatment and disposal. The primary agency of jurisdiction during the decade plus of initial planning was the Department of Public Health of the State of California. The agency acted in an advisory and assistance role to bring about elimination of adverse contamination situations and, to a minor extent, the avoidance of new conditions of that type. Initial treatment processes utilized were typically primary in nature, with the majority employing Imhoff Tanks and ponding prior to either land spreading or discharge to adjacent waterways. The

construction of collection systems associated with these treatment and disposal facilities were the primary objective as they conveyed sanitary sewerage and commercial wastewaters away from the sources of domestic supply which were predominantly individual groundwater extraction wells or small, stock mutual water companies. Groundwater levels, for the most part, were shallow with many individual wells being point driven, in lieu of being drilled. If sanitary seals existed, they were almost exclusively of the surface type. Both drinking water facilities and subterranean effluent disposal facilities were frequently subjected to inundation and saturation due to surface flood flows which occurred frequently during the winter months due to the concentration of housing along waterways and the lack of any storm or flood management capability.

Over time, these facilities began to be modified due to increased population and related connections. The water source orientation of the Department of Public Health was replaced with the pollution prevention and beneficial use protection orientation of the State Water Resources Control Board and its associated Regional Water Quality Control Boards. Staffing of the RWQCB was very limited into the middle 1970s with the Fresno office of the RWQCB having three (3) engineers on staff covering an area from Merced County south through Kern County and from the coast range to the Sierra Nevadas. Introduction of objective standards and enforcement provisions embodied in waste discharge orders continued to take shape over time, bringing about changes in treatment methodologies which were utilized, curtailment of discharges to surface water bodies and brought the requirement and necessity for trained and experienced operators.

Availability of supplemental grant funding, beginning with Federal Public Law programs such as PL92-500 and supplemented with State grant funds, brought about an era of construction of treatment and disposal facilities not paralleled in any other time frame. In many cases, entities were able to secure funding for up to 97.5 percent of a total project's cost.

In addition to facilities planning, location planning also took a more prominent position beginning in the late 1970s. Facilities were located at a greater distance downslope from the city and/or community which they served in order to allow for growth between the population center and the treatment facilities. In some cases, this location was due to odor, fly and vector concerns which were all appurtenant to treatment and disposal facilities and their related operational procedures during this period of time. Over time, increased concern with respect to groundwater quality and receiving water quality has brought about improved treatment facilities, drastically altered facilities and procedures related to solids handling and disposal and the virtual elimination of discharge to receiving waters. In most cases, treated effluent is totally reused and put to beneficial use, in lieu of pumping groundwater.

This history applies to the City of Porterville, located within the Integrated Regional Water Management Plan (IRWMP) area of the Deer Creek and Tule River Authority (DCTRA). Advanced secondary facilities now serve the city as well as unincorporated communities of Poplar, Woodville, Pixley and Tipton. Planning is underway for the unincorporated community of Plainview.

5.2.2 Rural Areas

Paralleling the activities the City of Porterville, aggregations of houses and related commercial and industrial activities in the smaller unincorporated communities within the IRWMP planning area have followed suit with the lead agency being the County of Tulare. Treatment and disposal facilities were constructed beginning in the early 1950s which have been modestly upgraded since that time. Qualified operational personnel are now a matter of fact, as is the relationship with the RWQCB with its related Waste Discharge Requirements. The facilities associated with these rural communities have been upgraded and enlarged on a much less frequent basis than the City of Porterville due, in large part, to the fact that most of the population growth has been directed to cities within the County of Tulare. In some cases, the lack of size, but with adverse water quality issues to address, has brought rise to the County of Tulare constructing and operating facilities to the benefit of the residents of certain areas. The economics of these installations and of the dischargers is such that, however, the costs are currently being subsidized by the Tulare County General Fund, with costs reflecting the lack of economy of scale existing at either the community or larger special district operated systems level. At the current time, each of these systems is in compliance with the applicable orders which have been adopted governing both operational and discharge issues.

5.3 HISTORY OF INTEGRATED REGIONAL WATER RESOURCE MANAGEMENT

5.3.1 Interagency Planning and Integrated Water Supply Development

As introduced in Chapter 2 of this IRWMP, a significant level of cooperation, planning and joint water management exists. Many of the agreements which are in place call for routine meetings to take place, both of staff as well as of elected officials and adequately funded budgets accompany each of these efforts. As the current drought situation is adequately demonstrating, the prominent position of water management of multiple types is front and center to parties such as elected officials, financing institutions, commercial and residential property developers and businesses looking to locate to or expand into the IRWMP planning area. As also discussed in Chapter 2, these efforts have been ongoing for decades and were not originally developed in an attempt to secure any available funding stream, but rather were constructed during a time when virtually no funds were available for water infrastructure development and local individuals felt that that paradigm was not going to change in the near-term. They proceeded to generate their own policies, procedures and efforts to implement structured water management within the IRWMP area. The same basis existed with respect to facilities construction with only those facilities related to flood control being funded by parties outside of the area.

With respect to the development of facilities related to the availability of water from the San Joaquin River through the Friant Division of the CVP, significant debt was incurred by the property owners at the time when those contracts were signed. Now,

some 60-70 years later, those debt instruments have been retired and new debt instruments are being generated as a result of the original infrastructure coming to the end of its useful life. Based on the critical nature of imported water supplies to the area, almost all elections to date to increase both land based assessments, and water based assessments pursuant to the implementing provisions of Proposition 218, have successfully passed providing a basis for development of adequate infrastructure in order to be able to enjoy the benefits of the imported water supply extending forward into the future.

5.3.2 Integrated Management of Resources and Operational Systems

As a result of costs associated with experienced personnel and, in some cases State licensed personnel, sharing of services is a routine matter, particularly with respect to the operations of many of the medium and small sized utilities. The cost of equipment and the proper maintenance of same has led to multiple sharing agreements wherein items of equipment such as sewer line cleaning machines, generators, backhoes and dump trucks are commonly shared between two (2) or more public agencies in order to have the equipment available, without the impact of having to bear the full cost by each agency.

Licensed operators, once solely dedicated to a single facility, now are being shared between facilities with several conducting ongoing education and experience programs in order to increase the number of operational personnel which are available.

A recent area of growth related to shared services is that associated with technology. Use of electricians experienced with the more sophisticated water pumping

systems which are currently being installed, experienced machinists maintaining sophisticated metering equipment, cogeneration equipment and even in some cases, disinfection equipment, are significantly more common in recent years. The information technology segment exemplifies the most extreme of these situations wherein drastic changes have occurred in billing systems, accounting systems and human resources related systems, each of which is associated with software and hardware of varying generations, but moving toward obsolescence over time. Sharing of expertise with respect to each of these systems is increasingly common amongst the water management agencies within the IRWMP area.

5.3.3 Integrated Management of Emergency Operations

Often led by management personnel of special districts or designated personnel at the County level, coordinated operations plans and agreements have been put into place with numerous agencies. Inventories of available equipment distinctly associated with each entity are shared so that each party is fully informed of the resources which are available and, in many cases, interagency cooperating agreements have been put into place, for the most part, to ensure priority to access emergency pooled equipment in the event of an emergency or disaster situation. Most of these agreements exist outside of structured emergency services coordinators which exist at both the County and State levels. The resources available to these entities are also tracked, but are supplemental to the local resources, in most cases.

5.3.4 Interagency Adaptive Management Response to Changing Circumstances

The recently completed Friant Division, CVP contract assignment process resulted in resource exchanges. Assignment of a portion of Tea Pot Dome Water District's Friant Division, CVP contract supply to Saucelito Irrigation District was accomplished. This supply is valuable to the Saucelito Irrigation District as one of its purposes is groundwater recharge and both the timing and cost associated with retaining surface supplies in the area are in keeping with the financial capabilities of the Saucelito Irrigation District to maintain those importation efforts.

The circumstances which brought about assignments are definitive. Impacts related to San Joaquin River Restoration, decreasing groundwater availability conditions and augmentation of dry year supplies were major factors in the TPDWD/SID assignment. It is a given that additional interagency efforts will be pursued in the future and like that referenced here, will have their own set of special circumstances bringing the parties together for joint benefit outcomes.

CHAPTER 6

RESPONSIBLE ENTITIES, MAJOR INFRASTRUCTURE AND WATER SUPPLIES

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

6.1 WATER SERVICE PROVIDERS

6.1.1 Domestic Water Service Providers

Based on the geographic coverage of the Integrated Regional Water Management Plan (IRWMP) of the Deer Creek and Tule River Authority (DCTRA), there are numerous providers of domestic water service within the IRWMP area. The nature of these providers varies from municipal agencies to special districts to private stock mutual water companies to for-profit corporations.

Listed in Table 6-1 are the potable system water suppliers including the municipal supplier, the special district providers, the mutual water companies and the for-profit corporations. In each of these cases, the noted suppliers operate under permit

TABLE 6-1
POTABLE SYSTEM WATER SUPPLIERS
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

SYSTEM OPERATOR	SERVICE AREA
Akin Water Company	South Porterville
Alta Vista Mobile Home Park	East Porterville
Beverly Grand Mutual Water Company	Porterville
Big Stump Trailer Park	South Porterville
California Water Service Company	East Porterville
Central Mutual Water Company	South Porterville
Deer Creek RV Park	Highway 65 at Deer Creek
East Plano Mutual Water Company	South Porterville
East Vandalia Water Company	South Porterville
Fairway Tract Mutual Water Company	East Porterville
Friends RV Park	Terra Bella
Grandview Gardens Mutual Water Company	Porterville
Golden Key Apartments	Porterville
LA Homeowners Water System	East Porterville
Lakeside Trailer Park	East Porterville
Lindsay-Strathmore Irrigation District	Rural Strathmore
Mt. View Duplexes	East Porterville
Mullen Water Company	South Porterville
Pixley Public Utility District	Pixley
Plainview Mutual Water Company (includes Central Water Company)	Plainview
City of Porterville	Porterville
Porterville Developmental Center	State Facility
Poplar Community Services District	Poplar
Porterville Trailer Park	South Porterville
Shady Grove Mobile Home Park	South Porterville
Shiloh Water Company	Porterville (island)
Sierra Mutual Water Company	South Porterville
Spiegelberg Water Company	South Porterville
Strathmore Public Utility District	Strathmore
Sunny Acres Water System	North Porterville
Tea Pot Dome Water Company	South Porterville
Terra Bella Irrigation District	Terra Bella
Teviston Community Services District	Teviston
Tipton Community Services District	Tipton
Williams Mutual Water Company	Cotton Center
Woodville Farm Labor Center	Labor Center
Woodville Public Utility District	Woodville

from the State of California, State Water Resources Control Board, Division of Drinking Water. Corporations have to address agency related issues for their water supply permit and the California Public Utilities Commission for their financial affairs and rates. The same is true of the private stock mutual water companies.

6.1.2 Irrigation Water Suppliers

As is the case with the domestic water suppliers, there are a myriad of entity types providing irrigation water. Some are public agencies and some are private stock mutual corporations. In the case of the private stock mutual, they are governed by their stockholders, however, are potentially subject to the payment of both State and Federal income taxes for profits gained as a result of the company operations. In some cases, private stock mutual corporations hold water rights directly and in others, hold water rights through an overlying mechanism, such as an association. Further, within the DCTRA IRWMP area, entities hold water rights on a pre-1914 basis to waters of the Tule River and/or have contractual rights to water made available through a contract with the United States for Central Valley Project water through the Friant Division. In addition, the Strathmore Public Utility District is a subcontractor to the County of Tulare for water made available in the Sacramento- San Joaquin Rivers Delta which is exchanged into the area by virtue of the County's interest in the Cross Valley Canal.

Presented in Table 6-2 are the California Irrigation Districts, in Table 6-3 are the California Water Districts and in Table 6-4 are the mutual stock entities. Deer Creek diverters by SWRCB license number are presented in Table 6-5.

TABLE 6-2
CALIFORNIA IRRIGATION DISTRICTS
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Lower Tule River Irrigation District
Pixley Irrigation District
Porterville Irrigation District
Saucelito Irrigation District
Terra Bella Irrigation District

TABLE 6-3
CALIFORNIA WATER DISTRICTS
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Angiola Water District
Tea Pot Dome Water District
Vandalia Water District

TABLE 6-4
TULE RIVER MUTUAL STOCK ENTITIES
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Pioneer Water Company
Porter Slough/Porter Slough Ditch Company (1)
Campbell-Moreland Ditch Company
Vandalia Ditch Company
Poplar Ditch Company
Hubbs-Miner Ditch Company
Gillian-McGee Ditch Company
Rhodes-Fine Ditch Company
Woods-Central Ditch Company
Downstream Kaweah and Tule Rivers Association (2)

1. Diverted at Boyston weir.
2. Not a mutual stock entity.

TABLE 6-5
LICENSED DIVERTERS FROM DEER CREEK
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

DIVERTER	LICENSE NUMBER
J.G. Boswell Company	SO10809
Angiola Water Company	SO10676
Alpaugh Irrigation District	SO11055
Atwell Island Water District	SO11056

6.1.3 Recreational Pools

As a part of the operations of both Terminus Reservoir and Success Reservoir, provision has been made for a portion of the conservation storage space to be assigned to a recreation pool designation. Water necessary to maintain each pool against evaporation losses is provided from the water rights held by the County of Tulare. While an in-depth presentation of current water rights is not an element of this IRWMP, the use of the County's rights for maintenance of these recreation pools is noted to be from rights which they hold which are of a pre-1914 nature. For the interested reader, the County of Tulare has previously directed the preparation of a water rights inventory detailing their contractual and river related rights, a copy of which can be obtained from the County.

6.2 OTHER WATER MANAGEMENT AGENCIES

6.2.1 Downstream Kaweah and Tule Rivers Association

The Downstream Kaweah and Tule Rivers Association is an unincorporated association which is a signator party to the Tule River Water Diversion Schedule and Storage Agreement. The Association represents the following parties, all of whom are located west of Range 24 East, Mount Diablo Basin and Meridian:

Entity	Type
Bayou Vista Ditch Company	Mutual Water Company
J.G. Boswell Co.	California Corporation
Gates – Jones Mutual Water Company	Mutual Water Company
Kings County Canal Company	Mutual Water Company
Liberty Farms Mutual Water Company	Mutual Water Company
Wayne Murray and Virgina Lee Murray	Husband and Wife
Salyer Land Co.	California Corporation
South Lake Farms	California Corporation
Tulare Lake Basin Water Storage District	Public Corporation
Tulare Lake Water Company	Mutual Water Company
Tule River Feed Lot, Inc.	California Corporation
Andy Wheat and Lillie Wheat	Individuals

6.2.2 County of Tulare

In addition to the referenced pre-1914 water rights held by the County of Tulare on both the Kaweah River as well as the Tule River, the County also plays separate water management roles. The first of these is acting in a master contract capacity for 5,309 acre-feet annually of CVP water supply made available in the Sacramento-San Joaquin Rivers Delta which is allocated entirely to subcontractors within the County. All of these subcontract assignments are permanent in nature, with exception of an allocation of 100 acre-feet annually which is temporarily assigned to the Saucelito

Irrigation District. The County retains the conveyance rights in the Cross Valley Canal associated with this supply. The County is in the process of working with the U.S. Bureau of Reclamation (Reclamation) to permanently assign the subcontracted quantities on a permanent basis. The County would then withdraw from its contract position and each subcontractor would become a long-term contractor directly with Reclamation.

In addition, the County also acts in a role where they have worked to provide water supply, for domestic purposes, to specific disadvantaged rural areas. To date, none of these areas are located within the DCTRA IRWMP planning area. The County is playing a role in providing emergency water supply and shower facilities in the drought impacted area of East Porterville.

6.2.3 County of Kings

While not a direct player within the DCTRA IRWMP planning area, the County of Kings nonetheless performs a function which impacts water management within the IRWMP boundaries. Acting as a lead agency in the holding of contract water rights with the State of California, Department of Water Resources for State Water Project (SWP) supply, the County acts in an important position with respect to imported water. Groundwater conditions within the DCTRA IRWMP boundaries improved markedly with deliveries of water to the SWP service area westerly of the IRWMP boundary, bolstering the declining water levels in that area and thus retarded the outflow of groundwater from the IRWMP region to the west. This trend is now

being reversed as the historical levels of entitlement have ceased to be made available to the County for delivery due to a myriad of conditions ranging from water quality to endangered species to drought. It remains to be seen whether or not historical delivery levels can ever be achieved again and to what extent the groundwater underlying the IRWMP boundaries are impacted.

6.2.4 Friant Water Authority

At the time of the development of the Friant Division, CVP by the United States, the operation of Millerton Reservoir and the Friant-Kern Canal were conducted by Reclamation. Based on policy directives generated by the federal government, and incorporated into the mission statement of Reclamation, private parties were sought out to take over the operation of federal facilities with the United States maintaining ownership. In the case of the Friant Division, the long-term contractors elected to form an organization specifically to contract for and deliver the administrative and operational functions associated with the operation of the canal and its related control facilities. The initial assumption of the Federal position was by the Friant Water Users Authority with the current organization, Friant Water Authority, being the successor organization. Under this paradigm, Friant Division, CVP contractors have a direct relationship with the Friant Water Authority for day-to-day operations of the canal and the Friant Water Authority has the day-to-day relationship with Reclamation. Reclamation continues to operate the Millerton facilities. A separate Authority has been

formed by the Madera Irrigation District and the Chowchilla Water District to perform a similar function relative to the Madera Canal.

6.3 WASTEWATER SERVICE PROVIDERS

6.3.1 City Wastewater System

In a different fashion than a provision of domestic, commercial and industrial water supplies, the wastewater treatment and disposal facilities serving the City of Porterville located within the IRWMP area, are operated by the City. In some cases, additional permits have been issued by the RWQCB for reclamation of treated effluent by individual parties acting under contract with the City for acceptance of treated wastewater for reclamation purposes. As detailed in Chapter 5 related to the history of wastewater systems development within the IRWMP area, these facilities are under regulation of the RWQCB and are of the advanced secondary treatment type. In the City's case, the collection system serving is also owned by the City and operated and maintained by their permanent staff.

6.3.2 Rural Wastewater Systems

Several wastewater collection, treatment and disposal systems exist within the IRWMP area. The Pixley Public Utility District, Poplar Community Service District, Strathmore Public Utility District, Woodville Public Utility District and the Woodville Farm Labor Camp facility of the Tulare County Housing Authority are the principal systems in this category. In many cases, areas outside of the principal service areas have been tied in with municipal systems based on multiple considerations,

including economic and staffing considerations. These areas include the East Porterville area served by the Porter Vista Public Utility District and the Porterville Developmental Center. The balance of the areas are on individual treatment and disposal systems, for the most part in the form of septic tanks and leach fields.

6.3.3 County-operated Wastewater Systems

The County of Tulare operates a number of collection, treatment and disposal systems within the County. Among these systems, the system serving the community of Terra Bella, in the form of the Terra Bella Sewer Maintenance District, is administered by the County. Financial and day-to-day administrative duties are performed by County personnel, while field operations are performed under contract by a for-profit licensed operator.

6.4 MAJOR INFRASTRUCTURE

6.4.1 Surface Water Storage Facilities and Associated Distribution Systems

The principal storage facility available to water rights holders within the DCTRA IRWMP area is Lake Success. Impounded by Success Dam, this facility allows for conservation storage beginning with a ramp up period in March of each year and extending to full storage by May 1. The entire reservoir storage is available for conservation purposes from that date until November 1 of each year. Beginning November 1, the flood control diagram goes into effect and storage operations are at the direction of the U.S. Army Corps of Engineers. Significant coordination exists

between said entity and the water rights holders, along with officials representing the City of Porterville and landowners in the Tulare Lake bed.

Winter storage is a function of the watershed rainfall index with the available winter irrigation water storage capped at 7,300 acre-feet, except as allowed by the U.S. Army Corps of Engineers. At times, encroachment into flood space is allowed if lack of rainfall and snow accumulation dominate, with the capability to take the reservoir down to approximately 6,540 acre-feet in anticipation of extreme run-off conditions. Additional storage is provided within the IRWMP planning area and certain identified basin facilities of water rights holders and in projects which are currently under construction.

The Lower Tule River Irrigation District (LTRID) has incorporated balancing and regulating reservoirs into their system. These basins also function as groundwater recharge basins. LTRID recently undertook expansion of operational flexibility on in the form of interties between principal system branches.

Numerous other surface water entitlement holders within the IRWMP boundaries have small balancing basins which also act as groundwater recharge facilities. The volume of water retained/detained on these sites is modest, as recapture for downstream irrigation deliveries is sought to be accomplished by gravity, eliminating the consumption of power associated with pumping for water supply retrieval.

A complex and extensive distribution network exists for delivery of accrued entitlement waters and purchased waters for import. This network also drafts supplies

from the Friant-Kern Canal for contract holders within the IRWM area. A schematic of the surface water diversion and delivery system is presented on Figure 6-1. As can be seen from an examination of Figure 6-1, flows can be intercepted for delivery from controlled sources such as the Friant-Kern Canal and Lake Success, but the delivery system also has the capability to intercept flows from unregulated sources such as Deer Creek for delivery for beneficial purposes. This includes diversion into delivery systems for further diversion into groundwater recharge facilities whenever crop demands are unable to utilize all of the available supply.

As a final storage and distribution element, a few of the local urban and rural unincorporated community storm drain basins have been retrofitted with recovery pumps. In addition to being able to allow for recharge of storm water runoff to the benefit of the groundwater reservoir, in certain locations, water can be recovered from these basin facilities and put to immediate beneficial use in assisting to meet on-farm demands. Where this recovery capability exists, it is appurtenant to a surface water delivery system either under control of a public agency surface water delivery entity, or a private stock mutual ditch company.

6.4.2 Flood Control Infrastructure

The flood control infrastructure within the DCTRA IRWMP area consists of two (2) principal components. The first of these is the stream groups component, of which the previously detailed Success Dam and Lake Success are the principal components. The second component is channel capacity. One of DCTRA member units' principal responsibilities is maintenance of channel capacity of a number of the

natural channels within the Tule River Basin. These waterways are integral to storm and flood waters management, both to reduce damage, as well as to optimize supply for recharge. For the most part, the maintenance activities are directed at maintaining channel capacity, eliminating interfering sediments and plant growth below the 50 percent depth of flow line, allowing flows to go further downstream. At that point, they are either available for diversion for beneficial use, or proceed to the Tulare Lake Bed for storage until they can be retrieved for beneficial use. Long-term management of the uncontrolled stream groups has brought about diversion of these channels into other facilities for purposes of beneficial use. Deer Creek flows, for instance, are diverted into the intake system of the Pixley Irrigation District where they are diverted for satisfaction of crop demand, or placed in groundwater recharge basins allowing the water to percolate to the groundwater reservoir for beneficial uses of enhancement of the available supply and increased elevation of the water level, thus reducing extraction related power costs.

In rural unincorporated communities and in the City of Porterville, discharges of stormwater to natural channels are augmented by storm water basins which are of both the detention and retention type. In some cases, storm waters are placed into basins to retain them where they are later vacated from the basins, over time, by the combined effects of recharge and evaporation. In other cases, the waters are detained until they are displaced into an adjacent channel regaining the stormwater capacity of the subject basin.

Facilities of this type also exist within the IRWMP area associated with the roads and highways system. CalTrans has numerous basins within the area to which they discharge highway and freeway accumulated waters to direct them away from the highway environment for safety purposes. Likewise, in certain locals, the county roadway systems employ like basins where they receive water removed from county roadway environments, both for purposes of public safety and to extend the useful life of the associated roadway. In almost all cases, these roadway associated storm water basins are of the retention type where the waters are not removed from the basin by any man-based action.

Another flood water associated vehicle which is in place within the DCTRA IRWMP area is the Warren Act Contract of Reclamation District No. 770. This contract is currently an annual contract between said reclamation district and Reclamation wherein waters which have been classified as damaging flood waters can be placed into the Friant-Kern Canal for delivery downstream to parties willing to accept said waters and put same to beneficial use. As the water rights subject to this removal from the Tule River Basin are those of the Downstream Association, their decision to pump these waters triggers the process and confirms that all beneficial uses within the Tule River Basin have been satisfied that can be satisfied by a river diversion. Adjustments are included in the Warren Act Contract to compensate diverters from the Friant-Kern Canal for damages to groundwater recharge facilities if they are diverting for recharge purposes or compensation for increased treatment costs if a downstream contractor is diverting for purposes of treating water for drinking

water deliveries. The current form of contract is being negotiated to move from a single-year contract to a 25-year contract. Considerable negotiation has surrounded this contract, principally due to water quality related concerns.

6.4.3 State Water Project Facilities

No facilities of the SWP are located within the boundaries of the IRWMP. The nearest facilities are on the west-side of the San Joaquin Valley with the nearest distribution system facilities being those of the Tulare Lake Basin Water Storage District. They are, nonetheless, of significant importance to the DCTRA IRWMP area as they provide the conveyance mechanism by which Feather River water is imported into the west-side of the Central Valley, offsetting the need to pump groundwater. Historical pumping in this area caused the condition of a strong groundwater gradient sloping to the west-southwest, a condition which was abated when normal water deliveries were being made to the valley portion of the SWP service area. Recent curtailment of those deliveries has brought rise to increased west-side pumping again with results already coming to bear with respect to the return to aggravated groundwater slope conditions.

6.4.4 CVP Facilities

As shown on Figure 2-1 and schematically on Figure 6-1, the Friant-Kern Canal was constructed through the easterly portion of the IRWMP area. The highest percentages of annual delivery of San Joaquin River water are made into the contractor’s service areas located within Tulare County. Approved locations for CVP

diversions include the Tule River and Deer Creek in addition to the diversion facilities of each Friant Division, CVP contractor. Facilities exist at each of these locations to allow the appropriate DCTRA member unit to divert federal project waters at those locations.

Two (2) check facilities exist within the Friant-Kern Canal which assists with both in-canal storage operations, as well as diversions. These are the Tule River Check and the Deer Creek Check.

6.4.5 Water Treatment Facilities

Surface water treatment facilities exist in one (1) location within the IRWMP area which serves the Terra Bella Irrigation District. The facility was constructed in compliance with the Surface Water Treatment Rule, and consists of a clarifier and gravity filtration facilities. Disinfection is accomplished by way of chlorination.

Currently, there are no significant well-head treatment facilities within the IRWMP area. The facilities which do not exist are principally related to leaking underground fuel tank sites.

With the anticipated establishment of a Maximum Contaminant Level for the contaminant 1,2,3-TCP, well-head treatment facilities will likely be constructed within the IRWMP planning area. Facilities are also anticipated to address naturally occurring Arsenic and others to address nitrate contamination. Significant efforts have been directed to designing recently constructed well facilities to avoid problems in the

areas with nitrates, DBCP and EDB. Well site design efforts are reflecting efforts to insure an adequate footprint to locate treatment vessels. Litigation related to the presence of 1,2,3 TCP and perchlorates in groundwater is currently in process.

6.5 WATER SUPPLIES

The practice of conjunctive use is employed throughout the DCTRA IRWMP boundary. Groundwater is the principal source of supply for meeting all needs within the Tule River Basin, however, has been proven to be insufficient, over time, to satisfy all demands. The utilization of surface water flows from the Tule River and Deer Creek to augment groundwater provides a substantial additional supply to the conjunctive use operations, however, they are insufficient to meet demands without overdrafting the groundwater supply. Within and immediately external to the IRWMP boundaries are a number of Federal contractors to the Friant Division, CVP system. The importation of contracted San Joaquin River water has allowed the DCTRA groundwater source to come close to being in balance when SWP deliveries were being made to what was considered to be at that time, a normal level. With the decline in the declarations of water supply to the west-side SWP contractors and the parallel condition for the east-side and west-side CVP contractors, it is anticipated that, the westerly portion of the IRWMP area is now in a more significant overdraft condition.

Described herein are the current sources of supply employed to meet demands within the Tule River Basin. They are presented in an order reflecting the quantities supplied from each source in meeting the needs of water users within the IRWMP planning area.

6.5.1 Groundwater

Groundwater in all areas of the Tule River Basin represents the principal source of supply. Based on their fundamental charge, the principal activities of the DCTRA member units surround delivery of supplemental sources of surface water delivered in-lieu of pumping groundwater thus leading to improved groundwater conditions.

In order to have a basis on which to properly evaluate groundwater conditions, DCTRA has historically divided the area within the DCTRA IRWMP boundary into surface water delivery areas. Figure 6-2 presents the current locations of the member units. The input and output characteristics of the DCTRA numeric groundwater model and related database are keyed to these delivery areas. For the most part, the model hydrologic boundaries follow the boundaries of surface water purveyors within the DCTRA and reflect the ability to direct water entitlement and delivery information directly from the database into the model, by DCTRA member unit.

In addition to the maintenance of the GIS database associated with the numeric groundwater model, the DCTRA conducts annual spring and fall groundwater measurements for a monitor well network covering the entire IRWMP area. Inventory work was initially accomplished on groundwater wells within the model area, including obtaining detailed well logs with sufficient lithology information to allow for cell development within the model parameters. Efforts have been recommended relative to the expansion of the area modeled to improve the capability to evaluate groundwater conditions and to address boundary conditions associated with running the model to the

north extending to the edge of the KDWCD model. Wells have been added to the DCTRA's semiannual groundwater measurement effort and also to the State's CASGEM database.

The City Council of the City of Porterville has put into place policies dealing with the impacts on groundwater in agricultural to urban land use conversions. The majority of the lands surrounding the city operate in a conjunctive use fashion and, when converted to urban development, change to exclusively being supplied by groundwater. While findings of the City Council showed that the resulting per-acre water consumption is less in the urban configuration than the agricultural configuration, an impact nonetheless exists as the surface water is no longer delivered into the area. Impact fees, on a per-acre basis are now being considered at the time of annexation and are utilized to generate programs to construct facilities to introduce surface water into the groundwater in the impacted areas and to purchase surface water to introduce into these constructed facilities, along with natural waterways, if they exist in a location which impacts the developed area.

As a demonstrable example of the extent to which conjunctive use is an important element within the Tule River Basin, the DCTRA member units currently have significant acreage of groundwater recharge capability. Not satisfied with that level of capability, the member units continue to purchase additional acreage and efforts are underway to develop said lands to recharge facilities to add those acres to the current inventory. The acreage excludes urban and rural storm water control facilities which

are used in the off-season as recharge facilities based on their availability, strategic location and soil characteristics.

6.5.2 Local Surface Water

The principal source of local surface water is directly from the Tule River. Supplemental to the mean daily inflow of the Tule River are flows of Deer Creek, if existing. The Tule River and the Kaweah River, as a designated tributary to the Tule River, have been declared to be fully appropriated by the State Water Resources Control Board. As such, unless a party can demonstrate the creation of new supply, the rights to the existing flow of the Tule River are held by the member units to the Tule River Association and riparian landowners lying adjacent to the Tule River. As previously noted, the flows of Deer Creek are managed in a fashion whereby flows from this source is incorporated into specific district distribution facilities and put to beneficial use. Except in extreme flood flow situations, no water is lost from the Tule River Basin and every drop is put to reasonable, beneficial use.

The entitlement to the flow of the Tule River is allocated according to a schedule adopted by the member units of the Tule River Association. Presented in Table 6-6 is a tabulation of the water diversion schedule segments for the Tule River.

Other than the previously referenced treatment of Friant Division, CVP water by the Strathmore Public Utility District on behalf of its customers and those of the Lindsay-Strathmore Irrigation District for its Improvement District No. 1, none of the entitlement water of the local stream groups is made available for human consumption

purposes. For the most part, this is due to the fact that the water is not available on a year- round basis and, in many cases, the flow of the Tule River is for less than three (3) months and, periodically, even a shorter period of time. In its recent Master Plan Development, the City of Porterville included the consideration of the inclusion of treated surface water as a potential source to meet future demands. Currently, the City has available supplies from the Tule River in the form of stock ownership in the Pioneer Ditch Company, but not from the Friant-Kern Canal.

TABLE 6-6
WATER DIVERSION SCHEDULE SEGMENTS – TULE RIVER
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

County of Tulare – Recreation Pool
Pioneer Water Company
Riparian Pumpers Zone 1
Channel Loss Zone 1
Campbell-Moreland Ditch Company
Porter Slough
    Channel Loss Zone 8
    Porter Slough Ditch
    Channel Loss Zone 8
    Below Road 192
Boydston Weir
Channel Loss Zone 2
Vandalia Ditch
Channel Loss Zone 3
Poplar Ditch
Channel Loss Zone 4
Hubbs-Miner Ditch/Gillian-McGee Ditch
Channel Loss Zone 5
Rhodes-Fine Ditch
Channel Loss Zone 6
Woods Central Ditch
Channel Loss Zone 7
Below Oettle Bridge

6.5.3 Imported Surface Water

Entities within the DCTRA IRWMP are served with water from the Tule River, imported from the Friant Division, CVP, or by way of exchange through the Cross Valley Canal based on the source being CVP Project Water made available in the Sacramento-San Joaquin Rivers delta.

Historically several districts have been a long-term contractor to Reclamation for Friant Division, CVP supplies. These entities include the Tea Pot Dome Water District along with all of the irrigation districts listed in Table 6-2. Cross Valley contractors include the Strathmore Public Utility District, the Lower Tule River Irrigation District, the Pixley Irrigation District and the Saucelito Irrigation District. Inputs of the imported water quantities are constructed into the GIS database for the numeric groundwater model of DCTRA. It should be noted and will be discussed in greater detail later in this IRWMP, the Kaweah River Basin has a parallel numeric groundwater model and companion GIS database. These models operate with a boundary condition appurtenant to each model between the basins, with it being a long term objective to amend the model configurations to eliminate the problems associated with the boundary conditions.

6.5.4 Water Conservation

Water conservation measures undertaken within the DCTRA IRWMP area take various forms. These forms cross over the line of urban/agriculture and over the line of groundwater/surface water. Each is important in its own right and it would be difficult to characterize one form of conservation as being more important than another.

Principal among the efforts is the conversion of agricultural lands which are characterized as poor to marginal due to their high water demand characteristics. In many cases, these lands have been retired from agriculture and have become the sites upon which groundwater recharge facilities have been constructed. The nature of the soil type having the capability to consume large amounts of water and be in a geographic position to contribute supplied water to the groundwater reservoir is certainly a significant conservation measure. Where these facilities are able to capture nonstorable flood flows from the Tule River, from local stream groups or from the San Joaquin River, they all provide example of conserved supplies.

Complementing with this effort are the efforts of individual farmers to modify their irrigation application methods, often at great personal expense, to improve application efficiency. While this procedure has the parallel benefit of improving crop yield, which assists in paying for the system modifications, water conservation benefits are also demonstrated. In times of curtailed availability of surface supply, the ability to control the timing and amount of water application is critical to sustaining the investment in permanent plantings. While in many years, water conserved by virtue of the installation of the systems is dedicated to additional crop yield, and the fact that there is a resulting decrease in the leaching fraction contribution to groundwater, the overall conservation benefits are still apparent.

The third conservation component of significance is that of education. Programs of the DCTRA and its member units which reach out to schoolchildren, schoolteachers and water supply professionals offer opportunities to expand the

knowledge base of those who have influence over water consumption habits and opportunities for water savings through conservation. Presented in Appendix F are the 2014 outreach efforts of the public agencies in the IRWMP planning area in this regard. While these programs vary from time-to-time, they are nonetheless ongoing and are a critical element in the DCTRA program to optimize management of the groundwater reservoir.

As a companion program to the agricultural outreach programs, the urban and rural water purveyors are heavily invested in both conservation education and conservation procedures. Through the mechanisms of written education documents, water conservation retrofit kits and retrofit incentives for plumbing fixtures, urban water suppliers are able to effect reductions in water use impacting not only groundwater extractions, but the economics associated with the production and delivery of water for human consumption.

6.5.5 Recycled Water

As noted under the prior discussions related to wastewater treatment and disposal, each of the permitted wastewater treatment and disposal facilities within the DCTRA IRWMP area recycle their entire treated discharge. While some of the recycling is accrual to the groundwater reservoir, most are in-lieu of groundwater pumping programs wherein treated effluent is delivered to satisfy crop evapotranspiration demand, in lieu of pumping groundwater. This leaves the groundwater supply in place, a procedure which not only conserves the groundwater

supply in a usable position, but also avoids the costs associated with power to pump the groundwater to the surface.

6.5.6 Cloud Seeding

In an attempt to wring every drop of water out of passing storms prior to exiting the Kaweah River Basin, the KDWCD conducts a cloud seeding program with a private operator based out of the Fresno Air Terminal. The contract for these services is reviewed continuously by the Board of Directors of the KDWCD, along with estimates prepared of the benefit of participation in the program. Similar programs are conducted on the San Joaquin River Basin by the Southern California Edison Company and periodically on the Kings River Watershed by Pacific Gas & Electric, often in concert with the Kings River Conservation District. Estimates of improved yield in a specific basin as a result of the cloud seeding program range from a low of two (2) percent to a high of five (5) percent. It is unknown at the current time what the specific impact of the Kaweah River Basin Program is on the Tule River Basin. Given the flight tracks, however, it is likely that there is overlap onto the Tule River Basin.

6.5.7 Banking Programs

Several banking programs exist within the Tule River Basin. These banks principally exist with the Lower Tule River Irrigation District (LTRID) and are with both in-Basin and out of Basin entities. As these programs call for delivery of LTRID available supplies in dry years, Sierra Nevada based runoff must be sufficient for LTRID to develop entitlement in order for return capability to exist.

At the current time, review is being conducted of the initial Banking Guidelines of Reclamation to determine if any potential exists for development of CVP supplied banks to be expanded or new ones generated within the IRWMP area.

A significant number of questions have been raised and directed to the Regional Office of Reclamation with responses to those questions likely determining any interest in pursuing such arrangements in the future. One of the obstacles which has yet to be overcome is the value of timing of puts and takes to a given bank and, in particular, the exchange of winter supplies for summer supplies. Current guidelines call for a 1:1 exchange, with a small leave-behind to benefit the exchanging basin. This ratio basis, however, ignores the significant value of exchanging a surface water supply available during peak summer months for a supply moved to groundwater storage during above-normal and wet winter months. Until understanding can be gained with those parties generating the guidelines for the use of, in particular, CVP supplies for banking, additional banking programs are not likely to be actively pursued.

6.6 HISTORICAL WATER DEMANDS

6.6.1 Agricultural Water Consumption

Agricultural water consumption within the DCTRA boundaries has been historically estimated based on land use information provided by the DWR. This land use data has been incorporated into each model run of the numeric groundwater model. Estimates of groundwater overdraft have been the principal motivating factor behind accomplishing each of specific area investigations and throughout the history of

accomplishing the water balance computations, a difference has existed between observed conditions of depth to groundwater and computed depths to groundwater. This characteristic is true of other groundwater basins within the Southern San Joaquin Valley region.

In the Kaweah River Basin, it was determined to undertake a sensitivity investigation related to several parameters in the computation methodology, starting with the land use element. Determination was made that the sensitivity analysis should utilize a data stream which was available on a year-round basis, thus reflecting not only crop types, but also the number of crops planted in a given year. It was a known deficiency of the use of the DWR data that multiple cropping in a given time frame was not picked up by their surveys to the same extent that multiple crops were observed by local water distribution entities.

It was determined to use satellite based imagery as the trial basis to see if same would provide a more adequate foundation for a determination of demand than the DWR basis. The sensitivity analysis has now been completed with the conclusion being that the use of satellite imagery does provide a far more reliable basis than the DWR information and a report has now been completed providing an adequate land use base from which to conduct the current update to the Water Resources Investigation.

For purposes of this IRWMP, however, that update has only just begun for the Kaweah River Basin and, as a result, the only demand information which currently exists for use herein is the last run of the numeric groundwater model which used the DWR land use data. It, therefore, has an inherent defect. The reader should understand

that with respect to the consumptive use of applied water for the satisfaction of irrigation demands, the estimates are understated. Based on Kaweah River Basin balance calculations which were accomplished, this differential is at least on the order of 16,000 acre-feet per year for a basin area of approximately one-third of a million acres. There is not a great deal of difference in size between said basin and the Tule River Basin, therefore, the crop acreage analysis impact could be expected to be of the same order.

In the KDWCD evaluation process of trying to determine why the empirical methodology was not resulting in a modeled outcome which was supported by actual depth-to-water measurements, water consumed by confined animals was determined to be a factor which should be considered. Steps were therefore undertaken to estimate the number of milking cows, replacement heifers, milk cow calves, goats and swine and to estimate the consumption of the animals. While the feed for same which was being grown within the KDWCD boundary had been taken into account, the actual animal consumption quantity had not. The modeling effort, therefore, took into account and continues to take into account animal unit counts and computations of annual quantities of water consumed for those demands. Groundwater model inputs for the DCTRA model have been adjusted accordingly.

6.6.2 Urban and Rural Non-agricultural Water Consumption

In contrast, the estimates of urban and rural water demand have a far more adequate foundation. That being said, the total volume of consumptive demands for municipal and industrial purposes, including rural household consumption, is much

lower than the agricultural demand. Adequate records exist from the City of Porterville, as well as the rural permitted systems within the IRWMP boundary, to accurately determine their annual consumption levels. Those figures also provide an improved basis for estimating the demands of the rural single-family homes which exist in the IRWMP planning area.

Water system demands for urban areas, rural areas and small water systems is on a remedial list of things to be done in this IRWMP, with data already assembled from Consumer Confidence Reports to provide the basis for the analysis.

6.7 COMPARISON OF WATER DEMAND AND SUPPLY

Without going through the exercise of computing the difference between supply and demand, the declining groundwater table within the DCTRA IRWMP area is demonstrative of demand exceeding supply. It should be noted that, however, while this is true on an area-wide basis, it is not true for all areas within the IRWMP area. The hydrologic units on the east side of the DCTRA IRWMP planning area have been demonstrated to be in balance and, in a number of years, actually in a net gain position. Characteristics of this area are such that they enjoy a senior right to diversion of natural flows of the Tule River, are planted to permanent crops which have a modest seasonal irrigation demand and the vast majority of farms utilize the most current and sophisticated irrigation water application methods. Such is not the case across all of the hydrologic units. In addition, dramatic and pronounced effect occurs on the westerly portion of the IRWMP area due to problems with delta diversions associated with both

the SWP and the CVP. As long as the response to reduced diversions from the delta is to pump groundwater to satisfy crop demand, the overdraft will continue to exist.

6.8 CLIMATE CHANGE

6.8.1 General

The topic of climate change has received considerable attention at the IRWM level, not in the context of whether it exists or not, but in the context of the hydrology which is currently experienced and what the potential responses from a water management point of view, might be. For example, the hydrology already experienced within the Tule River Basin swings from critically dry years when runoff is less than twenty percent of normal to extreme wet conditions when runoff swings to in excess of 200 percent of normal. In addition, runoff comes into the IRWMP area in the form of rainfall runoff, snowmelt runoff and snowmelt runoff accelerated due to warm weather and rainfall conditions accelerating runoff. The Board of Directors of the DCTRA, its staff and its consultants have difficulty envisioning a broader set of circumstances to deal with as the current year is demonstrative of a condition of almost no snowmelt runoff at all.

An additional factor of concern in dealing with this issue is the length of time necessary to transition from planning a water management project to its full implementation. A relatively simple project, at least in engineering terms, has been the effort to raise the level of Lake Success. Today, in excess of 25 years from inception of effort until being back at the point of beginning. Final costs will likely be a multiple

of the initial cost estimate with the potential for the environmental costs to exceed the construction costs.

In response more to current conditions, than anticipated conditions, the DCTRA members have proceeded with development of basins off of Deer Creek, designed as groundwater recharge facilities. Surface water purveying entities have likewise developed groundwater recharge areas for their individual entity and are continuing to expand on those areas. Local mutual stock ditch companies have also invested in water balancing and recharge facilities to benefit their stockholders and to deal with, in some cases, the lower elevation rainfall fed watersheds, runoff from which they intercept to bring into their systems for direct beneficial use and recharge.

The public agencies within the DCTRA IRWMP area are subject to the air quality rules established by the San Joaquin Valley Air Pollution Control District. They continue to examine their equipment fleets to ensure that they are compliant with the latest rules established by said District, not only because it is required, but in reflection on doing their part to reduce contributions to atmospheric conditions which are contributory to increased air temperature patterns and the resulting impacts on being able to store water in the mountains in the form of snow and ice pack, in lieu of trying to manage the runoff from the precipitation if it fell in the form of rainfall.

In preparing to respond to the Tulare Lake Hydrologic Region Report volume of the California Water Plan Update of 2013, considerable attention was given to the segment on Climate Change beginning on page TL-59. The report concludes that “enough data exists to warrant the importance of contingency plans, mitigation

(reduction) of greenhouse gas (GHG) emissions, and incorporating adaption strategies; methodologies and infrastructure improvements that benefit the region at present and into the future." The report goes on to state that there is a sufficient enough trend established that current levels of GHGs, already in the atmosphere, will continue to impact climate through the rest of the century. The IRWMP Stakeholders Advisory Group feels that steps currently being taken to expand groundwater recharge areas on the valley floor are part of the response to the observed increasing temperature trend. In addition, increased emphasis on flood plain mapping has drawn attention to the risks which currently exist relative to runoff patterns, providing a basis for further evaluation of flood impacts under warmer precipitation paradigms. It has been noted more than once, that the extreme peak flows experienced within the Tule River Basin have been as a result of warm precipitation conditions on a significant low-elevation snow pack. Whether those conditions would continue in an increased atmospheric temperature paradigm remains to be evaluated.

6.8.2 Vulnerability Assessment

A vulnerability assessment was performed for the Tule Basin using the 'Vulnerability Assessment Checklist' found in the *Climate Change Handbook for Regional Water Planning* (DWR and EPA, 2011). The assessment, provided below, offers a practical evaluation of climate change vulnerabilities related to water demand, water supply, water quality, flooding, ecosystems, habitats, and hydropower.

1. Water Demand

1.a - Are there major industries that require cooling/process water in your planning region?

Yes. The region includes fruit, vegetable, cheese and milk processing plants, but the temperature of the process water is not likely a major factor, and in many cases groundwater is used. No major power plant or industrial/processing plants that rely on cool water are found in the region.

1.b - Does water use vary by more than 50% seasonally in parts of your region?

Yes. Seasonal water use varies substantially (greater than 50%) in the Tule River Basin. Most of the water is used from late spring to the end of summer for crop irrigation and urban landscape irrigation. Approximately one-third of urban water demands occur in the winter with the other two-thirds in the summer. Irrigation water demands are typically low in the winter since effective precipitation can provide most of the needed water. Some of the crop land is also idled in the winter or is planted to permanent crops that are dormant in winter.

1.c - Are crops grown in your region climate-sensitive? Would shifts in daily heat patterns, such as how long heat lingers before night-time cooling, be prohibitive for some crops?

The region experiences hot dry summers. As a result, many of the crops grown have good resistance to heat. Therefore, changes in heat patterns would probably only impact crop yields if there is a significant increase in temperature. The primary concern with higher temperatures is that it will increase evapotranspiration and thus increase water demands. Freezing temperatures are sometimes a problem and can damage crops, but they are also beneficial to some permanent crops that need a certain number of chilling hours for an effective dormancy and to kill certain pests. Therefore, a reduction in the number of freezing days could negatively impact some crops.

1.d - Do groundwater supplies in your region lack resiliency after drought events?

No, groundwater supplies have generally been resilient over the long-term. The region experiences years where almost 100% of demands are met with groundwater and other years when the vast majority of demands are met with surface water. After dry periods, the groundwater has generally recovered after a sufficient wet period, aided by a large network of groundwater recharge basins and natural groundwater recharge. The region experienced historic groundwater level lows in the 1930’s and 1940’s, but fully recovered by the 1980’s due to surface water development and wet periods. Recently, with consecutive dry years coupled with impacts from San Joaquin River Restoration, groundwater levels are in a state of decline. Reductions in State Water Project (SWP) water supply reliability have further aggravated the recovery.

1.e - Are water use curtailment measures effective in your region?

Urban agencies, such as the City of Porterville, have a variety of conservation measures and these are effective at reducing demands in dry years. Agricultural water supplies are ultimately controlled by the hydrology and less surface water is delivered in dry years. This does not actually reduce water demands as growers pump groundwater to meet the remaining demand. If, however, groundwater levels continue to decline, then groundwater will become less reliable as the primary supply. The area has some hardened demand due to a large number of permanent plantings, so new (additional) water conservation programs may have to be implemented in the future if less surface water is available. Future curtailments may also be necessary due to recent State legislation that will require groundwater supplies to be managed for long-term sustainability.

1.f - Are some instream flow requirements in your region either currently insufficient to support aquatic life, or occasionally unmet?

All rivers and streams in the region are ephemeral and have never maintained year round fisheries. There are no minimum environmental releases in the local rivers and streams.

2. Water Supply

2.a - Does a portion of the water supply in your region come from snowmelt?

Yes, the majority of surface water comes from snowmelt in the Tule River watershed. The watershed extends up to a maximum elevation of 9,300 feet and much of the precipitation occurs as snowfall. As a result, the region is vulnerable to climate change impacts on snow including earlier spring runoffs, less water storage as snowpack and more frequent rain-on-snow events that could result in more reservoir flood releases.

2.b - Does part of your region rely on water diverted from the Delta, imported from the Colorado River, or imported from other climate-sensitive systems outside your region?

No water is imported from the Colorado River into the Region. Water is imported from the San Joaquin River watershed, which generally has the same climate change vulnerabilities as the Tule River watershed. Delta water is not directly used in the region, but Delta water curtailments do have an important indirect impact on local groundwater supplies. Several water agencies located just west of the IRWMP area use Delta water. When Delta water deliveries are reduced they increase their reliance on large well fields located near the western border of the IRWMP area. These large well fields have notable impacts on groundwater levels in the region. The Friant Division, CVP contracts are based on an exchange requiring movement of water from the Delta to the exchanging entities and without the Delta diversions, the San Joaquin River Supply contribution to satisfying local demands would be considerably reduced.

2.c - Does part of your region rely on coastal aquifers? Has salt intrusion been a problem in the past?

No. The region does not rely on coastal aquifers.

2.d - Would your region have difficulty in storing carryover supply surpluses from year to year?

Storage reservoirs that serve the region include Kaweah Lake (Kaweah River) and Millerton Lake (San Joaquin River).

Success Reservoir is operated by the USACE primarily for flood control. The reservoir volume is typically reduced to less than 10,000 AF in the fall to provide space for floodwaters. As a result, there is little to no potential for carryover storage.

Millerton Lake has some limited capacity to store carryover water from year to year. The space to store the water and ability to keep it in storage, depends on the annual hydrology. In some years, agencies can carryover water, but in many years they cannot.

The only real potential for improving carryover storage is through groundwater recharge and banking projects, unless new additional surface storage is built.

2.e - Has your region faced a drought in the past during which it failed to meet local water demands?

Yes. Surface water supplies are reduced during droughts, but groundwater is generally used to meet shortfalls. As a result, almost all water demands have been met in past droughts. Recently, groundwater levels have reached close to historic lows and some wells have gone dry. Due to a very high demand for well drillers, some landowners have had to endure without a well for a period of time. But, in Terra Bella Irrigation District, the lack of surface water during drought conditions have failed to meet water demands of the District causing landowners to abandon farms.

2.f - Does your region have invasive species management issues at your facilities, along conveyance structures, or in habitat areas?

Some invasive plant species, such as Arundo Donax, can clog natural channels and canals if they are not properly managed, so most agencies include this as part of their maintenance activities. Agencies in the area have also been alerted to the potential for invasive species such as quagga mussels and how to help prevent their spread.

3. Water Quality

3.a - Are increased wildfires a threat in your region? If so, does your region include reservoirs with fire-susceptible vegetation nearby which could pose a water quality concern from increased erosion?

No major reservoirs are located in the IRWMP area, but Success Reservoir is located just east of the Tule River Basin. Wildfires around the reservoir and in the Tule River watershed could result in flooding or water quality problems in the local rivers.

3.b - Does part of your region rely on surface water bodies with current or recurrent water quality issues related to eutrophication, such as low dissolved oxygen or algal blooms? Are there other water quality constituents potentially exacerbated by climate change?

Local agencies use algaecides such as copper sulfate to control algae in conveyance facilities. These efforts are effective, but may have to be increased if climate change creates conditions that promote more algae growth.

3.c - Are seasonal low flows decreasing for some waterbodies in your region? If so, are the reduced low flows limiting the waterbodies' assimilative capacity?

The region has experienced very dry years, where groundwater meets all water demands, to very wet years, where surface water meets most demands. Changes in annual low flows from climate change would be difficult to identify since low flows already vary due to natural climate variations and management of reservoir releases. The region will, however, continue to monitor and evaluate hydrologic data for long-term trends.

3.d - Are there beneficial uses designated for some water bodies in your region that cannot always be met due to water quality issues?

No. Generally the surface waters have excellent quality, largely because they are derived from Sierra snowmelt. In a few isolated areas, the water has had quality problems from anthropogenic sources, such as herbicides.

3.e Does part of your region currently observe water quality shifts during rain events that impact treatment facility operation?

Yes. Surface waters in the region generally have good to excellent quality, but during storms turbidity values can increase substantially and can affect operations at groundwater recharge facilities.

4. Sea Level Rise

The Tule Basin is approximately 100 miles from the ocean and several hundred feet above existing sea level, so sea level rise is not a concern.

5. Flooding

5.a - Does critical infrastructure in your region lie within the 200-year floodplain? DWR's best available floodplain maps are available at: http://www.water.ca.gov/floodmgmt/lrafmo/fmb/fes/best_available_maps/.

Significant infrastructure, including some critical infrastructure, lies within the 200-year floodplain of the Tule River.

5.b - Does part of your region lie within the Sacramento-San Joaquin Drainage District?

No.

5.c - Does aging critical flood protection infrastructure exist in your region?

No significant levee system is associated with the Tule River.

Success Dam was constructed in the 1958 - 1961, but is considered to be in good condition.

5.d - Have flood control facilities (such as impoundment structures) been insufficient in the past?

No. Flood control facilities have performed adequately in the past. Large floods in the 1950s prompted the construction of Success Dam, whose primarily function is flood control. Since then the dam has prevented large scale flooding in the Tule River Basin, although the reservoir is undersized for a very large flood. Localized flooding does commonly occur along creeks and due to poor drainage in some areas.

5.e - Are wildfires a concern in parts of your region?

Wildfires are generally not a concern in the region. They are a concern, however, in the Tule River watershed. Wildfires can result in flooding, severe short-term erosion and water quality degradation of surface waters.

6. Ecosystem and Habitat Vulnerability

6.a - Does your region include inland or coastal aquatic habitats vulnerable to erosion and sedimentation issues?

No.

6.b - Does your region include estuarine habitats which rely on seasonal freshwater flow patterns?

No.

6.c - Do climate-sensitive fauna or flora populations live in your region?

Yes. A large variety of flora and fauna are found in the Tule River Basin and some are likely climate sensitive. The region is highly developed so some have limited ability to migrate as a means of adapting to climate change.

6.d - Do endangered or threatened species exist in your region? Are changes in species distribution already being observed in parts of your region?

Yes, a number of threatened and endangered species are found in the Tule River Basin. It is unknown if species distribution is occurring due to climate change since little data is available on the topic.

6.e - Does the region rely on aquatic or water-dependent habitats for recreation or other economic activities?

There are limited recreational opportunities in the local river system, including swimming, canoeing and bird watching. These have a relatively small impact on the local economy.

6.f - Are there rivers in your region with quantified environmental flow requirements or known water quality/quantity stressors to aquatic life?

The Tule River and Deer Creek have historically been ephemeral and do not have minimum flow requirements. They have never supported a year-round fishery.

6.g - Do estuaries, coastal dunes, wetlands, marshes, or exposed beaches exist in your region? If so, are coastal storms possible/frequent in your region?

No.

6.h - Does your region include one or more of the habitats described in the Endangered Species Coalition's Top 10 habitats vulnerable to climate change (http://www.itsgettinghotoutthere.org/)?

The Tule River Basin is not included in the list of 'Top 10 Habitats Vulnerable to Climate Change' referenced above. The watershed, however, is located in the Sierra Nevada Mountains, which is on the list.

6.i - Are there areas of fragmented estuarine, aquatic, or wetland wildlife habitat within your region? Are there movement corridors for species to naturally migrate? Are there infrastructure projects planned that might preclude species movement?

The area is largely developed with agriculture, ranches and urban areas. Habitat is generally fragmented in the Tule River Basin. Wildlife could feasibly travel between habitat areas through agricultural land, ranch land or along the river corridors. No large infrastructure projects are planned that would further preclude species movement.

7. Hydropower

7.a - Is hydropower a source of electricity in your region?

No hydropower facilities are located in the Tule River Basin below Success Dam. The upstream Tule River power generating facility is located on the discharge from Success Reservoir, which is outside the Tule River IWRM Boundary.

7.b - Are energy needs in your region expected to increase in the future? If so, are there future plans for hydropower generation facilities or conditions for hydropower generation in your region?

Energy demands will likely increase due to population growth. Energy conservation could help to reverse this trend. No major hydropower projects are planned for the area, with a second unit expansion of the Success Powerplant being deemed currently not feasible. Some small hydropower projects might be developed along canals, but these would be very small and produce only a small amount of energy.

Prioritized Vulnerabilities

The assessment identified above noted climate change vulnerabilities in the Tule River Basin. These all need to be addressed to some extent, but the higher priority vulnerabilities are described below. These vulnerabilities are listed in their order of importance.

1. **Reductions in Surface Water Supplies.** Climate change could cause a reduction in surface water supplies from the Delta, San Joaquin River watershed (Friant CVP water)

and Tule River watershed through changes in precipitation patterns and/or a shift to more rain and less snow. This problem is exacerbated by reductions in CVP and Delta water supplies to protect endangered fish species. CVP water is directly delivered to local districts and SWP is used in adjacent areas, who rely heavily on groundwater when SWP deliveries are curtailed. Climate change could exacerbate issues with endangered fish species and result in even more cutbacks. Over time, more detailed information on the long-term reliability of these supplies, which can be incorporated into this climate change analysis, will be developed.

2. **Limited Water Storage Capacity.** Additional water storage may be needed if a greater portion of precipitation occurs as rainfall, or if there are more rain-on-snow events. A reasonable option for increasing surface storage at Lake Success is being pursued. Storage could be increased by constructing Temperance Flat Dam upstream of Friant Dam, but the future of the proposed project is uncertain and it would require a lengthy period of time to permit, design and construct. The region must therefore currently rely on groundwater storage to increase water reserves and reliability. Recharge basins are not as effective as surface storage in capturing water supplies since they can only accommodate limited flows and the capacity of the Friant-Kern Canal is limited.

These vulnerabilities will be re-evaluated periodically to reflect changes in hydrology and water supplies.

The region already deals with a wide range of hydrologic conditions from severe drought to serious flooding. The Region is attempting to better adapt to these natural conditions, which would complement adaptation to climate change. The Region does not believe, at this time, that planning for the most severe circumstances, zero snowfall and all rainfall in the Tule River watershed is necessary at this time.

It should also be recognized that climate change could have some positive impacts. Warmer temperatures could increase growing seasons, increase crop yields, allow new crops or crop varieties to be planted, and reduce frost damage to crops. Nevertheless, the negative impacts from climate change will likely outweigh the benefits. The Tule River Basin water system has been designed and managed based on past hydrology and large changes will challenge the water managers and users. The risks to the region from no action are clear and the DCTRA member units are committed to making continual improvements in their ability to address droughts and floods.

Adaptation Measures

Climate change adaptation is a response that seeks to reduce the severity of climate change impacts to humans, facilities and natural systems. Adaptation measures can also help the region to improve resiliency, which is defined as the ability to return to original conditions after an impact or disturbance.

The California Department of Water Resources (DWR) defines 'no-regret' strategies as actions that provide measurable benefits today while also reducing vulnerability to climate change (DWR, 2011). In other words, they are strategies that provide benefits with or without climate change. No-regret strategies are key to the Tule River Basin, since the impacts from climate change cannot be precisely known. An example of a 'no regret' strategy is constructing groundwater recharge basins. Recharge basins are needed now to increase groundwater supplies, reverse overdraft, improve water reliability and provide flood control benefits. They can also address some anticipated impacts from climate change, such as the increase in rain-on-snow events and more variable precipitation. As a result, constructing recharge basins is a positive strategy to address present and anticipated future conditions.

The following strategies are deemed the most practical and effective for adapting to climate change in the Tule River Basin. All of these are also considered 'no-regret' strategies.

- Construct new groundwater recharge and groundwater banking facilities.
- Import surface water supplies from outside of the region, when feasible and economical. These would be delivered primarily through the Friant-Kern Canal.
- Improve urban and agricultural water efficiency.
- Increase use of recycled water.
- Develop surface water treatment plants for municipalities to reduce groundwater pumping and utilize surface water when available.
- Revise land use planning policies to encourage conservation such as low impact development or water efficiency standards.
- Cooperate with the Southern Sierra IRWMP group, and other agencies in the upper Tule River watershed, to develop watershed management projects that will improve forest health and reduce fire risk, while at the same time increasing water supply and improving water quality in the Tule River Basin. The Tulare Basin Watershed Connections Group, which is a group of the Tulare Bain Wildlife Partners, is currently exploring such opportunities.

The Region has already made substantial progress in reducing vulnerabilities to droughts and flooding through the construction of new recharge basins. In addition, Central Valley Project contractors and local ditch companies are also investing in new recharge facilities. Groundwater recharge will remain one of the primary climate change adaptation strategies for the region.

Future Data Gathering and Analysis

Future data gathering and analysis will fall under two broad categories: 1) hydrologic and meteorologic data to characterize climate change trends, and 2) climate change literature and related legislation.

The Tule River Basin includes an extensive monitoring network that provides data on streams, rivers, reservoirs, groundwater and climate. This data will continue to be evaluated on a regular basis and potential trends will be identified. Changes in hydrology and climate can be caused by climate change or simply natural variability, but long-term consistent changes could point towards climate change. These monitoring programs are evaluated on a regular basis and, if needed, they will be expanded so they can adequately assess climate change.

A substantial number of climate change publications are produced each year, including some that assess local climatic conditions in the Tule River area. These studies are performed by various government agencies, non-governmental organizations, academic institutions and graduate students. The Regional Water Management Group will take advantage of these efforts and regularly review literature that comes from reputable sources.

The Regional Water Management Group will also monitor climate change related legislation that could impact project operations, regulatory requirements, project funding and greenhouse gas emissions.

Consideration of Greenhouse Gas Emissions in Project Review Process
Climate change mitigation can be achieved by reducing energy demands, improving energy efficiency and carbon sequestration. These will help to reduce greenhouse gas (GHG) concentrations in the atmosphere. Climate change mitigation will require global cooperation, but the Regional Water Management Group supports reasonable efforts to make their own local contribution. As a result, it is sensible to consider impacts to GHG when selecting and prioritizing projects. This criterion will generally be a lower priority than water supply or water quality, but it is still considered important.
When projects are reviewed and prioritized the project proponents will need to answer the following questions:

1. Will this project increase greenhouse gas emissions? If yes, explain how and quantify.
2. Will this project result in reduced greenhouse gas emissions? If yes, explain how and quantify.

Consideration of Climate Change in Project Review Process

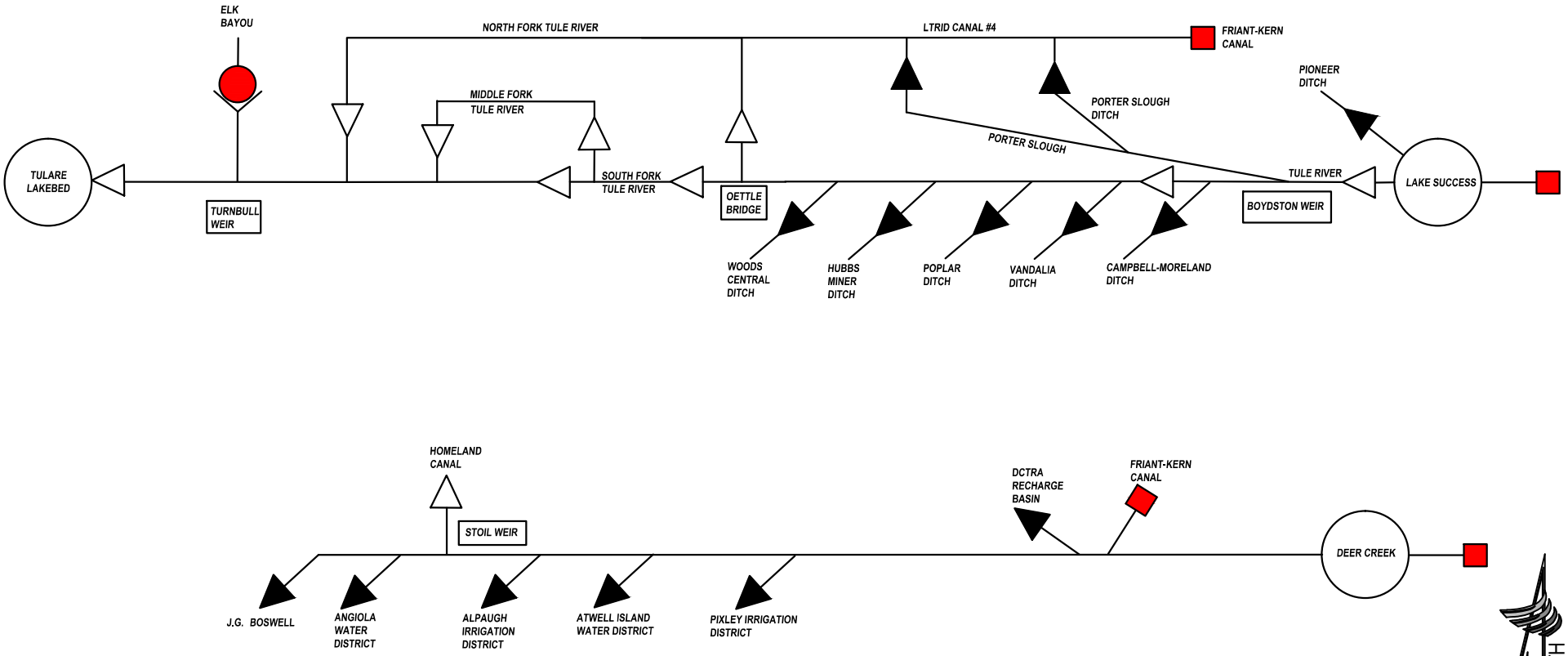
As previously discussed, climate change could have many adverse effects on the region including changes in the timing and amount of precipitation, higher evaporation and transpiration from higher temperatures, increased frequency of droughts and floods, reduction in water quality, increased wildfires and increased presence of certain pests.

Developing projects that can address these issues is important. When projects are reviewed and prioritized their contribution to addressing climate change will be considered. In particular, project proponents will need to answer the following questions:

1. Will the proposed project reduce vulnerability to anticipated impacts from climate change? If yes, explain and quantify.

2. Will the proposed project help the region to adapt to climate change impacts, or increase resiliency to climate change impacts? If yes, explain and quantify.

3. Will the proposed project help to increase the region's understanding of climate change impacts and local vulnerabilities? If yes, please explain.



4CREEKS

324 S. SANTA FE, STE. A
VISALIA, CA 93292
(559) 802-3052

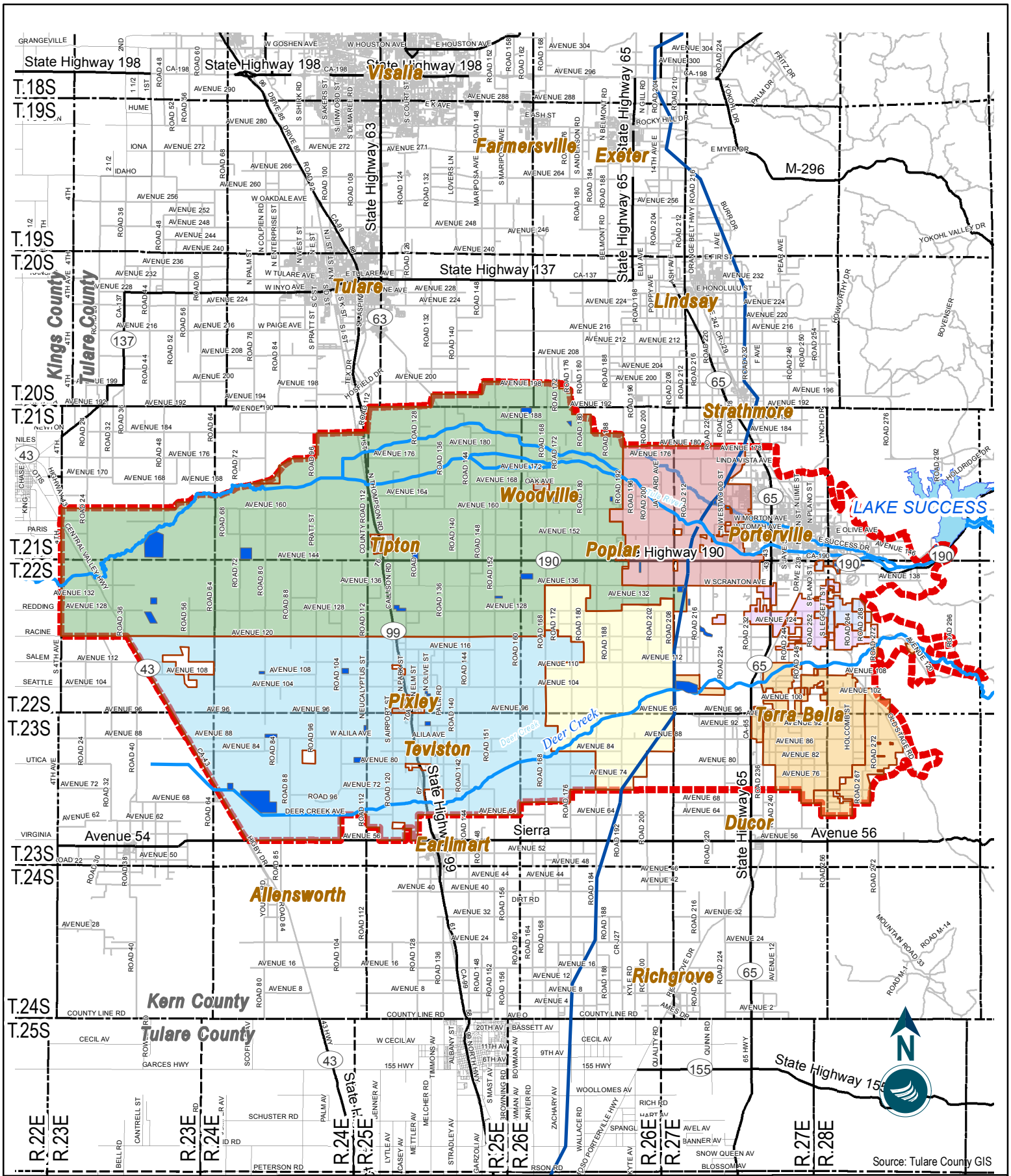
TULE BASIN INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER AND DEER CREEK SYSTEM SCHEMATIC

FIGURE 6-1

2/19/2015

NO SCALE

PAGE 1 OF 1



0 1 2 4 Miles

4CREEKS

2929 W. Main St., Ste. A
Visalia, California 93291
(559) 802-3052

Legend

- DCTRA Boundary (289,448 Ac.)
- Recharge Basins (2,102.3 Ac.)
- Waterways
- LakeSuccess
- Townships
- Roads
- Lower Tule River ID (103,034 Ac.)
- Pixley ID (69,014 Ac.)
- Porterville ID (16,997 Ac.)
- Saucelito ID (19,702 Ac.)
- Tea Pot Dome WD (3,481 Ac.)
- Terra Bella ID (15,053 Ac.)
- Vandalia ID (1,379 Ac.)

Figure 6-2

Hydrologic Units

Integrated Regional Water Management Plan

CHAPTER 7
WATER QUALITY

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

7.1 GROUNDWATER QUALITY

Groundwater quality within the Deer Creek and Tule River Authority (DCTRA) Integrated Regional Water Management Plan (IRWMP) area is generally considered in two (2) different contexts. The first of these is agriculture with the second being municipal and industrial. Of principal concern in the municipal and industrial category, the capability of the supply to satisfy State and Federal drinking water standards and, for industrial users, the capability to satisfy requirements for manufacturing and processing of related products.

Historically, pursuit of the evaluation of the quality capability of groundwater in a particular area to satisfy agricultural related needs has been left to individual landowners/growers. Several of the member districts of DCTRA extract groundwater for delivery to their landowners/growers, including Vandalia Water District, Tea Pot Dome Water District and Terra Bella Irrigation District. Sampling and testing to determine

suitability for agricultural purposes has typically been undertaken by the landowner/grower. In the case of the Terra Bella Irrigation District, as their wells are utilized for residential consumption to augment the Friant-Kern Canal source, said wells are tested on a routine basis.

As a result of the pursuit of quality related information on an individual basis, a very minor amount of information exists in the public arena as to the general water quality of the area. Older studies by the U.S. Geological Survey provide some insight as to water quality parameters, however, many of the investigations performed by said agency were specifically targeted to either problem areas or problem constituents, such as Boron and Arsenic.

This trend is being reversed as the RWQCB Irrigated Lands Regulatory Program (ILRP) General Order has been adopted and brings with it a new groundwater water quality investigation and evaluation component. Very controversial in its nature, parties have applied to represent landowners within the RWQCB's jurisdiction and that is the case within the DCTRA IRWMP area. The Tule Basin Water Quality Coalition has been recognized by the RWQCB as the third-party representative of growers in the Tule Basin. Initial steps required under the General Order include an initial Groundwater Assessment Report which was prepared with principal emphasis on the vulnerability of the groundwater reservoir to impacts from irrigated agricultural related discharges. Of particular importance, nutrient related impacts and pesticide related impacts are of high significance.

In the current agricultural arena, efforts associated with the Dairy Industry General Order, also adopted by the RWQCB, has been in place for several years. The groundwater component associated with said order is specifically related to the private wells located on dairies and monitor wells designed and constructed in locations adjacent to sumps containing dairy waste prior to land application. A substantial amount of information is currently in inventory and, while significant in nature, is restricted to those areas where dairies exist.

In contrast to the agricultural areas, characterization of groundwater supplied for municipal and industrial and rural drinking water purposes has generated a significant quantity of information related to its quality related parameters. This data is available from the individual purveyors and is lodged, by electronic transmittal, by testing laboratories directly to the SWRCB Division of Drinking Water database. Public access to this database is available electronically, with the exception of well log information. For each agency to whom the Division of Drinking Water has issued a water supply permit, they are required to issue, no later than July 1 of each year to each customer, a Consumer Confidence Report (CCR). Identified as the CCR, this document must meet specific format requirements and is designed to not only provide the drinking water customer with specific information with regard to the numeric test results related to their drinking water, but also is to provide information with respect to allowable limits and potential health effects of certain contaminants. In some cases within the IRWMP area, this CCR is provided in a bilingual format.

7.2 SURFACE WATER QUALITY

In diametric opposition to groundwater quality, significant information exists with respect to surface water quality in the agricultural regions of the IRWMP area, with little information related to water quality associated with the urban and rural developed areas. What storm water related water quality testing takes place, the data is frequently in concert with the agricultural related water quality program seeking to identify principally, any introduced contaminants which may be identified as having agricultural origins.

The ILRP program of the RWQCB, prior to the recently adopted General Order, required a surface water quality oriented program for each watershed within its jurisdiction. For the Tule Basin, this program was undertaken by the Deer Creek and Tule River Authority and information related to surface water quality under this program was developed over a period of time in excess of a decade. The data from this program is reported by each watershed to the RWQCB with test result information specifically transmitted to the State Water Resources Control Board database, which is electronically accessible to the public. Formatting requirements for information submittal have been changed from time-to-time related to this database and when those changes have been made, conversion requirements have existed to reformat prior information to satisfy the new format requirements.

In addition to submittal of the information to the SWRCB database, annual reports are prepared for each watershed which contain the specific test result information generated over the prior year along with responses to observed water quality failures.

Specific to the Tule River Basin IRWMP area, the Coalition has identified core monitoring locations of the natural waterways for sampling which are presented on Figure 7-1. The core sampling locations indicated on Figure 7-1 are identified by a legend driven system. Sampling and testing at these monitoring sites have been consistent with the orders issued by the RWQCB since the inception of testing. Additional sites have been added over time based on either identified water quality concerns or seeking out clarity on whether or not contamination exists at those locations.

For the most part, surface water quality within the IRWMP area is of very high quality. Whether the source is the Tule River, Deer Creek, a local stream group or the Friant-Kern Canal, water quality parameters not only indicate water of a high quality, but waters that are only slightly altered by the activities of man.

Where contamination has been shown to exist, steps have been taken to identify the source of the contamination and where found, to work with the landowner/grower(s) to initiate actions to bring about a change in the discharge or eliminate the adverse contaminant in the discharge.

Where water quality problems have been discovered and have not been quickly resolved, Management Plans have been generated to deal with the specific area where contamination was found and the specific contaminant. In some cases, where Management Plans have been developed, it has still not been determined if the contaminant source is from irrigated agriculture, household use of pesticides and herbicides, or commercial spraying operations such as those associated with State

highways and county roads. In some cases, discovery of contamination has been found to be associated with activities other than irrigated agriculture.

The conduct of this surface water program has transitioned to the newly formed Tule Basin Water Quality Coalition based on acceptance of said entity by the RWQCB. As the new General Order contains both a surface water element and a groundwater element, it was determined by the Deer Creek and Tule River Authority that they did not desire to directly conduct the groundwater portion of the program as required by the new General Order.

7.3 POTENTIAL SOURCES OF CONTAMINATION

Several potential sources of contamination exist within the IRWMP area. For some of these potential sources, such as irrigated agriculture, programs are in place to not only identify contaminants and the source of contaminants and to work on cessation of discharge of such contaminants, but also have structured regulatory requirements associated with the efforts. For others, such as septic tanks and subterranean leach field systems, requirements exist in some areas for monitoring of the condition of the systems and remedying identified problems, while in other areas, such regulation is totally absent. In some of the potential contaminant arenas, such as abandoned wells, there is only now a County of Tulare based program to abate the problems associated with the abandoned facilities. The following is a discussion of each of the current identified potential sources of contamination within the DCTRA IRWMP area.

7.3.1 Failing Septic Systems

In certain areas of the IRWMP, the RWQCB has issued a specific order to deal with design, inspection and operational considerations related to septic tank systems. An identified organization, typically a homeowners association, is required to report information from each homeowner related to the frequency of their septic tank pumping and, where dual leach field systems are required, the frequency of rotation between those systems.

The design of a new septic tank system is under the jurisdiction of the County of Tulare with soil percolation tests often required to accompany the design to ensure proper performance of the subterranean disposal system. Once installed, however, unless adverse conditions are noticed by an agency of jurisdiction, or complaints are received by same, no oversight exists with respect to these systems. In no cases within the IRWMP area have there been or are there studies related to the specific impacts of septic tank and subterranean disposal systems on the accumulation of contaminants to groundwater. Septic tanks are designed as biological reactors to reduce the pollution strength of certain contaminants within the waste stream delivered to the disposal system. They are not, however, designed to reduce nutrient loads, such as nitrates, which is a task often left to the soil structure which exists from the disposal area to first encountered groundwater. The adequacy of the soils to accomplish any degree of nitrate reduction is not an initial design consideration, nor are the programs to determine the efficiency of the systems in this regard. Thus, these systems have been identified as potential sources of contamination.

7.3.2 Abandoned Wells

Recent attention has been given to the issue of lack of destruction of abandoned wells within the Tule River Basin IRWMP by the County of Tulare. A current active project of the County within the KDWCD IRWMP, being conducted under a grant to the KDWCD and allocated to the County of Tulare, is a pilot program of identification of areas where abandoned wells exist which place in jeopardy existing water production facilities and to identify and implement steps to properly destroy those wells in concert with applicable State and County ordinance requirements.

While the State and the County have standards and ordinances related to well destruction, the standards are related to the abandonment procedure strictly and not to the identification of the location of these wells or conditions under which wells must be properly destroyed. Any number of circumstances can be referenced in which abandoned wells have been discovered in locations where proper destruction should have taken place, but did not. In addition, there is no identified program at any level of government to routinely seek out these locations and effect abandonment. For these reasons, abandoned wells have been identified as a potential source of contamination. These wells are of particular concern as they are drilled across water-bearing strata and act as a conduit to draw water from one aquifer to another, transporting with this water contaminants from one aquifer to another.

7.3.3 Landfills

Historically, dump operations were located with transport distance from the source to the repository being the principal locating factor. Dump closure, including landfill closures, were often conducted without consideration to downslope groundwater contamination. Brought about by regulatory change, investigations began to occur wherein it was required of dump and landfill owners to identify whether or not the subject facility was contributing to groundwater contamination. Where identified to be the case, clean-up operations were undertaken and continue to be undertaken to abate any further contribution to the groundwater reservoir of contaminants from the subject facilities. Of particular concern has been the migration from these facilities materials for which the soil mantle lacks the capability to provide reduction of the harmful effects of the material. In this family are materials such as pharmaceuticals and petroleum wastes, coupled with the household disposal of unwanted pesticide and herbicide materials. Disposal of these materials has led to Vadose Zone contamination downslope of the disposal facilities. Frequently observed at both closed sites and operating sites are extraction facilities designed to abate the effects of these contaminants. As considerable oversight exists from local, State and Federal regulatory levels, the DCTRA IRWMP does not call for an increased level of scrutiny and oversight with respect to this source of contamination.

7.3.4 LUFT

In a similar fashion to the landfill category, the program to abate the effects of leaking underground fuel storage tanks is well developed. A state-wide program, covered by a per-gallon fuel tax, collected at the pump, has been utilized successfully for several years in cleaning up and abating the effects of leaking underground fuel storage facilities. In addition to this successful program, new standards have been brought to bear for tank installations requiring double-walled tanks, sensors located between the tank walls to sense leaking from the first storage facility, elimination of underground tanks and movement to above-ground tanks and toward total containment systems wherein a leak is totally confined to a secondary area upon failure of the first. In many cases, these new regulations have eliminated the number of tanks which existed with farmsteads and individuals who previously had tanks for their use eliminating the option and fueling at commercial locations.

Based on the current State clean-up program and the current requirements related to new facility installation, this IRWMP does not call for additional oversight consideration related to fuel storage tanks.

7.3.5 Irrigated Agriculture

As previously noted in this Chapter, considerable attention has been given for some time to the potential contamination of groundwater and surface waters from sources identified as being associated with irrigated agriculture. As programs are in place, in addition to regulatory and statutory requirements, it is accepted by this IRWMP that

irrigated agriculture is a potential source of contamination. Efforts will continue to be expended to track the results of the ongoing programs, particularly as any adverse water quality occurrences may affect not only the beneficial use of available surface water and groundwater sources available to the IRWMP area, but may also affect land uses and land use planning.

7.3.6 Confined Animal Facilities

On a similar, but earlier pathway to the ILRP, the RWQCB identified confined animal facilities as potential sources of contamination affecting both surface water and groundwater. As a result, the RWQCB has placed confined animal facilities in a category to be regulated specific to certain findings of the RWQCB and with dedicated staff associated with oversight on the orders issued by the RWQCB. Unlike the General Order related to irrigated lands, the General Order related to confined animal facilities does not address representation by a third-party. Each individual operator has to respond to the General Order and while some monitoring is conducted on an area-wide or region-wide basis, reporting is still accomplished on a by-operator basis.

In addition to State oversight and regulation, the County of Tulare requires Conditional Use Permits for confined animal facilities. The process of issuing these permits involves a significant degree of scrutiny and oversight often requiring an in-depth and extensive environmental document which first must be considered, prior to any permit-related action.

As with the ILRP, it is a practice of the IRWMP process to track RWQCB actions related to confined animal facilities, County actions with regard to same and monitoring for trends from the reported outcomes of groundwater sampling and testing. These activities of the IRWM are envisioned to continue with the same, or increased, oversight by DCTRA.

7.3.7 Publicly Owned Treatment Works

Wastewater treatment and disposal systems serving urban and rural areas are subject to the Waste Discharge Requirements process of the RWQCB. Discharges to surface water require not only that action, but an additional action of the issuance of a permit under the National Pollution Discharge Elimination System (NPDES) which, in California, allows for primacy to be exercised by the SWRCB under agreement with the Federal Environmental Protection Agency. As a part of adopted and issued permit processes for both Waste Discharge Requirements and NPDES permits, a substantial monitoring and reporting program is a part. In addition, the RWQCB has instituted a spill notification program associated with sanitary sewer collection systems which require monthly reporting at a minimum and short-term reporting of any spill incident. In addition to written reports being required to be submitted to the RWQCB, monthly test result information is required to be submitted to the SWRCB database, which is accessible to the public electronically.

The siting of treatment and disposal facilities is a land use issue, not only for each of the counties of jurisdiction within the IRWMP, but also for the applicable Local

Agency Formation Commissions. Issues related to spheres of influence, boundary expansions and types of development are given consideration in the County arena and by the Local Agency Formation Commission. A part of any of the major facility permit requirements is a Groundwater Monitoring Plan, with its separate requirements. Data from these programs is often required to be submitted monthly and at most quarterly, in order to allow for any adverse trends to be identified quickly and steps taken to identify and correct any adverse condition. At the current time, this information is not tracked, nor analyzed as a part of the IRWMP process.

7.3.8 Storm Water Runoff

Storm water runoff is generated from a number of sources including native pasture and irrigated lands, county and state highway systems, developed rural and urban areas and isolated commercial and industrial processing facilities, including packing sheds and cold storage facilities. For areas subject to structurally intense development procedures, County permit requirements typically mandate retention basins be developed as a part of the development package. The design characteristics associated with these facilities are such that they address retention of storms to a defined frequency in the on-site facilities.

In a similar fashion, rural concentrated development and urban development is accompanied with the design and construction of storm water collection and detention facilities designed to what has been identified as a level where, for most precipitation conditions within the IRWMP area, are considered to be the dominant pattern. In some

cases, storm water systems discharge to public district and ditch company facilities by agreement and to natural stream systems in order to eliminate the need for the acquisition and development of land for the purpose of retention of the developed waters. With very few exceptions, mostly associated with the ILRP, testing of the quality of these waters is not accomplished, certainly not on a schedule driven basis. The water quality test results associated with storm water discharges incorporated into the ILRP are monitored by the DCTRA IRWMP as a normal activity of staff of DCTRA member units and their consultants. As noted, beyond the ILRP efforts and the aged efforts of the U.S. Geological Survey, water quality information associated with storm water discharges is virtually non-existent.

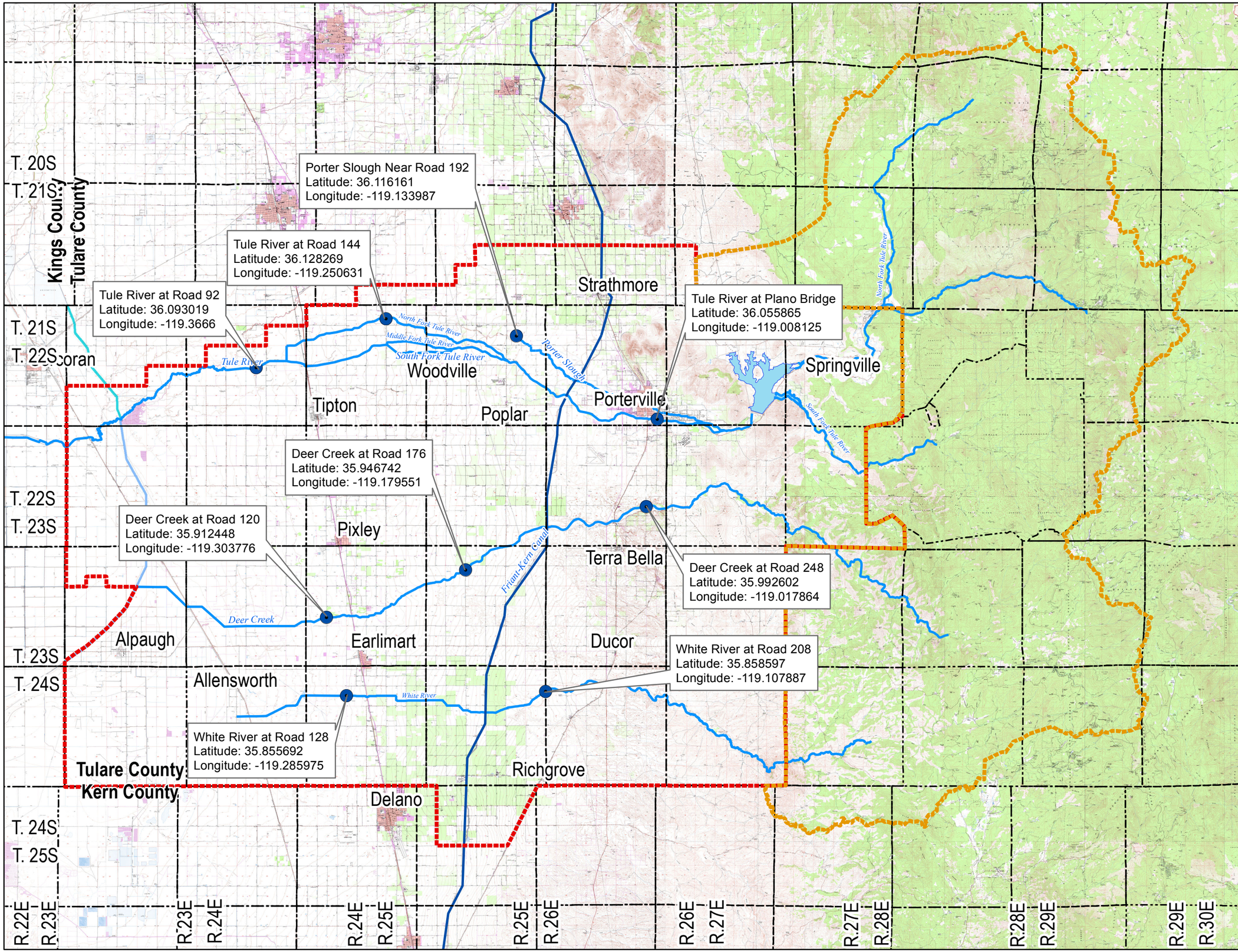


FIGURE 7-1
TBWQC Surface Sampling Locations

CHAPTER 8
FLOOD CONTROL

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

8.1 CURRENT FLOOD CONTROL PROGRAMS

8.1.1 Federal Flood Control Program

The administration of the elements of the Federal flood control program within the Deer Creek and Tule River Authority (DCTRA) Integrated Regional Water Management Plan (IRWMP) area is administered by the Sacramento District of the U.S. Army Corps of Engineers. The Sacramento District is extensive, covering areas of eight (8) individual states. It covers the trough of the great Central Valley extending from above Lake Shasta on the north to the Tehachapi Mountains on the south and extending to the crest of the Sierra Nevada adjacent to the IRWMP area and northerly into the Klamath Basin in Oregon. Originally a part of the San Francisco District, it was formed in 1866 with boundaries including the rivers and waterways within areas drained by the Sacramento and San Joaquin Rivers extending to Suisun Bay. Reformed into the Sacramento District in 1968, it is the second largest district in the United States and has

an area of coverage of 290,000 square miles. The District is under military leadership, typically in the form of an Army Colonel, who carries the title of District Commander.

In the context of the IRWM, Success Dam was constructed under the jurisdiction of the U.S. Army Corps of Engineers and was completed in 1961. The USACE, as it's known, takes its direction from Congress, for example, utilized the authorization of Congress in the Flood Control Act of 1944 to construct Success Dam. The USACE has day-to-day responsibility for the operations of the Dam and Success Reservoir, subject to local participant agreements, wherein non-federal flood control components are addressed as to their interface with the flood control aspects of a given project.

Utilizing single-purpose legislation, the USACE initiated studies in 1992 for the Lake Success enlargement project which resulted principally in a spillway modification. Also operated under the umbrella of an agreement with the USACE is the hydroelectric generation facility of the Lower Tule River Irrigation District which has an intake penstock through Success Dam, a powerhouse on the downslope face and a discharge into the Tule River downstream of the dam. Close and well-managed cooperation exists between the local water supply and power generation entities, including that of the Watermaster of the Tule River Association.

8.1.2 State Flood Control Program

The State of California Flood Control Program is managed under the guidance of the Central Valley Flood Protection Board. Previously known as the California State Reclamation Board, regulatory authority for the Board's business and actions were first

authorized in 1911 and were intended to reduce the risk of flooding within California's Central Valley. The Board was restructured in both 2007 and in 2009 and has as its current principal task, the review, update and adoption of the Central Valley Flood Protection Plan.

Acting in a similar fashion to the DCTRA IRWMP, the Central Valley Flood Protection Board now evaluates water issues, not just from a flood protection perspective, but also by including water management programs that combine flood management, ecosystem enhancement, water supply and land planning actions in an attempt to deliver multiple benefits, in lieu of a single flood protection benefit.

In 2013, the agency initiated a strategic planning process resulting in the adoption, in mid-year, 2013, of Governance Principals and a Strategic Plan. The Strategic Plan calls for the Central Valley Flood Protection Board to seek out new and innovative ways of managing flood risks, while at the same time attempting to reduce cost and maximize the per-dollar spent impact.

Within the IRWM area, the interface with the Central Valley Flood Protection Board is as the State participant in flood control projects such as the enlargement efforts related to Success Dam and issues related to floodway designation and floodway management on the Tule River and defined distributaries.

8.1.3 Tulare County Flood Control Program

Within the DCTRA IRWMP, local flood control issues in non-urban areas are under the jurisdiction of a special district identified as the Tulare County Flood Control

District. While often confused as a function of the County of Tulare, as it is frequently staffed by County employees, it is nonetheless a special district, separate and apart from the County of Tulare.

A principal function of the District is to work on local flood control projects within the County and, at the current time, all of the projects which the District is working on are in the Tule River and White River watersheds. The District played a role in the recent enlargement of Lake Kaweah representing those property owners in the rural unincorporated areas potentially affected by flooding related to the Kaweah River.

Principal in their current functions is their part in the National Flood Insurance Program which has required the County of Tulare to agree to manage flood hazard areas by actively adopting minimum regulatory standards as set forth by the Federal Emergency Management Agency (FEMA). Through this program, individuals are eligible to obtain flood insurance. The District is heavily involved with the Map Modernization Project of the Federal Emergency Management Agency and, since 2009, has adopted the new Digital Flood Insurance Rate Maps as a part of the flood insurance program. The District maintains a current and interactive website which is utilized principally in the map related programs.

8.1.4 City Flood Control Programs

For the most part, the storm water program of the City of Porterville, the only city located within the IRWM boundaries, is engaged in storm water management, in lieu of flood management. Due to its location associated with the Tule River and Porter Slough,

the City of Porterville has been a direct participant in the Lake Success Enlargement Program. In a similar fashion, following the devastating flood of Christmas of 1955, the City and a number of downstream agricultural landowners were the main drivers in succeeding to achieve the financing and construction of Success Dam. At the current time, the City is engaged with the federal government in their floodway mapping programs and seeks to stabilize that program and make meaningful changes to the manner in which policies are established and enforced relative to flood map generation and flood zone determination.

The City of Porterville has been a supporting agency in the Lower Tule River Irrigation District Tule River and Porter Slough channels maintenance agreement, the major element of which is to attenuate the damaging release flows from Success Reservoir into the Tule River and Porter Slough and reducing the flooding impact on the City and lands adjacent to the Tule River resulting from reduced channel carrying capacity. The other financial participants to the Channel Clearing and Maintenance are the Tulare County Flood Control District and the Tule River Association.

8.2 FLOODING PLANNING ISSUES

A number of flood planning issues are currently in the forefront in the DCTRA IRWMP implementation process. Beginning with the USACE dam seepage and seismic evaluation issues related to Success Dam, IRWMP stakeholders are heavily involved in the issues and potential outcomes of the resolution of these issues and moving back to the original issue of increasing the storage capacity of Success Reservoir. The interim

outcomes have dictated that Success Reservoir is allowed to operate at full storage. In addition, as a principal function of IRWMP participants is channel maintenance, maintenance of the flood channels downstream of Success Dam are a continuous occurrence. Whether in planning or implementation, manpower, equipment and expense is continually directed at these channel maintenance activities. The activities are carried out under permit authorities including the Federal 404 permit process and the State of California, Department of Fish & Wildlife Section 1602 permit process.

In discussion form, issues related to climate change and flood control concerns are beginning to take shape. As flood damage is envisioned to be at its greatest within the IRWMP area based on rainfall events on unregulated watersheds and on high-elevation warm rainfall on top of significant snow pack, climate change intensifies one of these paradigms and drastically alters the other. It is envisioned that discussion will continue relative to this issue until sufficient direction is generated with respect to potential projects which can be designed and implemented to alter the effects of climate change and to address a change in runoff configuration from predominantly snowmelt to a mix of snowmelt and rainfall. It is envisioned that a paradigm shift completely to a rainfall pattern is of such draconian proportion so as not to be in the realm of reasonable discussion at the current time.

CHAPTER 9
KEY ISSUES, REGIONAL PRIORITIES AND WATER MANAGEMENT STRATEGIES

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

9.1 KEY REGION WIDE AND WATERSHED-SPECIFIC ISSUES

9.1.1 Overview

A number of issues are of key position within the Tule River watershed and a significantly reduced number at the region wide level. Of principal magnitude, is the formation of an Integrated Regional Water Management (IRWM) Group, approval of this plan (IRWMP) and determination of the initial form of governance for implementation and oversight of the Plan. Beginning with the formation of the Deer Creek and Tule River Authority (DCTRA), coordinated water management became the focused issue of the member agencies of the DCTRA. It was envisioned that far greater strides could be made with respect to program and project implementation if partnerships were forged between willing parties, than could be accomplished if individual parties pursued like issues on their own. Agreements and projects began to fall into with place

with this changed paradigm of thinking which has resulted in the relationship between IRWM participants and stakeholders that exist today. The leadership position of DCTRA has been discussed over the years between participants with no other contenders or viable options being placed before the participating entities at any time.

With the advent of the State of California recognizing the value of water management integration and structuring allocation of bond funds around integrated regional management concepts, interest in the governance issue and, in particular, the governance leadership model, has been rekindled. As to whether this interest is driven by water management related interests or project funding interests, the issue will probably remain unanswered until a point in time when funding of projects falls once again to the local participants without any assistance from State and/or federal agencies.

To demonstrate the gravity of this issue, the issue will be put to the test as procedures move forward to adopt a Memorandum of Understanding formalizing the IRWM structure, addressing governance issues and addressing IRWM funding efforts and procedures. Issues as to what type of plan it is, whose plan it is and the plan maintenance are specific issues. In particular, debate will certainly exist at some point in time over issues introduced into the IRWMP as a result of IRWMP plan review and approval guidelines established by the State Department of Water Resources (DWR). A few of the issues which have been introduced into the IRWMP structure as a result of the DWR review and approval process are not felt to be applicable water management elements in the Tule River Basin. Of particular note is the degree of required attention and response to the issue of climate change and the response to

climate change from a water management standpoint. While there is little debate within the Tule River Basin with respect to whether climate change exists or not, considerable debate exists as to the extent that time should be spent trying to develop plans to respond to the issue, as compared to the historic area-wide planning process that is complementary to the impacts expected with climate change. Given the recent 20 year plus experience related to the project to add additional storage to Success Reservoir bringing with it a significant improvement in flood control benefits, brings rise to the question of how quickly water development projects can be created and implemented which are of any sufficient magnitude. Whether or not the topic of planning for a climate change shift of predominantly rainfall runoff as compared to snowmelt runoff can be sustained over the near term remains to be seen, as does the response of land use planners to a situation wherein either considerable more storage infrastructure would have to be developed or considerably more land will have to experience flooding conditions than currently exists. The role which the U.S. Army Corps of Engineers has is major in this regard and the manner and the degree to which they respond will define the responsibility of others relative to climate change.

It remains to be seen whether the Whose Plan? issue becomes one which pits agricultural water users, who have rights to the majority of the surface water rights in the Tule River Basin against rural and urban water users whose sole source of supply currently is groundwater. A high level of cooperation exists today between these disparate interests based on what is viewed as common interests. Whether time and declining groundwater conditions modify that relationship remains to be seen.

The final overview issue is related to the relationship between water quality and land use planning. Even today, confrontation is beginning to develop over approval of land uses in locations where the end use being planned for necessitates a water supply which is compliant with state and federal drinking water standards. Approval of land uses in deference to water quality are continuing to proceed with the end result being the unavailability of compliant water quality sources to the end users, oftentimes not realized by end users until significant economic decisions have been made. Considerable improvement relative to this issue is being requested by a number of parties, not only from the discussion standpoint, but also from the implementation standpoint.

9.1.2 Region-wide Issues

In addition to the overview issues presented in Section 9.1.1, a number of other issues are at hand. Leading these issues are the conditions of the groundwater reservoir underlying the lands within the ILRP, the cost to extract water as groundwater levels decline and changes in water quality associated with both legacy land uses and current land use practices. The role of Groundwater Management Plans is likely to change in the future with the possibility existing that local control of groundwater could become centered in a state-wide system such as that headed by a state engineer, where local input is directed through the veins of public comment, political comment and judicial related actions. Accompanying those changes are very active programs related to Basin Plan water quality objective changes, impacts related to implementation of the San Joaquin River Restoration, destruction/restoration of threatened and endangered

species habitats, along with the recovery programs associated with threatened and endangered species, and, as previously mentioned, the interface between current water managers, principally in the agricultural realm and water managers in the urban setting, particularly those who are in areas of declining groundwater conditions.

The final issue deals with that of disadvantaged communities. While the IRWMP planning area consists of predominantly agricultural land and urbanized areas, a number of population concentrations and rural residences exist for which the economic base of the home unit is considered to be disadvantaged. In recent applications submitted by water and sewer utility service providers to State agencies, information was generated detailing how the majority of the population served by these agencies were determined to be severely disadvantaged. Therefore, approximately one-half of the population of the IRWMP area falls into the disadvantaged definition but, more importantly, a significantly high percentage of that population falls into the severely disadvantaged category. As will be discussed later in this chapter, response to this issue, in earnest, began several years ago with processes and procedures being agreed upon to initiate a proactive approach to resolving water management problems related to this disadvantaged segment of the IRWMP population.

Through the course of the last 25 years, progress has been made through the collective DCTRA process in addressing issues such as surface water export and groundwater mining and export. As an example of the types of policies which are developed on an integrated water management based approach, the collective policies of the DCTRA member units is offered. These policies have been adopted in the early

years of the approach to integrated water management and are based on the intent of the Tule River Basin parties to retain waters of the Tule River and its tributaries within the Tule River hydrologic surface basin, now referred to simply as the "Basin." Boundaries as to use of Tule River water have been generally agreed upon, as were specific water management procedures, such as allowing water to leave the Tule River Basin during dry and critically dry situations. Such transfers were based in allowing relief to growers/landowners and urban users in other areas which do not enjoy the same conjunctive use capability as exists within the Tule River Basin.

As a dynamic planning document, this IRWMP is designed as a document to be flexible enough to deal with the fact that some of these issues will find resolution, while other issues will be brought to the table to be dealt with from the interactive process that exists between the Board of Directors of the DCTRA, its member units and their staff and consultants and the individuals participating in the Stakeholders Advisory Group. As always, public participation and public comment will be an integral element in the functioning of the IRWMP.

9.2 REGIONAL ACCEPTANCE PROCESS

In 2009, the DCTRA member units were invited to participate in a review process, in concert with the Kaweah Delta Water Conservation District (KDWCD) utilizing guidelines developed by DWR, for what was designated as the Regional Acceptance Process (RAP). At that time, the DWR had previously found that the planning effort and the geographical boundaries of the KDWCD IRWMP to be a "deemed acceptable" plan covering the Kaweah River Basin. Documents were

submitted at that time in support of concurrence by DWR of the KDWCD and DCTRA's positions relative to the RAP process.

For an approximately two (2) year period of time prior to the RAP application being submitted, the Stakeholders Advisory Group had been meeting to deal with a number of issues, particularly those related to water quality and water quantity issues. The process was designed to address those topics, whether the subject water user was agricultural in nature or was a domestic consumer. Coming out of the process were a number of conclusions and agreement as to processes which could be followed to change the circumstance, for instance, of a community with a water quality problem, no governance structure and a need to address the deficient quality conditions.

This information was provided to DWR who scheduled a formal review process with KDWCD, members of its Stakeholders Advisory Group and DCTRA. Coming out of this process, the DWR determined that all aspects of the IRWMP planning process were adequate, with one (1) exception, and that was the KDWCD plan was confirmed to be a "deemed equivalent" plan. Further, that KDWCD was an eligible applicant to apply for Round 1 implementation funding made available through the passage of Proposition 84.

The one (1) exception which the DWR desired to be pursued further was the potential integration of the IRWM efforts in the Kaweah River Basin with those in the Tule River Basin. Substantial confusion over the exact directive from the DWR over the RAP condition existed for a significant length of time. The matter was finally clarified when DWR issued language indicating that "the Kaweah River Basin and the Tule River IRWM regions must explore options on how best to structure the regional

boundaries in this area." With that clarification, intense effort began between the governing boards of the KDWCD and the DCTRA to address the issue. Joint and independent work sessions were set with the governing boards with a joint meeting of the respective boards occurring where draft alternative positions were presented for consideration and instruction. Policy direction was given to staff and consultants to draft a formal position for consideration for adoption by both governing boards. An evaluation process occurred, culminating in a formal joint decision being made by both governing boards. A copy of the overview of the decision which was before the governing boards is attached hereto as Appendix G. In addition, Appendix G also contains a copy of the staff recommendation which was generated as a result of the joint board efforts. The recommended actions from the staff report were adopted in July, 2013, by both governing boards.

9.2.1 Recommended Response to RAP Process Recommendation

Ratified by both the governing boards of KDWCD and the DCTRA, the following five (5) recommendations were instructed to be adopted. The adoption was as policy instruction and are as follows:

1. The Kaweah River Basin and the Tule River Basin would continue their existing Integrated Regional Water Management procedures and implementation of related policies as they apply to each specific basin;
2. That the IRWM Plan structures be developed on a DWR acceptable format specific to each river basin;

3. That the existing Kaweah River Basin Advisory Group be retained and expanded to include Tule River Basin membership. The Advisory Group meeting location would be rotated between the basins so as to encourage participation by water management entities and disadvantaged communities specific to each basin. A specific task given to the Advisory Group would be to address the project evaluation process and, in particular, the evaluation of projects from the perspective of improvement if projects were designed on a multi-basin format, in lieu of just a single basin format;
4. That specific steps be taken to update and expand the prior activity of the DCTRA to delineate needs and capabilities within the participating entities between both Plan areas; and
5. This structure should be reviewed in no more than five (5) years to allow for the opportunity of strengthening, confirmation or modification of the policies and procedures based on the success of implementation.

The policies instructed to be put into place as of the date of final Board action have been put into effect. Written plan development for the Kaweah River Basin is evidenced by a DWR approved document and this parallel document is being completed which will be considered by the DCTRA by the fall of 2015. Conformation of the acceptance of the actions of the governing boards relative to the integration considerations were formally accepted by the DWR. The letter evidencing that acceptance is presented in Appendix H.

9.3 REGIONAL PRIORITIES

9.3.1 Short-Term Priorities

Within the DCTRA IRWMP process, short-term priorities have been defined as those which can be implemented within a five (5) year time frame. In the development of the list of projects process whereby projects are submitted to the Stakeholders Advisory Group for consideration for ranking for project funding, the priorities fall into three (3) focused areas. The first of these is addressing drinking water quality issues, on a basis that covers the entire IRWMP area. This includes urban suppliers, rural water suppliers and individual rural water systems.

The second priorities fall into the category of water supply reliability and the priority is effective for both agricultural suppliers, as well as municipal and industrial suppliers. It is acknowledged that a declining groundwater reservoir, expressed in terms of both elevation and storage volume, is not in the best interest of any type of supplier. The third category is related to improved water management. Expressions of these priorities are related to control systems, replacement of older and deteriorated distribution facilities and pumping facilities and improved coordination between water rights holders in the Tule River Basin. It is acknowledged that it is the latter category that has the most chance of success, however, recent changes at the State level related to the drinking water program, have generated expressed hope from disadvantaged community representatives that projects can be designed and implemented for the benefit of those with less than adequate quantity and/or quality within the five (5) year planning and implementation horizon.

Additional priorities for the five (5) year term include completing the updates to the Groundwater Management Plan of the DCTRA, along with annual updates, further defining the role of urban water suppliers utilizing groundwater in the Tule River Basin groundwater management activities and completing the update to this IRWMP as contractually will be required by DWR IRWMP approval.

9.3.2 Long-Term Priorities

In the planning horizon of five (5) to twenty (20) years, the priorities turn to larger-scale items such as retarding the decline of groundwater elevations within the entire IRWMP area. Central to this issue is participating in the resolution of a much larger issue, that being conveyance of water from Northern California river systems through the Sacramento-San Joaquin Rivers Delta and south to both State Water Project and Central Valley Project contractors. As is being demonstrated in the current paradigm, solution impact also extends to the San Joaquin River exchange contractors and the importance of making water available south of the delta for protection of the Friant Division, CVP supplies. Lacking a resolution to this problem on a 20-year horizon will change the groundwater dynamic within the DCTRA IRWMP considerably. There is an insufficient supply, under any hydrologic conditions, when coupled with storage and conveyance capacity restrictions on the east side of the valley to overcome the impact on the Tule River Basin groundwater decline to the degree necessary to prevent wholesale cropping and land development changes within the IRWMP planning area.

An additional long-term goal will be the determination of the success of any pilot program within the DCTRA IRWMP area of providing assistance to those who have either inadequate drinking water quality or quantity and lack the sufficient resources to implement programs to effect changes in either parameter. This program will be described in greater depth later in this chapter, but is an integral component of the value of IRWM planning. Coupled with this issue will be the demonstrated success or failure to deal with land use policies such that developments, of any size, cease to be approved to be placed in locations with known water quality failure problems. The loop which is currently in evidence within the IRWMP area of creating drinking water problems faster than they are solved will either be overcome or not in this planning horizon.

It is not envisioned that any major structural changes will occur within the IRWMP area in this planning horizon with respect to either flood control related issues, or structural considerations designed to specifically address climate change in and of itself.

9.4 WATER MANAGEMENT STRATEGIES

9.4.1 Resource Management Strategies

9.4.1.1 Introduction

The California Water Plan Update of 2009 identified a litany of issues identified as Resource Management Strategies (RMS). Considerable attention is given in the IRWMP evaluation guidelines to the degree to which these RMS issues are addressed, both as separate topics, as well as integrated topics. While a few of the RMS topics are outside of the scope of this IRWMP, such as

enhanced surface storage under CALFED, the majority of the RMS topics are embodied in everyday water management decisions and strategy developments within the IRWM planning structure for the DCTRA.

RMS are defined in the 2009 update to the California Water Plan as projects, programs or policies that help local agencies and governments manage their water and related resources.

RMS can include structural and non-structural solutions, or even a combination of both. Structural solutions involve development of constructed facilities such as conveyance structures, consisting of pipelines or canals, recharge ponds and water treatment facilities. Non-structural solutions include policy solutions or programmatic approaches to water management issues.

The aforementioned 2009 California Water Plan Update describes 33 different RMS. It is not anticipated that all strategies are applicable to every region of the State, but encouragement is given to foster and implement as many strategies as practical to diversify water management efforts. This IRWM Plan evaluates all 33 strategies contained in the 2009 California Water Plan Update with these evaluations including consideration of the following:

(1) Description of the RMS;
(2) Discussion of the current applicability to the Tule River Basin;
(3) Evaluation of the current use of the strategies in the Tule River Basin;
(4) Discussion of constraints to implementation or constraints to enhancement;
(5) Discussion of potential impacts of climate change on the strategy; and
(6) Ability of the strategy to help adapt to climate change impacts.

Presented in Table 9-1 are each of the RMS contained in the 2009 California Water Plan Update. A notation as to their current applicability to the Planning Area is noted. For those noted as not currently being applicable, they will be subject to periodic review as part of the IRWM Plan's implementation procedures. Currently, 22 of the RMS are applicable to the Tule River Basin which has resulted in a successful portfolio of resource management strategies.

TABLE 9-1
RESOURCE MANAGEMENT STRATEGIES
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Category	Strategy	Applicable to Region
Reduce water demand	Agricultural water use efficiency	X
	Urban water use efficiency	X
Improve operational efficiency and transfers	Conveyance – Delta	
	Conveyance – regional/local	X
	System reoperation	
	Water transfers	X
Increase water supply	Conjunctive management and groundwater storage	X
	Desalination	
	Precipitation enhancement	X
	Recycled municipal water	X
	Surface storage – CALFED	
	Surface storage – regional/local	X
Improve water quality	Drinking water treatment and distribution	X
	Groundwater remediation/Aquifer remediation	X
	Matching quality to use	X
	Pollution prevention	X
	Salt and salinity management	
	Urban runoff management	X
Improve flood management	Flood risk management	X
Practice resource stewardship	Agricultural lands stewardship	X
	Economic incentives (loans, grants & water pricing)	X
	Ecosystem restoration	X
	Forest management	
	Land use planning and management	X
	Recharge area protection	X
	Water-dependent recreation	
	Watershed management	X
Other strategies	Crop idling for water transfers	X
	Dewvaporation or atmospheric pressure desalination	
	Fog collection	
	Irrigated land retirement	X
	Rainfed agricultural	
	Waterbag transport/storage technology	

9.4.1.2 Agricultural Water Use Efficiency

Agricultural water use efficiency is applicable in three (3) areas within the IRWM Planning Area. These areas are distribution of source waters, distribution of entitlement by the water rights holding entity and on-farm efficiency. Agricultural water use efficiency in each of these areas can be improved through a variety of measures with the improvements occurring based on actions of the DCTRA or the Tule River Association (Association) by the water rights holder which may be a public entity such as a water district or an irrigation district, or a private-stock mutual water company and by local landowners/growers. The 2009 California Water Plan Update lists 16 Efficient Water Management Practices (EWMPs). These are as follows:

1. Water Management Plan;
2. Water Conservation Coordinator;
3. Water management services to water users;
4. Improved communication and cooperation;
5. Policy changes;
6. Facilitate alternative land use (drainage);
7. Facilitate use of recycled water;
8. On-farm irrigation system improvements;
9. Water transfers;
10. Canal lining and piping to reduce seepage;
11. Flexible water ordering;
12. Spill and tail-water recovery systems;
13. Conjunctive use of surface and groundwater;
14. Automate canal/control structure telemetry;

15. Water measurement and water use reporting; and
16. Pricing or other incentives.

Most of these EWMPs are employed throughout the Tule River Basin. Initial implementation and continual effort to analyze and employ these practices are an important component of water management. In some cases, an EWMP may not be applicable to the Planning Area as for instance, no drainage problems exist to any significant degree within the Tule River Basin. As another example, where conveyance system piping occurs, it is often within an area converted to urban use where impact fees have been paid allowing for construction of an offsetting recharge area. In some areas where piping has been employed, the piping is actually laid in the prior open channel section. Only dry-year supplies are conveyed through the pipeline system, whereas normal and above-normal year supplies are still conveyed in the open channel sections, thus allowing for groundwater recharge to occur. For certain of the EWMPs, implementation is on a Basin-wide basis. These include water management services to water users wherein on-farm advice is made available to growers in the entire region.

Likewise, several entities within the Tule River Basin are signatory to the Memorandum of Understanding of the Agricultural Water Management Council. Said organization is a non-profit that promotes improvements in agricultural water efficiency and provides technical assistance in the preparation of plans which detail implementing policies, outlines the methods by which assistance is provided and documents efforts to implement the goals associated with EWMPs.

For those areas which have surface water supply service through a contractor from the Friant Division, CVP, Water Management Plans meeting the requirements of the U.S. Bureau of Reclamation and the Agricultural Water Management Council have been prepared. Annual reports and 5-year updates to these plans are required by the repayment contracts associated with the allocation of CVP Project Water.

The majority of the water supply entities within the Tule River Basin are public in nature, thus eliminating obstacles to implementing EWMPs, as compared to areas which are principally served by non-public agencies. Funding and cost-effectiveness of efficiency related issues pose an obstacle, which is often only overcome by dry-year conditions. Local conditions such as topography, micro-climates and flood control channel maintenance issues also impede implementation of EWMPs.

9.4.1.3 Urban Water Use Efficiency

Principal to urban water use efficiency is the issue of behavioral improvements that lead to the decrease of indoor and outdoor residential, commercial, industrial and institutional water use. To a lesser degree, unlike agricultural water use efficiency, technological improvements are readily employed as only cash expenditures are required to be made, in lieu of modification of behavioral patterns. Best management practices (BMPs) or demand management measures (DMMs) are the measures typically set forth by

regulatory and advisory authorities with the more common practices and measures being as follows:

(1) Water use survey programs;
(2) Residential plumbing retrofits;
(3) Water system audits;
(4) Water metering;
(5) Large landscape conservation programs;
(6) Clothes washing machine rebate programs;
(7) Public information programs;
(8) School educational programs;
(9) Conservation programs for non-residential users;
(10) Wholesale agency assistance programs;
(11) Inverse tiered conservation pricing procedures;
(12) Availability of Conservation Coordinator;
(13) Water waste prohibition ordinances; and
(14) Reduced-flow water closet replacement.

Most of these BMPs and DMMs are in place within the Tule River Basin. The level of implementation and the practice varies, however, based principally on the implementing agency. The City of Porterville has extensive urban water conservation goals, policies and programs, well funded and properly administered. New conservation measures are constantly being examined and some, as demonstrated in current drought conditions, implemented with relative ease.

State legislation, in the form of SBx7-7, also known as the Water Conservation Act of 2009, established a goal of reducing per-capita water use of

20 percent by 2020. That goal has been required to be met earlier by an implementing executive order related to the current drought situation, implemented principally by actions to require mandatory reduction in outside watering. Where landscape conversions are taking place in order to reduce consumption, most have the capability of being accomplished on a permanent basis which could result in a long-term reduction in water demand.

As with agricultural water use efficiency, obstacles exist to implementing efficiency measures in the urban setting. Principal amongst these conditions is still the attitude issue, exemplified in public acceptance, followed by issues such as lack of adequate funding programs, the economy of providing additional supply as compared to reduced use where the supply vehicle is groundwater and, where meters are employed, increased rates where lower water sales result and the revenues related to metered rate structures have been improperly constructed leading to increased rates when consumption is reduced.

9.4.1.4 Conveyance-Delta

Conveyance through the Sacramento-San Joaquin Rivers Delta includes the management, movement and diversion of water from that area. Approximately 5,309 acre-feet of Delta-base supply is applicable to the County of Tulare, with 100 acre-feet being contracted for by the Saucelito Irrigation District and 45 acre-feet by Styro-Tek. Four hundred acre-feet is also contracted for delivery by the Strathmore Public Utility District. This contract supply is not currently being employed for other than groundwater recharge purposes and thus a significant reliance on Delta related diversions only exists within the Tule River

Basin by Friant Division, CVP contractors. The majority of the supply coming into the Tule River Basin which is of a Friant Division, CVP nature, is split between Class 1 and Class 2 supply, with the Class 2 supply principally from Purchased Water Contract supplies from the natural flows of the San Joaquin River, not connected with diversions from the Delta.

9.4.1.5 Conveyance-Regional/Local

Conveyance is that action to move water from its source to areas of need. Conveyance within the Tule River Basin consists principally of utilization of natural channels and earthen constructed facilities, many of which incorporate significant elements of historic natural channels. At the district and ditch company level, constructed facilities, such as diversion facilities and canals, exist with, as previously noted, limited employment of pipelines and pumping facilities. These conveyance facilities range in size from larger systems employing relatively high capacity earthen channels to small, local, end-user distribution systems that deliver water to specific landowners/growers. Urban related deliveries are only those associated with groundwater recharge with two (2) surface water treatment facilities existing within the Planning Area serving Strathmore and Terra Bella. For the most part, larger conveyance systems utilized for delivery of agricultural supplies are also facilities utilized for flood control purposes and management and maintenance activities are principally oriented toward the flood control aspect. As a result, only during times of high Tule River releases from Success Reservoir are these facilities inadequate to

convey water to areas for distribution for use and/or recharge and few problems exist distributing available volumes to meet peak summer demands.

The same systems are utilized to convey storm waters during the winter periods and coordination efforts must be employed to ensure proper conveyance and disposal of storm water related flows, along with Tule River entitlement flows mandated to be released from Success Reservoir for flood control purposes. Based on the fact that improved automation and controls can increase operational flexibility, some steps have been made to begin to automate controls on the Tule River system and further, telemetry systems to monitor diversions to ensure that any losses associated with spills are reduced to as close to a zero level as possible.

Climate change may affect this paradigm wherein demand for higher conveyance capacity may increase if the timing and volume of flows changes due to atmospheric warming trends. In addition, increased capacity may be needed to deliver water during periods of the year which are not the prime growing season, as well as to deliver higher volumes of water than are currently experienced for short periods of time.

9.4.1.6 System Reoperation

System reoperation is defined as actions taken with respect to existing operational procedures related to reservoirs and conveyance facilities to alter water related benefits. System reoperation is typically examined in the context of improving the delivery of water to improve the efficiency related to existing uses or to impose improvement in one use over another. For instance, operation of

reservoir releases for power production would be enhanced if releases were during a defined period of peak power use, as compared to running a generator on a run-of- the-river basis, where releases are dictated by agricultural water demands.

Water rights on the Tule River are managed by the Tule River Association (Association). Agreements exist between all of the pre-1914 water users associated with the Tule River and the major riparian users of River water. These agreements define the operational policies for the member units and have proven to be instrumental in reducing conflicts between water users, in establishing guidelines for management of available supplies and to ensure compliance with State law relative to water rights priorities.

As the Tule River watershed is relatively small, a fishery does not exist below Success Reservoir. Unlike other stream systems where flow exists on a year-round basis, examination of system reoperations does not involve fisheries related impacts. Significant system reoperation procedures are felt to be limited with respect to existing systems. Storage limitations associated with Success Reservoir exist, particularly from November 15 to May 1 of the following year as the reservoir is operated exclusively for flood control purposes. The balance of the year, system operations are tuned to the desires of the water rights holders and the demands of stockholders to meet the requirements of their existing demands. Individual entities currently are experimenting with operational changes, some due to power generation enhancement, as compared to water use efficiency modifications.

Changed conditions in the future could result in a basis for reoperations and, thus, the issue needs to be periodically evaluated. These changes could include impacts related to proposed changes in groundwater regulations, as well as climate change induced conditions.

9.4.1.7 Water Transfers

Established California legal statutes define water transfers as temporary or long-term changes in the point of diversion, place of use or purpose of use resulting from the transfer or exchange of water or related water rights. Water transfers are a recognized beneficial water management tool within the Tule River Basin, with specific guidelines established for both in-Basin and external Basin transfers and exchanges having been developed over the years. Such guidelines development has been based on the demonstrated capability of transfers and exchanges to accomplish the securing of new supplies, to increase supply reliability, to assist in maintenance of the groundwater basin and addressing droughts and associated overdraft conditions. In some cases it has been based on generating revenue during certain market conditions to be leveraged to future water purchases during the existence of more ample water supply conditions. For instance, a reduced period run during dry year conditions can result in income being generated sufficient to allow for purchase of external Basin supplies sufficient to run for weeks in length. Foregoing a few days of water run and associated loss patterns, in exchange for recovery of all water lost and a multiple supply imported with funds

generated from the initial transfer are recognized as significant water management tools within the Tule River Basin.

These transfers and exchanges are not without constraint. Many ditch companies with pre-1914 water rights have long established boundary restrictions for delivery of their water rights. Many adhere to an unwritten Basin water transfer policy which restricts the conditions under which transfers can take place and requires findings by the Watermaster and the Association Board of Directors prior to a transfer being approved. To a limited extent, additional constraints are imposed based on costs established for water being made available for transfer, Groundwater Management Plan Memorandum of Understanding constraints and restrictions and facility related issues. For out-of-Basin transfers, additional restrictions are imposed by the U.S. Bureau of Reclamation as Federal facilities are required to be utilized in out-of-Basin transfers. Mechanisms are currently in place to allow these transfers and exchanges to take place, to invite proposals related to water banking and to hopefully comply with requirements associated with recent groundwater legislation. In exchange, obtaining tangible, measurable water supply benefits is fundamental to any program of this nature.

9.4.1.8 Conjunctive Management and Groundwater Storage

Due to the variable nature of supply within the Tule River Basin, conjunctive use is the fundamental water management strategy which is employed. By definition, conjunctive use is the coordinated and planned management of both surface and groundwater sources of water supply in order to

most efficiently use both supplies. Conjunctive management is the device utilized to maximize water supply reliability, to reduce the impacts on the groundwater reservoir, to avoid subsidence associated with overdraft and to manage water quality related issues. Each of these issues involves the potential for conflicts. Managing supplies to optimize reliability can vary by crop type and soil type. Timing of delivery of available surface water supplies may be optimum for one landowner/grower, while not providing the same benefit to another. Timing of deliveries to lands on the east side of the Tule River Basin, where citrus crops are dominant, is often different than exists in the center of the Basin and even different yet for uses associated with the westerly lands within the Basin. Timing of deliveries to lands in the west portion of the Basin are critical with respect to dealing with overdraft and resulting subsidence impact issues. Reasons for management for water quality related purposes can range from reducing impacts of adverse conditions by virtue of quantity of flows available for dilution purposes and for purposes of managing salt accumulations below the root zone of permanent plantings.

In practice, conjunctive use involves numerous procedures and facilities, allowing for recharge during times of available surface water supplies, followed by groundwater extraction, either during times of reduced groundwater deliveries to supplement same, or as the entire supply during periods of time when surface water is unavailable for delivery.

Monitoring of groundwater conditions is a critical component to a properly conducted conjunctive use program. Specifically, monitoring of

groundwater levels, accumulation of knowledge related to area lithology and performance runs of groundwater models are all required to provide a proper basis for groundwater management to occur. The need for adequate funds to conduct these programs is also of significance.

In an area such as the Tule River Basin, groundwater balance can only be achieved through the employment of proper conjunctive use procedures. Increasing storage in groundwater during times of available surface supplies, in excess of then current demands, is the only mechanism available to offset withdrawals during periods of time when insufficient surface water flows are available to meet demands.

Entities within the Tule River Basin have caused the creation of a groundwater model to assist in the monitoring effort. A model exists for the entire basin with the capability to build a smaller cell size model for use in urban areas. These models allow for changes in land use and crop types to be introduced into the input side of the models and variable supply inputs to be employed to determine the impact on the volume of groundwater in storage as a result of land use or cropping pattern change.

Friant Division, CVP contractors have also engaged in a process to perform an overall examination and inventory related to water resources, identified as their Water Management Plans. Approximate 5-year updates have currently been mandated by the federal government, thus allowing for the most current information technology to be employed. Efforts to improve the basis for

the groundwater resource inventory are anticipated to continue in the future based on policy and budget instructions provided by the DCTRA governing board.

To assist in the system balance efforts, DCTRA and its member units have currently in inventory, several hundreds of acres of groundwater recharge basins. This acreage is in addition to the natural channel acreage which is continuously employed as a recharge vehicle. Not satisfied with this level of facilities, DCTRA member units have in development additional areas with funds budgeted, accompanied by outside grant funds and input from other participants in the form of land and/or funding to further augment recharge capabilities.

Currently the water management efforts within the Tule River Basin must allow for management of flows resulting from flood year events such as 1969 and 1983 and provide groundwater benefits in the driest of years. The extent to which climate change may affect the adequacy of the current facilities to deal with the variable nature of runoff, from both timing and volume of flow perspective is a challenge that the local water management entities feel they are up to. Active participation in response to hydrologic and regulatory change exists.

Notwithstanding the success of implementation of conjunctive use operations within the Planning Area, constraints do exist to development of additional conjunctive use facilities. Most obviously amongst these constraints is the availability of land on which to place recharge facilities. Historic efforts have oriented this effort toward lands which are marginal for agricultural purposes due to the quality of the soils or the high water requirement associated with

same. As a significant portion of these lands have already been developed to recharge areas, additional effort must be undertaken to both identify additional areas and to examine incorporation of same into the existing development program without adverse impacts on the agricultural community. Issues associated with additional land purchases continue to rise in significance as land purchase prices have increased dramatically in the last several years and fuel, equipment and labor costs associated with construction of, or improvement to, conveyance facilities to bring water to recharge facilities have also escalated. In addition, power costs related to recovery of recharged water have significantly increased and risk continues to escalate that recharged water flows westerly to areas outside of the target area for benefit. This is principally as a result of significantly decreased entitlement allocations of the Central Valley Project and the State Water Project to contract holders. Declining groundwater conditions, to a significant degree based on reduction of outflows to the west, are again returning and where groundwater balance was thought to be achievable a decade ago based on existing cropping patterns and water supply availability programs it is now starting to diminish based on the drastic changes in opportunity to pump project supplies from the Sacramento-San Joaquin Rivers Delta. While deliveries of supply from the Delta are not made to any significant degree for the benefit of landowners specifically within the Tule River Basin, outside of Friant Division, CVP exchange supplies, the withdrawal of deliveries from lands to the west has historically had a significant impact on groundwater conditions within

the Basin and it appears that a return to those pre- westside project conditions is returning.

Additional constraints to recharge related programs include recognition of third-party impacts in any planning process and increased participants from local agencies and landowners/growers. Discussions are ongoing with local domestic water purveying entities with respect to altering their historic non-participation in groundwater recharge related efforts due to the quantity/quality impacts on their current supply. Principal among those impacts is the movement of contaminants from one area to another based on groundwater gradients introduced as a result of differential pumping based on available surface water supplies.

9.4.1.9 Desalination

The treatment process for water involving the removal of salts is identified as desalination. This practice involves treating a source of water high in salts to remove said salts and to have as a result, usable water. Within the Tule River Basin, neither sea water nor brackish water from groundwater exists. There currently is, therefore, no available source for desalination within the IRWMP Planning Area. The ability of this method to be a source of water supply is, therefore, not applicable.

9.4.1.10 Precipitation Enhancement

Weather modification in the form of precipitation enhancement, commonly called “cloud seeding”, has been utilized successfully within the Kings River and the Kaweah River Basin for decades. Utilizing this technology,

clouds are artificially stimulated to produce more rainfall or snowfall than they would normally yield over a specific land mass. The technology employed with this enhancement methodology occurs by injecting particles which act as a nucleus into clouds, thereby seeding the clouds with a nucleus around which water molecules can form to enable snowflakes and/or raindrops to form. While cloud seeding has been employed within the adjacent watersheds for decades, it has limited use in dry periods as storm containing water particles are absent and, in years of extreme precipitation, additional precipitation would only augment potential flood damaging flows. For the intervening weather conditions, however, contracted weather modification services involving aircraft seeding storms as they approach the foothills east of the Basin, upwind of the target are available. These aircraft efforts can be augmented by ground-level generators located in foothill and low elevation mountain locations. The primary target is usually the available low-altitude super cooled liquid water that develops in-cloud on the east side of the foothill and mountain slopes, those being the windward and upslope areas associated with foothill and mountain barriers. Current estimates of long-term additional runoff are in the neighborhood of five (5) percent.

Of all of the current water supply augmentation steps, climate change could affect the weather modification program to the greatest degree. Disruption of the historic weather patterns around which cloud seeding activities are centered could be significant, thus destroying the forecasting base which has been established and further leading to changes in seeding conditions, the results of

which are currently unknown. Of significant impact is the fact that the current nucleus forming agents which are utilized may no longer be applicable if high-altitude temperature patterns change. Nucleus forming agents which operate at temperature conditions well below freezing would be rendered ineffective if these temperature conditions cease to exist or diminished in their frequency.

9.4.1.11 Recycled Municipal Water

At the current time and for some time, discharges from municipally owned wastewater treatment works have been completely recycled into the environment. For the most part, these supplies are utilized in substitution of groundwater pumping for agricultural purposes and little opportunity has been seen to further enhance the reuse paradigm as it has been complete. Recently, modifications to discharge requirements, particularly to natural streams, have changed such that discharges to natural channels have changed to the extent that such discharges are in a phase of planned obsolescence. They are being replaced with either discharge patterns to adjacent lands where waters of the State are not involved or, in the alternate, discharges are being upgraded to a tertiary level and their use then directed toward new beneficiaries to the exclusion, for the most part, of the traditional pathways.

Significant in the Tule River Basin in this changed paradigm is the availability of a program wherein reclaimed wastewater can be discharged to irrigation canals for direct reuse on a year-round basis. In exchange, entitlement waters of a local irrigation entity, which is the recipient of the treated water, can be rerouted and recharged upstream of a domestic groundwater contractor is a

contract position which has not historically existed. While the Tule River Basin, as a whole, would remain in the same balance, the shifting of available surface supplies within the Basin can be altered with the benefits redirected to defined areas within the Basin. The extent to which withdrawal of the treated effluent will have on the historic place of use remains to be seen. In addition, the extent to which such programs will be pursued in the future by discharging entities remains to be seen.

9.4.1.12 Surface Storage-CALFED

The CALFED Bay-Delta Program, identified as CALFED, was a department within the government structure of the State of California that was focused on Sacramento-San Joaquin Rivers Delta water problems, both in-Delta as well as export based. In 2009, CALFED was replaced by the Delta Stewardship Council. “CALFED Surface Storage” is a legacy title for a RMS designed to improve surface storage while improving conditions in the Delta on a parallel basis. The CALFED Surface Storage strategy includes five (5) potential surface storage reservoirs in California. It is not anticipated that any of these efforts will have a significant impact on the Tule River Basin and potentially only an incidental impact on Friant Division-CVP contractors peripheral to the Tule River Basin. It has been determined that this element is not applicable to the subject IRWM Plan.

9.4.1.13 Surface Storage-Regional/Local

The Tule River Basin seeks to be the recipient of a modification to its surface storage capabilities. Spillway modifications associated with Success Dam

would result in an overall increase in storage in the reservoir, along with additional yield development. The reservoir now provides improved downstream flood protection benefits, principally to the City of Porterville and the Tulare Lakebed areas. Additional storage opportunities have been evaluated on Deer Creek and White River, said studies resulting in a lack of feasibility due to environmental constraints and/or economic constraints. While an off-stream storage site was initially investigated as a part of the East-Side Division-CVP, no additional feasibility studies have been initiated, nor are there any likely significant storage opportunities existing within the Tule River Basin. The water rights on the Tule River are fully appropriated, based on action by the State Water Resources Control Board and, as a result, additional storage may result in some reregulation capability, but little to no additional yield capability.

From a climate change perspective, a change in precipitation and/or runoff patterns may result in reduced snow pack and alteration of winter runoff. These changes would require a re- examination of the development of surface storage for water supply purposes during peak growing months and flood control purposes could also change. This would require a re- examination of potential sites, few of which exist based on examinations which have been undertaken to date.

9.4.1.14 Drinking Water Treatment and Distribution

Principal in Tule River Basin IRWM planning activities is that related to the provision of potable drinking water. Significant participation by both disadvantaged community and environmental justice representatives in the

Stakeholder Advisory Committee structure has resulted in identification of drinking water problems and pursuit of solutions to these problems utilizing the IRWM structure as a potential solution vehicle. Within the Tule River Basin, groundwater related treatment facilities currently exist for the unincorporated community of Terra Bella and numerous services of the Terra Bella Irrigation District.

Historic efforts have been related to water quality associated with discharges from agricultural uses, with that program having been memorialized in the Irrigated Lands Regulatory Program of the Regional Water Quality Control Board. The local orientation has the potential to change to examining those opportunities which exist for construction of surface water treatment facilities in identified areas with poor groundwater quality characteristics and potential dedication of portions of agricultural surface water supplies to those facilities. These efforts are in the infant stages and are being supplemented by efforts of the County of Tulare related specifically to the unincorporated area of East Porterville.

Primary constraints to pursuit of this method of altering the landscape of domestic water quality include the development of water treatment and distribution systems to serve any candidate areas, elevated operation and maintenance costs, opposition to higher water rates, or in this case, the payment of a water rate at all and the lack of qualified water treatment plant operators.

Factored into the surface water treatment plant equation will have to be impacts of climate change on mineralization and increased turbidity. In

addition, if storage of water is required, elevated water temperatures, both as an aesthetic issue, as well as an adverse plant growth inducement cause, will be factors to be dealt with.

Based on experiences currently being generated through similar examinations in out-of- Basin areas, these facilities are felt to be economic to an acceptable degree only if they are regional in nature and resolve many of the identified adverse problems, such as operations problems on a collective basis.

9.4.1.15 Groundwater Remediation/Aquifer Remediation

Groundwater remediation takes place in specific and infrequent locations within the Tule River Basin. Virtually all of these locations are associated with a vadose zone consisting of a specific plume of contamination caused by a prior surface related activity such as a leaking underground fuel storage tank. This contamination has traveled to free groundwater in the soil profile and requires extracting the contaminated groundwater from an aquifer, or multiple aquifers, treating it and then discharging to an approved location. These discharge locations vary from adjacent water courses, to re-injecting to the ground, to reuse for a beneficial purpose. Remediation does not provide for a new quantity of water, but does provide for a source of water from a previously contaminated source. While a remediated supply is made available, the principal purpose is to prevent the further spread of the specific contaminant, thus rendering additional supply unusable.

9.4.1.16 Matching Quality to Use

The strategy of matching water quality to specific beneficial use has little application in the Tule River Basin. Typically the strategy is to avoid utilizing a higher quality of water for a beneficial use than is required by that beneficial use. As agricultural is the major consumer of water within the Basin, the surface water and groundwater currently available within the Basin are both suitable for agricultural use. Treated wastewater is directed toward lands which meet the requirements for reuse of said supply and surface waters are of very high quality, only requiring treatment for removal of turbidity and bacteriological contamination if utilized for human consumption. If such supplies were to become available in a recognized usable quantity, issues of acceptance of using a lower quality water than otherwise available and the matching of the location of use to the location of availability would become major issues to be evaluated.

9.4.1.17 Pollution Prevention

Current and applicable water quality guidelines, including Basin Plan criteria, are driven by avoidance of contamination as the principal objective. Reliance on treatment following contamination or pretreating water to allow for "space" to introduce contaminants are, for the most part, discouraged. Where pollution is unavoidable, such as the case with certain municipal and industrial related discharges, regulatory programs exist for removal or reduction of contaminants to an acceptable level based on the beneficial use objectives in

existence related to the specific discharge. Current activities related to pollution prevention have started to extend up into the contributory watershed based on drinking water requirements and introduction of flood flows into facilities such as the Friant-Kern Canal, waters in which are utilized for human consumption, following conventional treatment. Extension of efforts into the upper parts of the watershed allows for avoidance of pollutants being introduced into the runoff, further avoiding any significant level of treatment being required.

9.4.1.18 Salt and Salinity Management

Importation of surface water into the Tule River Basin, domestic discharges such as those associated with home water softening units and certain agricultural practices result in additional salts being discharged, principally to groundwater. Given the very high quality of surface water available to the Basin and with discharge limits in place on discharges from municipal and industrial treatment facilities, contributions from these sources are significantly minimized.

Notwithstanding the limited impact from salts buildup, the DCTRA is nevertheless engaged in several arenas designed to address salinity management. In particular, the DCTRA is engaged in the CV Salts Program and in activities related to Basin Plan Modifications related to the salt topic. The position of the Association with respect to the Irrigated Lands Regulatory Program (ILRP) has recently been handed over to the newly-formed Tule Basin Water Quality Association. Salts management is an issue within the structure of the ILRP to be

addressed by the third-party coalition groups covering the irrigated lands within the jurisdiction of the Central Valley Regional Water Quality Control Board.

9.4.1.19 Urban Runoff Management

Runoff from urban areas is handled within the single incorporated city within the Planning Area by the governing municipality and in unincorporated areas by the County of Tulare. While in all cases, irrigation water conveyance facilities play a major role in conveyance to disposal facilities of urban runoff, it is nevertheless the responsibility of the urban entity to properly address disposal of urban runoff. Urban runoff within the Planning Area typically is comprised of two (2) different sources. The first, and most obvious, is that of storm water runoff comprised principally of rainfall falling on impervious surfaces within the municipality and gathering of that runoff in facilities designed for that purpose with most disposal actions contributing to groundwater recharge. The second form of water to be managed is that related to nuisance discharges during dry weather periods. These flows are placed in the nuisance category for three (3) principal reasons. The first of these is that they have to be managed during a period of time when facilities utilized for irrigation purposes need the available capacity or occur at a time when maintenance activities need to be conducted and the nuisance flows interfere with such activities. The second issue related to these flows is that many accrue to local storm water facilities where they pond in a shallow depth configuration and pose vector breeding problems which have to be managed at a significant cost, in comparison to the water involved with the discharge activity. The third issue is that related to contamination. While the

volume of these flows is low, discharges from urban landscape have been demonstrated to carry significant elevations of contaminants and activities where water is washed into urban gutters carries with it petroleum and petroleum byproducts contamination which often accrues to groundwater. While principal actions are directed at preventing groundwater contamination, most actions, under current conditions, are limited in nature and, for the most part, ineffective as compared to the total contamination picture. Land conversion based on increased development further exacerbates this condition, less specifically addressed in the new development as compared to the previous agricultural use.

9.4.1.20 Flood Risk Management

The City of Porterville and the County of Tulare have been invited to become signator to the Memorandum of Understanding providing the basis for the IRWM Plan and and do play a role in the management structure. These agencies, in combination with the State and County Offices of Emergency Services, are those principally responsible for flood risk management. In this case, management is defined as assisting individuals and government infrastructure agencies and departments with assistance in and response to preparing for, responding to and recovering from a flood event. Solutions which are offered are both structural in nature and include policy issues such as land use zoning and flood plain zoning. At the current time, considerable dialogue is at the forefront involving the activities of the Federal Emergency Management Agency (FEMA) with respect to their determination of what constitutes an adequate flood control levee. At the current time, there is little involvement at

the IRWM level with the topic. This could change in the future based on impacts related to climate change. Changes resulting in an increase in either the severity or intensity of flooding may require modifications to monitoring systems and improvements in flood plain protection structures. Land use planning policies may also need to be re-examined under this paradigm.

9.4.1.21 Agricultural Land Stewardship

In cooperation with landowners/growers, the DCTRA, along with the Agricultural Commissioner of the County of Tulare and the University of California Extension are heavily engaged in agricultural lands stewardship. In this context, agricultural land stewardship involves the conservation of natural resources and protection of environmental features associated with agricultural lands. The joint practice of conducting land operations for food production while recognizing considerations such as soil preservation, air quality, energy conservation and threatened and endangered species habitat development and maintenance, are all elements of agricultural land stewardship. The accepted definition also extends to protection of open space characteristics, as well as the buffer zone between agricultural operations and rural communities. As Tule River Basin lands are fully developed, the impacts associated with conversion of agricultural land to urbanized land further impacts agricultural lands to accommodate issues such as storm water management, flood control, water conservation, carbon sequestration and habitat preservation. Within the Basin, preservation of the remaining examples of riparian oak forest and riparian oak savannah has been undertaken, as well as vernal pool preservation.

Constraints obviously exist to further implementation of these stewardship activities. Principal among these is funding, not just for initial purchase and maintenance, but also for security related functions. Illegal drug activities and steps necessary to avoid intentionally set fires compete with the desire to utilize the settings for public access and related educational purposes.

9.4.1.22 Economic Incentives (Loans, grants and water pricing)

Economic incentives related to water management efforts run the gamut from policy development to implementation. Water marketing, water banking and water pricing policies are all driven by economic considerations and economic incentives play a significant role in the degree to which these activities take place. Direct financial assistance or water pricing, in conformance with the statutory requirements associated with Proposition 218, are fundamental to the offering of incentives. These criteria are typically deeply engrained in economic incentives associated with loans, grants and rebates. Other economic incentives can involve the granting of free services, timing of the use of power, availability of treated wastewater for reuse and costs associated with easements associated with access to sources of water supply. On the periphery, economic incentives can also produce benefits of an environmental or social type and influence the construction of new facilities through delay and/or avoidance alternative procedures.

Particular to the IRWM Area, specific incentive examples include tiered water pricing, rebate programs for installing conservation devices and exchanges

of treated wastewater for high quality surface water for recharge and/or direct reuse. Additional incentives are available to landowners/growers relative to on-farm irrigation efficiency in the form of system conversion financial assistance.

9.4.1.23 Ecosystem Restoration

A principal water management element which exists within the adjacent Kaweah River Basin IRWM Planning Area is the implementation of the outcomes related to the Kaweah River Corridor Study. The focus of this study was on the development of lands within the Basin on which could be developed projects which were multi-purpose in nature. The targeted purposes included groundwater recharge, storm water control and habitat preservation/restoration. To date, a number of examples now exist within the Kaweah Basin of multipurpose projects involving water management where habitat preservation, habitat development or a combination of both, are principal elements of project development. Under the leadership of the City of Visalia and the KDWCD, groundwater recharge and storm water basin design has left the era of the sterile engineered levee configuration for a design which accommodates re-vegetation of both trees and native grasses and incorporates significantly different maintenance activities than those associated with the sterile levee type of approach.

Parallel to these efforts, the DCTRA has constructed basins with the groundwater recharge and environmental benefits. DCTRA has also been engaged in discussions related to restoration projects associated with Deer Creek

sand mine sites which are now in the reclamation phase, or are anticipated to enter that phase in the near-term.

There are a number of recognized constraints to development of ecosystem restoration projects, which include sufficient funds to acquire property, high costs associated with property acquisitions, impacts on adjacent parcels which are farmed where introduction of endangered species may be a potential, rodent control and weed control activities. The degree to which protection and restoration has been implemented within the Basin demonstrates that the majority of these obstacles can be successfully overcome.

9.4.1.24 Forest Management

There are no forests located within the IRWM Planning Area. A significant portion of the Tule River Watershed is, however, forested up to the high-altitude tree line. The management of these forest lands is split between the U.S. Forest Service and the National Park Service and a recognized Tule River Indian Reservation. As a result, water management entities located within the Tule River Basin have no governance authority over activities within these forests. Acknowledging, however, the fact that activities such as water management, timber management, native and invasive vegetation management, outdoor recreation and stock grazing occur within the forested areas, has led to an active input position to the agencies charged with overseeing watershed quality related issues. The input takes the shape of communication with the governing agencies with respect to their proposed policies and procedures and is anticipated

to expand to include a cooperative effort in this regard with the recently formed Southern Sierra IRWM.

9.4.1.25 Land Use Planning and Management

Historically, land use planning has been conducted by different agencies, on different time schedules and was based on differing policy directives from governing bodies. To a significant extent, this remains the case. Attempts to integrate water management related concerns into land use planning is based on a recognition that there is a direct relationship to water supply and water quality, flood and storm water management and impacts on agricultural water conveyance facilities where urbanized development is involved. While history has proven that many of these relationships are contentious and do not always result in agreement with regard to policy development, the interface nonetheless exists. The principal tool utilized in the Tule River Basin to overcome these differences is education. Coupled with an attitude inviting cooperation, successes have been achieved which overcome the previously predominant aggressively opinionated and argumentative processes. Development of water management related tools such as the numeric groundwater model has offered a new forum for interface between water management agencies and land use planners. In addition, the IRWM forum is being opened to the governmental agencies who carry the charge of land use planning as one of their principal purposes and their involvement, to date, in the IRWM process has led to improved relationships between the participants.

Also assisting in the barrier reduction efforts has been the requirement of State and local agencies associated with water supply planning related to land developments to reflect adequacy of supply. This requirement has caused an improvement in relationships between the water management entities and the land development participants as certification of adequacy of water supply is now statutorily required as part of the land development process.

The IRWM process offers a unique forum for this relationship to be further improved. The Stakeholder Advisory Group currently includes individuals responsible for land use planning policy development and implementation , as well as representatives of Disadvantaged Communities, where improvement is needed in the relationship between water managers and land use planners. The types of projects which have been developed and pursued through the IRWM process demonstrate the success of this cooperative approach.

9.4.1.26 Recharge Area Protection

Protection of land uses for specific purposes are enveloped in law for a number of topics. Most significant of these are policies related to mineral resources where lands containing identified mineral resources which have been determined to exist by the State are required to be protected from encroachment by land uses which may impede their development. To date, no such procedures exist within the IRWM Planning Area for candidate water management sites, even though groundwater recharge and banking programs may be of benefit to the urban development of lands currently in agricultural production. No rules

currently exist which would ensure that area suitable for development for recharge purposes are protected from an agricultural to urban environment conversion. In addition, pollutant loads from urbanization are not currently subjected to the same water quality criteria as exists for agricultural areas. The potential thus exists for groundwater recharge areas to be subject to contamination. The topic is one which was discussed during development of the recent General Plan update by the County of Tulare, however, policies were not introduced into said update reflecting requested area protection measures. Based on the current lack of policy development and implementation, entities developing recharge areas are left to their own devices with respect to protection of prime recharge areas.

This necessitates a significantly higher financial investment in land than would just basin site acquisition and development. Thus, the buying power of the funds associated with groundwater recharge are diminished as land must be purchased for protection of the recharge area from contamination, in addition to purchasing the recharge area itself. One of the current policy suggestions to improve this situation has been to begin development of mapping on which is depicted the prime recharge areas within the IRWM Planning Area.

9.4.1.27 Water-Dependent Recreation

As the Tule River and its distributaries flow for only a portion of a given calendar year, little water-dependent recreational opportunity exists. The sole exception is tubing and rafting excursions on a portion of the Tule River during irrigation release periods. Points of ingress and egress for these recreational

opportunities are typically associated with public road rights-of-way, as little or no access is available through private lands.

With the exception of impacts of climate change which may modify this paradigm in the future, the opportunity is factually limited due to the limited quantity of surface water existing within the Basin. Future updates to the IRWM Plan will need to consider examination of this issue and a determination of whether or not opportunity events have changed to the point where the inclusion of this objective into IRWM Planning needs to be accomplished.

9.4.1.28 Watershed Management

The watershed feeding Success Reservoir and forming the Tule River exists completely outside of the IRWM Planning Area. As previously noted under the forest related section, planning in this area is almost exclusively under the control of the U.S. Forest Service, U.S. Park Service and the Tule River Indian Reservation.

Normal watershed management functions of evaluating policies, land use planning, management of land and resources and fire prevention and fire suppression efforts are all outside the purview of any participating entity in the IRWM process. Input with respect to watershed management from the standpoint of watershed management is virtually nonexistent. Vegetative management, controlled burns and water quality related impacts are dealt with by the agencies of jurisdiction with entities involved in the IRWM process only allowed input in a public forum approach. In most cases, responsible agency status is not invited, nor accepted when requested. The IRWM process is designed to continue to seek

input with respect to the programs of the governing agencies and opportunities to coordinate efforts, when appropriate.

9.4.1.29 Crop Idling for Water Transfers

Crop idling is practiced within some private stock ditch companies within the IRWM boundaries. In some cases, public agencies allow growers to fallow land for a season and transfer water to another grower within the same entity boundaries. Crop idling is typically an extreme measure within the Tule River Basin in response principally to drought conditions. As such, it does not exist on a large scale basis. As previously referenced under the transfers discussion of this chapter, procedures and agreements are already in place to deal with the transfer of entitlement generated from crop idling (single-year land retirement) related activities. It is acknowledge that there are a number of social and economic impacts associated with crop idling which have not been significant, to date, on the limited basis for which these retirement procedures have occurred. Expanding such activities to a larger basis will require examination of the social and economic impacts to determine if they must be addressed in the future.

9.4.1.30 Dewvaporation or Atmospheric Pressure Desalination

Dewvaporation is a specific process of humidification-dehumidification desalination. It involves the availability of brackish water which is subject to evaporation by heated air resulting in the deposit of fresh water as dew in a heat transfer process. As there are no saline or brackish water sources of supply in the IRWM Planning Area, this strategy is not applicable.

9.4.1.31 Fog Collection

Winter months within the IRWM boundaries brings numerous days of fog formation. The fog which is formed is sporadic in nature and is not typically consistent in its formation locations. Fog formation also occurs during the winter months when water demands are low. In addition, utilization of this source of supply would require a closed distribution system to be constructed due to the high cost associated with generation of supply from the fog source. Unlike rainfall deficient coastal areas where copious fog is formed, the opportunities are virtually nonexistent within the Tule River Basin and therefore, this strategy is not applicable.

9.4.1.32 Irrigated Land Retirement

The U.S. Bureau of Reclamation, in conjunction with the Bureau of Land Management has retired a significant number of acres in the southwest portion of Tulare County, outside the boundaries of the IRWM. No such land retirement steps have been taken within the IRWM boundaries, nor are there any currently under discussion. As drainage impaired lands do not exist within the IRWM Planning Area, funding for such land retirement steps does not currently exist.

As the objective of irrigated land retirement is the removal of farm land from irrigated agricultural production to provide water supplies elsewhere, or to take unproductive land out of production, examination has to be made of the value of the lands within the IRWM boundaries for the productive differential

between lands within the boundaries as compared to other lands where the water supply resulting from land retirement would be made available. As the lands within the IRWM boundaries are all high-value, high-soil class and micro-climate lands, it is unlikely that lands within the Tule River Basin would be a replacement target for lands external to the subject boundaries. As some of the most significant agricultural land in the world exists within the IRWM boundaries and as the gross farm gate receipts are reflective of one of the top counties in the nation, it is not likely that the area will be the subject target for this program in the short-term or long-term. The land parcels which have been identified to be marginal with respect to agricultural production have been the primary targets for acquisition for groundwater recharge areas. As previously noted, the opportunities for purchase of these types of land to enhance the groundwater recharge basin inventory have significantly diminished over time.

As the opportunity nonetheless exists for retirement potential, this strategy has not been determined to be not applicable. It will remain on the "watch" list for future policy examination efforts related to the IRWM Plan.

9.4.1.33 Rain Fed Agriculture

Absent runoff from rainfall and accumulated snowmelt from the Sierra Nevada Mountains, the lands comprising the IRWM Planning Area are desert in nature. With an average rainfall of 10 inches or less, insufficient precipitation exists in virtually all years on which to base a rain fed agricultural economy. While there are some lesser-value foothill lands in the southeast corner of the valley floor lands of Tulare County which have sustained by rainfall, the crops

are sporadic and marginal in terms of yield. Given the availability, even to the extent of side-hill development in the foothills, of a water supply within the Tule River Basin, a rain fed agricultural economy does not exist. Unless new varieties of plants can be developed which will compete successfully with existing crops, or whether groundwater management rules and regulations will require idling of otherwise highly productive agricultural lands remains to be seen. For the current time frame, given both rainfall conditions and current land use patterns, this strategy has been determined to be not applicable.

9.4.1.34 Waterbag Transport/Storage Technology

By definition, waterbag transport/technology involves harvesting water in geographic areas that have unallocated fresh water supplies, storing the water in large inflatable bladders and towing them to a coastal port for offloading. This strategy is currently not being utilized within the State of California and likely will not be an implementable strategy in the interior portions of the State, such as the Tule River Basin. While it may eventually have some application in urbanized coastal areas, it is not likely to be competitive with alternative sources of supply. Transporting bladders by rail or by truck, while technically feasible, have even more severe economic consequences. It has therefore been determined that this strategy is not applicable to the Tule River Basin.

9.4.2 DAC Communities/Rural Water Related Concerns

Considered to be of significant importance by the Board of Directors of DCTRA and the IRWM Stakeholders Advisory Group is the matter of dealing with water quality/water quantity related issues for rural unincorporated communities and aggregations of single-family residences identified in current context as "hamlets." For several years, the Stakeholders Advisory Group worked on structural, political and management procedures related to addressing these water quality/water quantity issues. The issue was pursued to the extent that process and procedures were identified for both entities where a local governance structure existed and for those where it did not. As one would expect, the IRWM process was interjected into the solution set resulting in a process which is expressed graphically in two (2) process diagrams which are presented here as Figures 9-1 and 9-2. Figure 9-1 presents the scenario where there is initially no identified lead agency to address the drinking water problem. The process follows from initial problem identification and definition through project completion and implementation. "Go-no go" points are incorporated, indicating where the willingness of the local beneficiaries to engage becomes the critical element in the success of the particular project to proceed from initial identification and description to completion and implementation. Paralleling this process, but for those situations where there is an identified lead agency, Figure 9-2 presents the pathway for a process from problem identification and definition again to completion and implementation. The process, in this case, only ceases if there is no identified feasible solution. It should be noted, with the advent of Proposition 218, this process diagram may need to be modified to reflect

the support, in general, for the project, but an unwillingness to fund the level necessary to achieve project implementation.

As the lead agency in the IRWM process for the Tule River Basin, this process has become an important item for the Board of Directors of DCTRA. Based on opinions which exist with respect to the capability of the Regional Water Quality Control Board's recently adopted Irrigated Lands Regulatory Program General Order to succeed in any reasonable time frame with respect to addressing groundwater quality improvements, the Board of Directors has instructed engagement of staff and consultants in the pursuit of the process generated by the Stakeholders Advisory Group. At the current time, outlines are being prepared of policies and procedures to implement the process and to further expand the process into non-traditional arenas for the Tule River Basin areas. As an example, the Board of Directors has suggested that a potential arena for IRWM activities related to disadvantaged area drinking water activities is related to technical assistance. This technical assistance comes in numerous forms including management assistance, governance assistance, outreach assistance, operations related assistance and projects funding and construction plans and specifications preparation assistance. In demonstration of one of the elements of this consideration, there is contained in Appendix I, a memorandum in which is summarized training and technical assistance activities which have application to areas within the Kaweah River Basin for which the KDWCD has elected to engage. This process, if successful, could be considered for implementation in the Tule River Basin.

9.4.3 Rural Water Supply Study

In addition to the KDWCD outreach effort, the County of Tulare has recently completed a report specifically oriented to the various issues outlined in the Appendix I memorandum with specific emphasis on four (4) specific concerns. The first of these is the arena of management and financial activities, the second addressing water supply and water supply augmentation issues, the third dealing with technical issues related to water and wastewater systems and the fourth related to individual water and wastewater systems. Recommendations forthcoming out of the report have application at the individual level, the community level and at the community governance level. Most importantly, recommendations are made with respect to actions which county, state and federal governments can take to improve the drinking water and wastewater conditions which exist for individuals living within the Fresno, Kings, Tulare and Kern County region, but with application likely state-wide for a similar population. In particular, the report is charged to address obstacles which can be removed from delivery of service at the local, state and federal governmental levels and steps which can be taken to enhance the current process and procedures related to such delivery of service.

9.5 INTEGRATION OF STRATEGIES WITH BASIN PLAN OBJECTIVES

Table 9-2 presents the surface water beneficial uses which are adopted into the Basin Plan by the RWQCB for both the Kaweah River and the Tule River. From a water management planning perspective, the Basin Plan has always been considered the primary and governing document in this regard. The beneficial uses listed in the

table are those which the RWQCB has chosen to be protected by activities taking place within the respective basins. Activities involving discharge to waters which have established beneficial use criteria are enjoined from degrading the potential for said waters to be utilized for those purposes. It is reinforced in this IRWMP document that the Basin Plan Objectives are of paramount significance and deserve the position which they have been accorded by action of the RWQCB in establishing said protective standards.

TABLE 9-2
SURFACE WATER BENEFICIAL USES
TULARE LAKE BASIN
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Stream	MUN	AGR	IND	PRO	POW	REC-1	REC-2	WARM	COLD	WILD	RARE	SPWN	GWR	FRSH
553,558 Kaweah River														
Above Lake Kaweah	•				•	•	•	•	•	•	•	•		•
Lake Kaweah					•	•	•	•		•				•
Below Lake Kaweah	•	•	•	•		•	•	•		•			•	
555,558 Tule River														
Above Lake Success	•	•			•	•	•	•	•	•	•	•		•
Lake Success		•			•	•	•	•		•				•
Below Lake Success	•	•	•	•		•	•	•		•			•	
552,553, 554, 555 Other East Side Streams	•	•				•	•	•	•	•			•	
551,557, 558, Valley Floor Waters		•	•	•		•	•	•		•	•		•	

CHAPTER 10
WATER RESOURCES MANAGEMENT OPPORTUNITIES

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

10.1 PARTNERSHIP FORMAT

While not discouraging the individual entity approach to water management and development of water management projects, the Tule River Basin Integrated Regional Water Management Plan (IRWMP) is designed to foster and encourage a partnership based approach to project evaluation and development. When viewed from a single-entity approach, projects are not allowed to achieve their maximum potential. Only when evaluated by multiple stakeholders potentially affected by results of a project and given a chance to change their project elements to be incorporated with the proposal of another entity, can optimum results be assured of being achieved. It is this partnership type approach that has been a part of the Tule River Basin IRWMP since the formation of DCTRA. It is the intent of the Board of Directors of the DCTRA to continue to encourage this basis of approach to project development and water resources management into the future. The current approach to the IRWMP structure with a participant Memorandums of Understanding and an open Stakeholders Advisory Group process ensures that the Board of Directors' directive has a chance of succeeding.

10.1.1 Water Supply Augmentation Measures

There are a number of water supply augmentation measures which are currently being contemplated. Amongst these are programs which are appurtenant to other organizations or are partially driven by regulations and guidelines either in place, or in the process of development. As is the case with the IRWMP area, these programs have somewhat of a division between municipal and industrial water management issues and those of the agricultural community.

Augmentation measures related to municipal and industrial uses include putting shuttered groundwater extraction facilities back into operation with the assistance of treatment methodologies. As shuttering wells from systems due to contamination often causes a skew within the groundwater reservoir, problems associated with mounding and over-drafting can be partially addressed with a more even distribution of water extraction made available by utilizing mechanisms such as well head treatment.

A water supply augmentation methodology currently in use in the DCTRA area is that of the Lower Tule River Irrigation District. Elements of their program call for partners receiving surface water during below normal and dry years from the supply of the LTRID to participate in the construction of groundwater banking facilities and to participate in the purchase of above-normal and wet year supplies to deliver in-lieu quantities to agricultural users and to populate the groundwater recharge facilities for purposes of augmenting the groundwater reservoir. Such program could be expanded to become a mechanism by means of which water supply augmentation for municipal and industrial needs could be addressed.

With respect to agricultural water supply augmentation, several opportunities exist, some of which are available programs, some in the process of being developed and others in the concept stage. Amongst the developed programs, attention is currently being given to those related to the San Joaquin River Restoration Settlement actions. This program, in the early stages of implementation, offers funding assistance for programs which are designed to replace the water supply lost as a result of release of heretofore allocated project yield from the San Joaquin River to the River below Millerton Reservoir for purposes of reintroduction and maintenance of an anadromous fishery. Most, if not all members of DCTRA are affected by the Settlement action and are therefore eligible to participate in the program to mitigate the effects of Settlement implementation.

In progress in the development phase, is the concept of an improved surface water distribution system in the northerly portion of the Porterville Irrigation District (PID) service area. While this would be a paradigm shift for the PID to deliver water directly to all of its landowners/growers, the Board of Directors is considering this program due to the declining levels of groundwater in the subject area. PID would utilize its Friant Division, CVP contract as the principal mechanism to provide water to these facilities, augmented from agreements with mutual water companies with pre-1914 water rights from the Tule River.

Additional programs which have been discussed which could provide augmentation would include delivery of water to concentrated water use areas, such as East Porterville. Augmentation of the groundwater extractions in this area would allow for existing groundwater conditions to remain, to the extent that demand could be offset

by an imported supply, in lieu of groundwater pumping, while this program would be of benefit in a localized area of the DCTRA, it nonetheless is an augmentation measure which would have benefits to both a portion of the agricultural community within the DCTRA, as well as to downstream municipal and industrial users, such as the City of Porterville.

Programs based on cooperative partnerships such as the City of Porterville treated effluent farm water deliveries in partnership with the City property lessee, is an example of a partnership wherein groundwater supply augmentation for municipal and industrial purposes is in the process of taking place.

Banking programs have been developed between partners within and without the Tule River Basin which will call for normal, above-normal and wet year puts into the Lower Tule River Irrigation District service area, in exchange for yielding dry year, Friant Division, CVP Class 1 water for the prior puts. These puts are at negotiated ratios to the extraction quantities attempting to reflect the higher value of dry year surface water entitlement.

10.1.2 Water Demand Reduction Measures

A number of water demand reduction measures are already in effect within the DCTRA IRWM area. Principal amongst these are the utilization of rate structures associated with metered deliveries for domestic, commercial and industrial consumption with accompanying rate structures which can be varied to encourage conservation. In addition, household plumbing retrofits and installation of improved technology, low-flow

plumbing devices are mandated to be installed in new construction, as well as retrofits requiring a building permit.

On the agricultural use side, considerable improvement in agricultural irrigation delivery efficiency has been accomplished over the last several decades. Often at considerable economic expense, complete conversions of fields from furrow and flood irrigation to low-volume micro sprinkler and drip irrigation has occurred. Such conversions are extensive and common place within the permanent plantings areas of IRWMP area. The greatest opportunity for demand reduction, however, is that associated with elimination of multi-cropping in a single year. Double cropping in certain parts of the IRWMP area is common as the growing season is year-round and readily accommodates both a summer, as well as a winter crop. In some cases, adjustment of crop types and the nature of the harvest has allowed for both triple-cropping and quadruple-cropping. The impacts on the groundwater reservoir when these cropping choices are made absent a plentiful surface water supply are beginning to be understood. It is likely that demand reduction procedures undertaken in the future will call for the reduction and/or elimination of a significant portion of this multiple-cropping if declining groundwater level trends are to be abated.

10.1.3 Flood Control Projects and Programs

Flood control facilities have been given development potential planning consideration on Frashier Creek, Deer Creek and White River. In addition, off-stream storage related to the Friant-Kern Canal and its relationship to flood flows on the San Joaquin River has given rise to the evaluation of Hungry Hollow as a potential off-stream

storage site. This concept was included in the proposed East Side Division, CVP, planning which was abandoned by the U.S. Bureau of Reclamation. To date, projects on minor stream systems have not been given consideration, due to the low-volume discharges from these facilities, the fact that water is currently diverted for beneficial use in the majority of storm-water related events and flood related events on these streams are so infrequent as to eliminate the economic viability of current flood control project types. Whether this remains the situation for the future is yet to be determined.

10.2 WATER QUALITY IMPROVEMENT OPPORTUNITIES

The most significant future opportunities for groundwater quality improvement lie in outreach education and employment of Best Management Practices related to application of pesticides and herbicides. This educational component applies to both the urban and rural development regions of the IRWM area, as well as the agricultural areas. Both areas are potential sources of contamination leading to the degradation of groundwater supplies and avoidance of contamination is the strongest methodology for assuring future beneficial use capability of existing surface and groundwater supplies.

The pilot disadvantaged community drinking water outreach program currently being developed by the Kaweah Delta Water Conservation District (KDWCD), will hopefully identify additional water quality improvement opportunities. It is acknowledged that most water quality improvements within both the KDWCD IRWMP area and the DCTRA IRWMP area will be oriented to human consumption purposes. Levels of constituents such as nitrates are of benefit to irrigated agricultural and are not considered to be adverse, as they are with respect to human consumption. Likewise,

pumping groundwater with residual quantities of DBCP and 1,2,3-TCP are not adverse to agricultural operations and allow for reduction in the level of these contaminants in the environment through volatilization associated with pumping and exposure to sunlight when applied for irrigation application purposes. The pursuit of the implementation of this pilot program is currently a priority of Tule River Basin IRWM and, to date, has received a positive response from the representatives of potential beneficiaries of this process.

10.3 OTHER WATER MANAGEMENT MEASURES

10.3.1 Land Use Policies

Of critical importance in the water resources management opportunities which exist within the DCTRA IRWMP area, is the matter of improved land use policy decisions. Currently, most land use policy decisions, particularly those which allow for the placement of developed subdivisions and farmworker housing installations in areas with known groundwater contamination, occur without thought to that existing contamination. It is a goal of the DCTRA IRWMP to intensify discussions with land use policy decision makers, bringing attention to the gravity of this situation and providing input as to how their land use planning policies could avoid many of the adverse drinking water situations which are being developed. If the resolution of providing high quality drinking water to rural residents is to be properly addressed, the land use policy decision making process is the first and foremost arena in which attention to improvement needs to be given.

10.3.2 Water Supplies for New Development

Assuming the addressing of proper placement of new development with respect to groundwater quality issues, sufficient quantity then becomes the principal issue. Policies such as have been developed for the City of Porterville wherein evaluations have taken place of agricultural to urban development and displacement of previously delivered surface water supplies and their relationship to water balance, will need to be evaluated for other areas. These policies have resulted in the recommendation to consider implementation of impact fees designed to at least generate a cash flow position wherein water can be acquired and delivered to offset the impacts of the development based land conversion and the modification of the water supply delivery sources. Additional policy considerations associated with the City of Porterville will also need to be given in the future. Their recent policy, calling for maintaining a position of only extracting water from the groundwater reservoir where said extractions are within the safe yield of the groundwater structure will bring about a myriad of changes in lifestyle. In particular, landscaping considerations under this type of policy adoption would be considerably different than those which currently exist. High volume demands for landscaping during summer months would virtually need to be eliminated. In addition, conservation practices would need to be employed, such as the rural practice of utilizing water supplies to introduce moisture into the dirt for dust abatement and atmospheric cooling conditions. In an over-drafted groundwater basin, it is envisioned that future policies will be directed principally at these two (2) related urban water uses. New developments will lead the way with landscaping requirements and provisions for dust control built into project

development considerations. Eventually, it is envisioned that the policies and procedures which are generated as a result of applications for new development will roll over into existing rural development related ordinance restrictions. It is acknowledged that the current groundwater declining trends cannot be sustained into the future with water uses remaining status quo.

10.3.3 Agricultural Crop Water Management Measures

Previously noted, water demand reduction measures potentially exist where multiple cropping patterns contribute directly to significant reductions in the available amount of groundwater in storage and to resulting declines in both static and groundwater pumping levels. In addition to exacerbating water quality related concerns, additional impacts associated with over-drafting include increased power consumption related to pumping, the need to develop additional power grid improvements to accommodate increases in power demand, falling groundwater conditions which both reduce the useful life of the pumping unit and entrain air into delivered domestic supplies creating adverse conditions from an aesthetic perspective with these deliveries.

Already existing, but in somewhat an aggravated current condition is the matter of subsidence. The importation of water, both on the east and west sides of the IRWMP area had led to groundwater extractions over-drafting principally sand and gravel aquifers, in lieu of pulling water from the clay lenses in groundwater wells. Over-draft conditions which are currently occurring within the IRWMP planning area are pulling water molecules out of the clay lenses which virtually instantly lose the support structure

offered by the water molecules and collapse instantly due to the loss of structural support. This water storage capability is then permanently lost due to the weight of the overburden on the clay lens and results in the development of reflective subsidence which ultimately manifests itself at the ground surface. In addition to interference with the gravity delivery of surface water, numerous structural problems associated with roadways, drainage systems and constructed buildings, including single-family residences, occur. Evidence of this subsidence accelerating beyond historic levels is beginning to be documented. An element of the DCTRA Groundwater Management Plan is associated with documentation of this occurrence and the degree to which it exists. Improvements and a more significant outreach in this regard are anticipated to be incorporated into the next update to the DCTRA Groundwater Management Plan, which is currently in progress.

10.3.4 County Systems Infrastructure Improvements

As the County of Tulare has elected to act in the role as lead agency for several rural hamlet water systems, monthly costs associated with the operation and maintenance of these systems has been observed to be a major issue. At the current time, many of these systems are having their costs subsidized by the General Fund of the County of Tulare and several attempts to correct this trend through Proposition 218 related procedures have met with failure. It should be recognized that this situation will intensify in the future as these systems become older and both maintenance costs increase, as well as the systems facing costs associated with replacement of obsolete and deteriorated facilities. The affordability characteristics of delivery of drinking water supplies meeting

applicable state and federal drinking water standards are again, a reason why land use planning must become a critical element in water management planning. Systems deterioration and systems abandonment due to the lack of proper financial planning and land use planning are situations which are to be avoided based on policies and procedures associated with this IRWMP.

10.3.5 Pilot Studies

In an attempt to begin to address the issues related to disadvantaged community water supply and water quality related issues, the County of Tulare acted as lead agency for a four (4) county effort addressing water and wastewater related issues for the disadvantaged communities within the four (4) county region, which includes the area of within the Tule River Basin IRWMP area within the County of Tulare. The pilot studies address issues not only related to water quality, water supply and their related technical issues, but also administrative, managerial and finance issues critical to the maintenance and well-being of rural water supply systems. The fourth pilot study deals with individual household water supply and wastewater treatment and disposal systems. The final report is completed and is available for use.

10.3.6 SCADA Expansion

Another water management measure which is increasing in its importance to optimized water management is the installation and maintenance of Supervisory, Control and Data Acquisition Systems. Otherwise known as SCADA Systems, installation of same allows for remote monitoring and remote control of water management related

facilities. Whether these facilities are surface water oriented, groundwater oriented or in response to power production, significant efficiencies can be achieve through the utilization of this equipment and its related software systems. Consideration of increased design, installation and maintenance of these systems within the IRWMP area is encouraged and offers opportunity for improved management of available water supply resources.

CHAPTER 11
WATER RESOURCES MANAGEMENT FRAMEWORK COMPONENTS

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

11.1 PLANNING FRAMEWORK

In addition to the traditional water management planning tools, as have been outlined in the chapters previous to this chapter, there are a number of other planning instruments which are critical elements to proper water management planning. Reference has already been made to land use planning standards and their relationship to delivery of potable and standards compliant drinking water supplies, particularly to hamlets and individual rural housing units. Supporting those land use policies are general plans and their related elements and a number of other formally adopted, publicly vetted plans. While these plans do not have as their basic underpinnings the broad water management related issues of this Integrated Regional Water Management Plan (IRWMP), they nevertheless have a direct nexus to the water management planning process. These plans are described herein in general context, but, as they are adopted plans and in the public domain, will not be described in detail in this IRWMP.

11.1.1 County and City General Plans

The County of Tulare has recently adopted an updated General Plan. It was adopted initially with at least a portion of said plan currently subject to a legal challenge. This general plan has elements related to infrastructure development, with particular emphasis on the provision of water supply to community areas, with specific emphasis on water supply for areas subject to development. In recognition of the significance of surface water supply to development within the county, reference is made to surface water supply related issues. The General Plan has a special section related to water supply based on the early recognition by the Board of Supervisors that water plays a critical role in the economic well-being of the County. It was the understanding of the Board of Supervisors that the authors of various components of the General Plan took into consideration the water supply information which was made available prior to the development of policy issues which are embodied in the adopted General Plan.

It is the goal of the Board of Directors of the Deer Creek and Tule River Authority (DCTRA) to work with the County with respect to the issues of land use planning and land use actions as they relate, in particular, to water quality and, to a lesser extent, water quantity. The need to cease approval of land division maps and permits which allow development to occur in locations where the drinking water supply is out of compliance with state and federal drinking water standards is increasingly apparent.

11.1.2 National Forest Land Management Plan

While the DCTRA IRWMP has an easterly boundary that extends only up to approximately the 660 foot contour, actions which take place higher in the Tule River

watershed have an impact on beneficial uses within the IRWMP planning area. In particular, sedimentation reduction is a major issue, particularly as it affects storage capability behind Success Dam. In addition, uncontrolled stream systems feeding into the IRWMP area are sensitive to and impacted by adverse volume sediment loads. The recharge capability of the Tule River and its distributaries and the uncontrolled stream system beds are the principal locations where effective recharge of runoff to the groundwater reservoir occurs. Accumulation of sediments in these channels is adverse to the effective percolation capability of same.

In addition, coliform contamination is an objective water quality standard in both the Basin Plan for the Tulare Lake Basin and within the adopted General Order related to the Irrigated Lands Regulatory Program. The actions of parties in their utilization of natural forest and park lands contributory to the stream groups is currently exhibiting an adverse level of coliform presence and the matter is rising on the radar of the Regional Water Quality Control Board as an issue to be dealt with. As preliminary indications are that the source of this contamination is not from irrigated agricultural, attention of the Regional Water Quality Control Board will be turned away from irrigated agricultural to other potential sources once they feel that sufficient justification exists of the source not being irrigated agricultural. Coordination with the National Forest Land Management Plan and with U.S. Forest Service personnel will obviously be required to address each of these and potentially additional, water quality related issues.

11.1.3 Urban Water Management Plans

An Urban Water Management Plan is currently in place for the City of Porterville. The plan deals with existing and forecasted future conditions, particularly with regard to land use considerations. In response to projected demands, forecasts are made of future requirements for supply, with additional segments dealing with water quality related issues. In addition, due to declining water levels, both static and pumping, each of these plans deals with issues related to power required for extraction and the costs related to same. Additional considerations are given to water quality issues and historical and projected impacts on water quality parameters. Interface between elements of these plans and this IRWMP will obviously take place in the future and the guidance provided by the plan will be employed by those parties who are charged with dealing with the particular matter at hand. Within the DCTRA IRWM planning structure, including the Stakeholders Advisory Group, participation from each of the urban water suppliers already exists and attendance is regular for each of the representatives. Adequate knowledge sharing as to elements of each of the urban plans between both IRWMP planning areas will be of necessity moving forward with the formal adoption of this IRWMP.

11.1.4 Groundwater Management Plans

The DCTRA has in place, an SB1938 compliant Groundwater Management Plan. This plan was prepared pursuant to the statutes related to implementing AB 3030 and has been updated bringing the plan SB1938 compliant. There are a multiple number of signatories to the DCTRA Groundwater Management Plan, including parties outside of DCTRA membership.

Based on the parties signator to the DCTRA Groundwater Management Plan Memorandum of Understanding, the jurisdiction of said Groundwater Management Plan extends beyond the boundaries of DCTRA. In fact, based on the Memorandum of Understanding participants, the area covered by said plan extends beyond the boundary of the IRWMP, particularly to the west. To date, steps taken to update the policy provisions of the DCTRA Groundwater Management Plan has taken into consideration IRWM principals and it is anticipated that that degree of cooperation and coordination will remain in the future.

11.1.5 Water Shortage Contingency Plans

At the current time, there is a single identified water shortage contingency plan in place within the DCTRA IRWM planning area. This plan is in the form of a written agreement between the Lower Tule River Irrigation District (LTRID) and the Terra Bella Irrigation District (TBID). Principal features of this plan call for entitlement to Friant Division, CVP supplies of TBID to be made available to LTRID when the demands of TBID have been met, in any given year. In a reciprocal fashion, in below-normal and dry year conditions, the LTRID available declared Friant Division, CVP supplies are first dedicated to TBID to meet their in-lieu domestic, domestic and agricultural demands. Supplies above that level are available to LTRID to use at their direction. While there are other informal water shortage contingency plans, there are no others that exist in written form that apply on a long-term basis. To the degree that such plans may be developed in the future, policies such as those of the Tule River Association relative to out-of-basin transfers will need to be taken into consideration as they are principally focused on water

balance conditions within the Tule River Basin. Likewise, any future negotiations related to water banking where such banking will call for exportation of water from the Tule River Basin will need to take into account existing adopted policies with respect to out-of-basin transfers.

11.1.6 Capital Improvement Plans/Master Plans

For many of the public agencies and California Public Utility Commission governed utilities, capital improvement plans and/or master plans are in place. Many of the public district surface water suppliers also have in place either complete or equipment and distribution system oriented capital expenditure plans.

Based on the requirements of the implementing legislation of Proposition 218 and multiple court related decisions based on litigation surrounding compliance with the legislation implementing Proposition 218, future water management planning will need to take into consideration the economic constraints imposed by existing adopted elements of budgets, improvement plans and/or master plans. Water supply and water supply infrastructure projects developed as a result of the IRWMP process and participation have already had to take into account financial constraints imposed by both economic conditions within the IRWM planning area, as well as the constraints imposed by the implementing legislation associated with Proposition 218. This will continue to be of necessary concern in future planning efforts.

11.1.7 San Joaquin River Restoration

An important element of San Joaquin River Restoration Settlement legislation and the underpinning Settlement Agreement, calls for funding and project assistance and priority for restoring back to the Friant Division, CVP contractors that element of water supply estimated to be taken from their declared basis by virtue of Settlement. Based on the position of the number of Friant Division, CVP contractors within and adjacent to the IRWM boundary, attention to and participation in San Joaquin River Restoration activities will be paramount, particularly those dealing with water supply restoration.

11.2 WATER MANAGEMENT AND MONITORING PROGRAMS

The IRWMP project evaluation and scoring criteria take into account compliance with elements of adopted water management and monitoring programs in their evaluation and scoring processes. Outlined as follows are several topics related to water management and monitoring which are incorporated in this evaluation and scoring process. Updates to this IRWMP will need to consider the addition and/or deletion of programs from this inventory.

11.2.1 Groundwater Measurement Programs

The DCTRA, throughout its history, as well as Friant Division, CVP contractors have historically engaged in a process of groundwater level measurements which occurs in both the spring and fall months of each year. Data from these measurements is fed to the U.S. Bureau of Reclamation who published documents up to 1992 with said information. The information is also supplied to the State Department of Water

Resources (DWR) who historically published maps of both confined and unconfined lines of equal elevation on both a spring and fall basis. That mapping procedure has now been reduced by DWR to publication in the spring only of the unconfined lines of equal elevation of water in wells.

Complimentary to these programs, both the Tule River Basin urban and rural domestic water purveyors also conduct depth to groundwater measurement procedures. While driven principally by the economic factors of power consumption and capability of current pumping equipment to satisfactorily perform within the observed groundwater conditions, the information is nonetheless available in the public arena and can be utilized for project planning and impact analysis purposes. Based on the importance of this information to IRWM based water planning, it is envisioned that these efforts by local agencies will continue into the future and be available as a planning tool to IRWMP participants and the associated Stakeholders Advisory Group.

11.2.2 Stormwater Management Programs

A number of stormwater management programs exist within the IRWMP area. Historically, stormwater master plans were associated with these programs, however, these plans were not referenced in 11.1 of this IRWMP as each of these plans is currently considerably out of date. The programs, however, are functioning programs and are documented whether they are at the State, County or local levels. Coordination with the implemented elements of these programs, as they are documented, can be taken into consideration in the IRWM planning process. Attention will also need to be given to the fact that while the overall stormwater master plans are not being brought current,

planning related to additions to the current system elements still is ongoing and these peripheral planning efforts will need to be taken into account in coordinating IRWM plans and project proposals which involve storm drainage elements.

11.2.3 Water Quality Monitoring Programs

As previously introduced, a considerable program, both in terms of scope and cost exist with respect to surface water quality. An extensive inventory of surface water quality test results associated with agricultural delivery systems exists and is database accessible, both at the local, as well as at the State level. With the expansion of the Irrigated Lands Regulatory Program into groundwater, it will not be long until an expanded amount of information is available with respect to groundwater quality which, at the current time, is restricted principally to the domestic water purveyors' service areas and the Dairy Order Monitoring Program. While this information is available through the databases of the Division of Drinking Water of the SWRCB and the RWQCB and published by each water purveyor and transmitted annually to their customers, the same level of quality information does not exist in the rural unincorporated areas not covered by a permitted domestic water supplier. Deliverables which are in the near-term, time wise, are required as a part of the newly adopted General Order under the Irrigated Lands Regulatory Program with respect to groundwater. As time passes, additional information will be available through this monitoring program to be utilized as another tool in the IRWM planning process.

11.2.4 Water Quality Improvement Programs

Associated with the activity to determine surface and groundwater quality, are required management plans where water quality failures are observed. Whether these failures are toxicity related or simply elevated levels of contaminants, two (2) exceedances of a constituent within a three (3) year period at the same sampling locations triggers a management plan requirement. At the current time, there are nineteen (19) Management Plans which have been prepared and are being implemented within the Tule River Basin. Each of these Management Plans is designed to eliminate the source of the contamination and to improve water quality in the area of the observed water quality objectives failure.

11.2.5 Conservation Programs

An extensive number of conservation programs are in effect within the IRWMP area. Whether these are required elements, such as those of the Friant Division, CVP or in Water Management Plans required to be prepared on a 5-year basis and updated annually, or are conservation elements of the Urban Water Management Plan of the City of Porterville, the plans are in evidence. Each of these plans brings with it either Best Management Practices or conservation procedures designed to conserve the available ground and surface water supplies and to improve the efficiency of the use of same. These conservation programs and their related plans play an important role in Tule River Basin water management given the difference between the level of demand and the available supply to satisfy that demand.

11.2.6 Weed Management Programs

Weed management programs are of importance to planning within the IRWMP area for several reasons. These include control, from a contamination point of view, of the application of herbicides and the need to do so in a fashion which does not result in contamination of runoff or reaching surface water sources or, accruing, through percolation, to reach usable groundwater. These programs from a public agency and water purveyor standpoint relate principally to water conveyance facilities maintenance, well site maintenance and reservoir and recharge basin maintenance. Increased usage begins to be evident when road and highway weed abatement procedures are taken into consideration, along with railroad related weed abatement procedures, which are principally designed to reduce the potential for spark-induced fires. The two (2) most significant areas where weed abatement programs exist are in the agricultural arena, where materials application is typically under a jurisdiction of licensed professional advice and restricted materials registration and application constraints and homeowner related applications where no controls exist, except for what material may be available for over-the-counter purchase. To the extent that these programs interface with other management programs, be they surface water related or groundwater related, the programs will need to be taken into consideration in the planning process.

11.2.7 Vector Control Programs

Active within the DCTRA IRWMP area are a multiple number of vector control related entities. Considerable cooperation exists at the current time with these agencies and such coordination is anticipated in the future. Coordination takes place on the level of

the types of materials which are allowed to be applied and where they can be applied, including water supply conveyance facilities, water management and recharge related basins and stormwater collection and disposal facilities. Additional interface takes place related to on-farm facilities including dairy waste related impoundments and tailwater return sumps. Additional coordination takes place with respect to wastewater treatment and disposal facilities, particularly as it relates to treated effluent storage and discharge for recycling/reuse. To a lesser extent, coordination exists with school districts and municipal agencies related to parks and grounds watering. Future water management planning activities will need to recognize the degree to which coordination currently exists with vector control agencies and to incorporate their thoughts and recommendations into future water related planning efforts and related construction details, where applicable.

CHAPTER 12

STAKEHOLDER INVOLVEMENT AND COORDINATION

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

12.1 INTRODUCTION

As has been the case through history of water management planning in the Tule River Basin, interested parties have gathered together in a number of venues to evaluate common goals and objectives and to formulate plans to cooperatively implement projects and coordinate management of water supplies. At times, these gathered groups have been the governing boards of the water management agencies, while more often, they have been the staffs and consultants to the governing boards. Beginning in the early 1990s, a number of other parties began to meet with the water managers and staffs as it became apparent that water and the management thereof, was going to be a critical element in the maintenance and potential growth within the here and now identified as Deer Creek and Tule River Authority (DCTRA) Integrated Regional Water Management Plan (IRWMP) area. Representatives of electric utility services, city and county regional planning staff members, staff of Self-Help Enterprises, leadership of the County Agricultural

Commissioner's Office and the head of the University of California, Cooperative Extension have all been involved for almost three (3) decades in the issues related to water management on the IRWM level.

With the formal actions taken by the DCTRA since its inception, this group became more formally organized and its actions led to the formation of DCTRA. With the recent development of a draft Memorandum of Understanding, a process will exist which will allow direct participants in the IRWMP other than DCTRA member units. Representatives of other agencies outside of the DCTRA and the County are now encouraged and are often specifically invited for input on a particular matter.

12.2 COOPERATING PARTNERS INVOLVEMENT

With a process evolving whereby interested agencies can become signator to a Memorandum of Understanding with the DCTRA, these participation documents become the basis for coordinated efforts with respect to input to state and federal agencies, water related plan documents issued by agencies of both the state and federal government in applications for funding of specific water resources oriented procedures and projects and in the joint funding of local projects for which there is no state or federal funding available. Steps to formally identify these water management relationships have started to intensify with the periodic availability of funding at both the state and federal levels.

12.3 STAKEHOLDERS ADVISORY GROUP

While the interested parties group advisory to the Deer Creek and Tule River Authority (DCTRA) Board of Directors has had different informal titles over time, it has

now been formally organized and recognized in procedural documents as the DCTRA IRWMP Stakeholders Advisory Group. By action of the DCTRA Board of Directors, acting in response to the Regional Approval Process, this Stakeholders Advisory Group is now advisory to both Boards of Directors. A list of current participants is presented in Appendix J.

12.4 PUBLIC STAKEHOLDER OUTREACH

As the parallel process to the KDWCD IRWM process became the formally organized and identified mechanism by which regional water management plan efforts were coordinated within the DCTRA, parties outside of the framework are now looking to join the framework to begin to address their specific issues related to water management. With the draft Memorandum of Understanding soon to be executed, membership requests should increase. The basis for participation will be other than just general public interest in the topic. An outreach effort soon to be adopted, is specifically designed to deal with interested parties issues for which either they are the stakeholder or the representative of a stakeholder segment of the water management world.

12.4.1 Stakeholder Outreach Meetings

For some length of time, DCTRA representatives have attended KDWCD IRWMP meetings, providing their input as to the framework of project planning and project evaluation and with the issue of the mechanisms by which disadvantaged communities and/or disadvantaged community representatives could participate. Meetings are currently being held on an on-call basis surrounding activities at the

DCTRA level, activities within the Tule River Basin and activities driven by funding programs, currently those specific to the Department of Water Resources (DWR). Previous meetings with KDWCD staff and consultants have surrounded policy issues related to the Regional Acceptance Process (RAP), meetings to work through RAP driven issues and meetings related to policy development specific to this IRWMP. In all cases, these meetings have included the IRWMP Stakeholders Advisory Group and, where appropriate, the Boards of Directors of the KDWCD and the DCTRA. In the future, Stakeholder Advisory Group meetings are anticipated to be held on an as-needed basis with the exception being during the Tule River Basin IRWMP development process and during the project layout, project evaluation, project coordination and project ranking process. That process is anticipated to be energized and de-energized based on available funding opportunities.

12.4.2 Electronic Outreach

The sole mechanism which exists at the current time to communicate with the Stakeholders Advisory Group is by electronic outreach. A copy of the current Tule River IRWMP Stakeholders Advisory Group contact list was noted to be presented in Appendix J.

12.4.3 Web Site

At the direction of the Board of Directors of DCTRA, development of a web site for the DCTRA has been instructed to be created and maintained. The KDWCD IRWMP web site is anticipated to act as the template for DCTRA.

As a water conservation instrument and an education instrument, several of the member units of DCTRA publish a newsletter, on differing basis, with each of these newsletters being available to be posted on the web site. In the interim, they are mailed to a list of interested parties which has been developed over time. DCTRA management has invited comment with respect to the web site and constructive suggestions on how it may be developed to the benefit of water management within the IRWMP planning area.

12.4.4 Targeted Outreach

Within the conduct of the IRWMP Stakeholders Advisory Group, it is acknowledged that certain topics brought to the Group and to the DCTRA would benefit from input from parties with expertise who do not routinely attend the Stakeholders Advisory Group meetings. When that need is recognized, specific outreach from the DCTRA will be made to specific individuals and/or entities which are felt to potentially be of assistance to the Stakeholders Advisory Group in formulating a position relative to the then current topic.

In addition to such supplemental targeted outreach efforts, additional outreach efforts are also incorporated into the project development process. Stakeholder invitations are anticipated to be extended when specific projects have been identified for pursuit and input is requested from parties in both the impacted and benefitted environments. With the reforming of the Water Commissions by both the County of Kings and the County of Tulare, additional targeted outreach potential exists within the appointed members to those groups. The Commissions bring to the table a different perspective of land use, a

broader basis of political representation and disparate water related interests are present within the make-up of the appointed commissioners.

Should DCTRA choose to parallel the creation of the new disadvantaged communities assistance program of KDWCD, an additional outreach effort will need to be created. As parties experienced with project definition and creation have learned by experience, the strongest projects are those which have the wholehearted support of the affected stakeholders. As work begins in areas which currently have no defined governance structure on which to develop water quality and water supply related projects, stakeholder outreach efforts will occur and be actively pursued in order to ensure that support for project development and project handoff at implementation occurs with the support of and with the actions of the directly affected parties.

12.4.5 Cooperation and Coordination with State and Federal Agencies

Coordination between parties associated with the DCTRA IRWMP are in a continuous mode of coordination with state and federal agency management and staff. Virtually no element of water management within the Tule River Basin takes place without the involvement of representatives from these agencies. Whether it is day-to-day coordination with the U.S. Army Corps of Engineers relative to storage in Lake Success, or water releases from Success Dam, to an ongoing series of projects developed in cooperation with and funded by the Bureau of Reclamation and/or the DWR, constant communication and meetings takes place.

From a flood control standpoint, the relationships with the U.S. Army Corps of Engineers and state agencies including the State Lands Commission and the Central

Valley Flood Protection Board, are necessary and important to achieve optimum coordination. These efforts are related to both maintenance and project planning and development as related to storm water control and flood protection procedures and projects.

12.4.6 Outreach to Other Regions

This IRWMP has been prepared on a parallel basis to the KDWCD IRWMP. In addition to the policy decision to share a common Stakeholders Advisory Group for their respective IRWMP, the DCTRA Board of Directors indicated a desire to have their IRWMP prepared on a parallel format to that for the KDWCD. In this fashion, should it appear to be appropriate at some point in time in the future to combine the two (2) IRWM areas into a single plan area, the transition will be much easier, as the majority of the IRWMP related work will be simply merging of documents in the policy arena in particular, in lieu of creating new documents which would require extensive overhaul in order to allow for the merging to occur.

As shown on Figure 4-2, the DCTRA IRWMP boundary also abuts that of the Southern Sierra IRWM to the east. A considerable degree of cooperation exists between the two IRWM groups and it is anticipated that the entities will conduct joint project evaluations to determine if a strengthening of projects could occur as a result of simply evaluating the nature of particular projects and their particular advantages and disadvantages. It is a goal of the Board of Directors of DCTRA to continue this coordination, which is partially based on the recognition that water deliveries into the DCTRA have a common source basis of the Tule River.

12.4.7 Outreach to Disadvantaged Communities

Based on the decision to adopt a common Stakeholders Advisory Committee, programs specifically designed to address water quality issues related to disadvantaged communities and aggregation of single-family residences in a disadvantaged hamlet setting are raised to a new level. Recognition exists that a different outreach methodology will need to be generated, at least as to the efforts of the IRWMP, relative to the outreach mechanisms to other than surface water related entities.

Mapping has been completed of each of the concentrations of households within the IRWMP boundary in excess of six (6) single-family units. From this basis, work could begin with respect to the drinking water quality of each of those areas, followed by the development of a program for assistance to the identified areas. In some cases, this outreach could be oriented toward development of a water distribution system and the extension of an adjacent water purveyor, meeting current state and federal drinking water standards, as the methodology to supply the now non-compliant area with an adequate drinking water supply. In other areas, where consolidation is not an option, pursuit of a step-by-step process as was outlined in Chapter 9, could be undertaken by DCTRA. Throughout this process, an outreach to the effected homeowners and to representatives of environmental justice concerns would need to be made in order to ensure that all possible steps are taken to remedy the drinking water quantity/quality deficiency.

While the IRWMP process adequately addresses the intent to incorporate stakeholders and potential beneficiaries in the service areas into the process, more specific work needs to be undertaken to address the project development phase and, more

importantly, the government's development steps which are associated with generating solutions to rural drinking water related problems.

12.4.8 Outreach to Native American Tribal Communities

The DCTRA and the Tule River Association have a longstanding relationship with tribal community representatives in the area. While not always a harmonious relationship with respect to water rights, consultations do take place on any project which is in the development process or, more importantly, at the threshold of the construction process, to ensure coordination with tribal group representatives and to ensure protection of antiquities, sacred sites and burial sites.

CHAPTER 13
PROJECT DEVELOPMENT PROCEDURES

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

13.1 PROCEDURES APPROACH

While a considerable amount of effort goes into integrated regional water management procedures and processes associated with the preparation of existing water management elements and the evaluation of procedures, methodologies and structures associated with the improvement of the management process, another integrated approach, separate from that of operation and maintenance exists. Conceiving of new projects and procedures designed to improve water management within the Deer Creek and Tule River Authority (DCTRA) Integrated Regional Water Management Plan (IRWMP) area has received separate consideration with respect to policies and procedures. Extending back 20-30 years in history, coordinated operations on the development of water management facilities, including groundwater recharge facilities, occurred on a joint and cooperative basis. Oftentimes, basins were developed with the underlying fee land being held by a special district with the DCTRA

contributing equipment and manpower to maintain the basins. In a limited number of cases, maintenance is performed on a fee basis, in lieu of an exchange benefits basis. These cases are extremely limited, however. In the 1990s, projects began to be developed pursuant to formal partnership arrangements where cost sharing occurred relative to property development and operation and maintenance considerations. As property has increased as a percentage of total project cost and where specific items of construction equipment have been purchased by various water management agencies, project development and implementation has taken several forms depending on the circumstances of the participating parties. A number of parties with specific water management needs have remained outside of the project development process due to both initial funding and operation and maintenance funding constraints. The DCTRA Basins have been developed pursuant to joint development agreement procedures, including a benefits determination.

The cooperative process remains in place to date, notwithstanding the availability of funding from federal and state water management related programs. With only local entities involved in project development and implementation and with the utilization of their own revenues, the process of project selection and development only required a winnowing process elected to be utilized by the participants.

With the advent of the availability of state and federal funding to assist in the development of projects, a separate process was needed to address project development, structure and coordination in order, principally, to ensure that only the best projects were being put forth for funding consideration.

It was at this time that the joint IRWMP Stakeholders Advisory Group engaged in a process of project development, project evaluation and scoring and project funding submittal coordination. Literally hundreds of hours were invested in the development of the process. A primary goal of the process was to ensure that it was flexible enough to respond to funding opportunities for all aspects of water management. This included surface water related projects for both irrigation and flood water control, groundwater related projects, water supply project types, as well as water quality project types. Expansion of the typical IRWMP area projects from being irrigation supply oriented to being inclusive of urban and rural community needs has also been addressed. The outcome is a process which was reached by consensus between parties with disparate interests and with often seemingly disconnected goals. The process is now in place, functioning and is folded into the IRWM planning process by action of the Board of Directors of the DCTRA. As with all processes associated with the DCTRA IRWMP, the process remains open for modification based on the circumstances of time, participants and funding agency criteria.

13.2 PROJECT SOLICITATION, QUALIFICATION AND PRIORITIZATION

On a periodic basis and sufficiently in advance of the announcement of any funding opportunity, solicitation of projects is sought from prospective MOU participants, as well as other potential participating parties within the IRWMP area. The submittals are to contain sufficient information to determine if the candidate project reasonably complies with criteria which will be utilized to determine the competitive nature of the proposed project relative to the funding invitation. At a minimum, a project

must satisfy at least one (1) of the IRWM Plan Objectives. Sufficient detail indicating how that is accomplished must be presented.

The project advocate is required develop and present for evaluation, project related documents dealing specifically with a number of issues. These issues are to be developed in the form of a technical report and, at a minimum, include the following information:

1. A cost estimate and a Total Project Cost;
2. Total Project Cost in comparison to proposed cost sharing amount. The economic feasibility of the project, absent grant funding, must be demonstrated;
3. Project objectives including a determination of the independent value of the project;
4. Yield benefit, if any;
5. Water supply benefit;
6. Water quality benefit;
7. Groundwater benefit;
8. Climate change relationship;
9. Demonstration of project technical feasibility;
10. Financing details including local share and method(s) of funding local share are to be addressed;
11. Operation, maintenance, repair and replacement considerations including estimates of costs, methods of funding those costs and indication if a Proposition 218 proceeding must be completed to secure an adequate revenue source;
12. Licensed operator requirements and opinion as to short-term and long-term licensed operator availability;
13. Opinion and discussion as to the project being a Disadvantaged Community project and the basis for the opinion including the most recent Median Household Income and the source for the information;

14. Source(s) of and nature of Environmental Justice concerns. Consideration of potential solutions must be presented;
15. Examination of the project merit in relation to the strategic implementation of the IRWM Plan;
16. An analysis of the project's contribution to climate change adaptation;
17. An examination and computations, if possible, of the project's contribution to reduction of Greenhouse Gases as compared to the project's identified alternatives;
18. An indication of the status of the project proponent's governing body action(s) to adopt the IRWM Plan;
19. Where applicable, the project's contribution to reducing dependence on exports from the Sacramento-San Joaquin Rivers Delta;
20. Administrative requirements and benefits;
21. Presentation of a thorough discussion of the project status including status of CEQA/NEPA compliance, required permits including status of acquired permits and an estimate of time to secure those remaining, bond financing status if applicable and a statement of "Ready to Proceed," if applicable;
22. An initial evaluation of integration potential with other identified prospective projects;
23. Relationship to established Resource Management Strategies.

The submitted prospective project information is then evaluated by the IRWMP Stakeholders Advisory Group, typically with a scoring effort against the scoring associated with the funding agency's process, and taking a very conservative viewpoint of how a funding agency may score the subject project. For DAC projects, the DAC Scoring Criteria contained in Appendix K is utilized as a supplement to the standard scoring criteria, also presented in Appendix K. Following the process, projects which survive the evaluation process are critiqued for weak areas, along with the potential to be

coordinated with other competing projects. A read-looking view is also taken relative to the project with other projects, previously submitted, which either did not succeed in prior funding cycles, or whose project configuration may be strengthened when put in combination with the current subject project.

Following this iterative process, the resulting project descriptions and structures are subjected to an internal scoring procedure developed specifically for the DCTRA IRWMP. The criteria and related point system were developed by the IRWMP Stakeholders Advisory Group and have been approved for use by the Board of Directors of the DCTRA. For DAC projects, the DAC scoring criteria contained in Appendix K is utilized as a supplement to the standard scoring criteria. The IRWMP scoring criteria is set forth in Appendix K. Particular attention is called to the sub-scoring categories of 19 through 23. These subcategories are used, in particular, where applications are oriented to a specific nature. For instance, project applications which are flood control oriented only would have specific emphasis placed on Criteria 22 and weighted accordingly.

13.3 CURRENT HIGH PRIORITY PROJECTS

As would be expected with any active IRWMP group, projects are continuously being conceived and evaluated. In addition, it is the desire of the IRWMP group to maintain a current list of projects for two (2) specific purposes. The first, an entity proposing a project can look at other projects on an IRWMP generated list and see if there is any potential for integration of projects or, just as importantly, to see if projects are competing for management of the same segment of the available water supply within the IRWMP planning area. In addition, looking at the scope of other projects and the

evaluation associated with other projects gives rise to either dismissal of a project at onset or advancing a particular project concept. The current approved projects list is presented herein as Table 13-1.

TABLE 13-1
CURRENT PROJECTS LIST
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Submitting Entity	Project	Project Description Summary	Total Project Cost

CHAPTER 14

COMPLIANCE, BENEFITS AND IMPACTS RESULTING FROM IRWMP IMPLEMENTATION

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

14.1 OVERALL BENEFITS OF THE IRWMP

14.1.1 General

This chapter provides a description of the benefits and impacts related to implementation of the Tule River Basin Integrated Regional Water Management Plan (IRWM Plan). Impacts have been addressed in the IRWMP Plan from the perspective of the IRWM Planning Area, as well as the interfaces with surrounding IRWM regions. Pursuant to provisions of the 2012 IRWM Grant Program Guidelines, this chapter addresses both impacts and benefits of regional water management, impacts and benefits of defined resource management strategies, impacts and benefits to disadvantaged communities, impacts and benefits related to candidate project evaluations and steps related to the periodic updating of impact and benefits analyses.

In addition to being a Guideline requirement, identification and discussion related to IRWM Plan implementation allows for IRWM Plan Objectives to be reviewed in a current situation context. It also allows for emphasis priority to be developed relative to Resource Management Strategies and for avoidance of adverse impacts from certain elements of Resource Management Strategies. The impact and benefits analysis is also an element of the overall evaluation process of the IRWM Plan performance.

14.1.2 Benefits of Regional Water Management

Based on the objectives set forth for the DCTRA IRWM Plan, the governance structure which currently exists offers the opportunity to establish and put into effect policies, procedures and develop projects related to water management. These policies and procedures are related to a number of specific areas of interest which were discussed principally in Chapter 10. Running the gauntlet from water supply augmentation through water quality and into land use policies, there is a wide breadth of subjects that fall under the category of water management policies and procedures. What the IRWM structure offers, as compared to either no structure or alternative structures, is the chance to work on the issues in a joint fashion, taking into account disparate interests, along with like interests, working toward the goal of improving management related procedures, along with relevant projects.

While simple partnerships offer some similar benefits, the expansion of those partnerships to the degree offered and experienced by the DCTRA IRWM Plan Stakeholders Advisory Group is of substantial advantage. Representation exists of a myriad of interests, sometimes seeming as though there is no common thread. But when all is said and done, the topics, opinions and constructive suggestions all circle back

around to the goal of improving IRWMP Planning Area efficiencies related to water management. Another concept has yet to be developed which replaces this model with the chance of improved outcomes. The fact is exemplified in the DCTRA case, as in one form or another, the model has functioned for in excess of two (2) decades. Whether the IRWM structure exists in the formal, written format required by agencies in exercising jurisdiction over allocation of project funds, or in demonstrated partnership actions requiring little more than a handshake, is not material. The fact that individuals and representatives of entities come together under one structure or the other is not the significant issue. The fact that they do and that the outcome is expressed in improved water management procedures and the development and implementation of water management facilities is the critical issue.

The approach to regional water management incorporated into the DCTRA IRWM Plan demonstrates that a cooperative, comprehensive and objectives based approach to regional water management is far superior to an individual entity fragmented approach. The effort further reduces the potential for development of conflicting goals, policies and projects within a defined planning area. This coordinated approach will likely become even more important as extractions of groundwater are required to remain within defined sustainable yield quantities.

Efforts to date to develop projects have proven that there are multiple benefits from coordinated development. Project evaluations performed by multiple stakeholders with diverse interests and objectives has resulted in stronger candidates and weak/strongpoints have been coordinated to the benefit of all projects. Project

coordination also allows for increased potential for project approval/funding influence and reduced costs associated with project development.

These benefits would be lost if the IRWM Plan is not supported and maintained. Likewise, if participation and financial support diminish, the IRWM Plan effectiveness diminishes or could be lost.

Primary impacts associated with such a loss would be loss of capability to manage groundwater on a cooperative region-wide basis. Management elements include both water quality and quantity issues, issues which are now mandated to be managed on a regional basis. Numerous adverse impacts have been identified associated with loss of capability to manage groundwater including the following:

(1) Declining water levels;

(2) Potential land subsidence;

(3) Increased pumping costs;

(4) Increased costs to lower pumps, deepen wells or construct new wells;

(5) Potential conflicts between overlying water users for available groundwater supplies;

(6) Loss of economic viability at the farm level;

(7) Inability to respond to dry year conditions;

(8) Reduced supply reliability;

(9) Limitations on planned development and inability to comply with revised state laws requiring proof of adequate and sustainable water supplies; and

(10) Inability to address regional water quality issues such as drinking water solutions for DACs.

14.1.3 Benefits and Impacts of Resource Management Strategies

Introduced and discussed in Chapter 9 were all of the Resource Management Strategies (RMS) presented in the 2009 California Water Plan Update. Of the total applicable on a state-wide basis, 22 were determined to apply within the Tule River Basin. An overview of the benefits and impacts of applicable RMS is presented in Table 14-1. While success of implementation of the IRWM Plan objectives is the best measure of IRWM Plan performance, the examination of benefits and impacts associated with the RMS represent the potential benefits and impacts related to implementation of the IRWM Plan.

14.1.4 Adjacent IRWM Area Benefits and Impacts

Significant coordination exists with adjacent IRWM Planning Areas as a result of joint efforts related to the Irrigated Lands Regulation Program, coordinated efforts between river watermasters and groundwater management plans coordination. The southern San Joaquin Valley has a long history of coordinating together on matters related to water supply, water quality, flood control, groundwater interface and water management planning. It has been long recognized that inter-regional water management coordination is necessary for progress to be made on the political front and for projects implementation. Following is a brief discussion of areas of influence between the DCTRA IRWM Plan and those of adjacent entities.

14.1.4.1 North – Kaweah Basin IRWM Plan

The Kaweah Basin IRWM Plan boundary adjoins the DCTRA IRWM Plan boundary along its south and southwesterly sides. The separation, for the most part, follows the Southern boundary of the KDWCD and the northern boundary of the

TABLE 14-1
BENEFITS AND IMPACTS OF RESOURCE MANAGEMENT STRATEGIES
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Strategy	Benefits	Impacts
Agricultural Water Efficiency	• Redirect supply • Reduced application cost • More efficient use of chemicals • Reduced subsurface drainage • Protection of water quality	• Reduced groundwater recharge • Lost revenue if usage based • Causes operational changes • Irrigation hardware needed • Hardware maintenance • Irrigator training requirements • Reduction of spills
Urban Water Efficiency	• Redirect supply • Reduced supply/distribution costs • Reduced home chemical use • Delayed capital costs • Protection of water quality • Reduced energy use • Reduced groundwater overdraft • Reduced wastewater production	• Causes operational changes • Lost revenue if usage based • Inconvenient watering times • Creates hard demand that reduces opportunities for drought response
Conveyance – Regional/local	• Maintain water rights • Conjunctive use • Improved water quality • Increased flood control capabilities • Deliver surface water to areas that use only groundwater	• Increased use of facilities • Shortened maintenance periods • Increased costs for larger facilities

Strategy	Benefits	Impacts
Water Transfers	• Efficient use of surface supplies • Revenue generation • Groundwater recharge • Agricultural sustainability	• Loss of annual local water supply • Groundwater mining • Environmental impacts
Conjunctive Management and Groundwater Storage	• Dry year supply • Extends use of existing basin capacity • Overdraft reduction • Improved water supply reliability • Groundwater recharge • Improved groundwater management • Water quality improvement • Reduction in flood impacts	• Increased pumping costs compared to surface water • Litigation challenges • Increased data collection needs and costs • Uncertainty of facility impacts to neighbors • Facility capital costs • Land use changes for facilities
Precipitation Enhancement	• Quick project development • Increase in water supply • Power development	• Accuracy of location and timing
Recycled Municipal Water	• Reliable supply • Improved water quality • Allows for development • Drought resistant supply	• Increased operations and maintenance cost • Public acceptance • Water quality concerns with microbial contaminants, salinity, heavy metals and pharmaceuticals
Surface Storage – Regional/Local	• Water supply reliability and augmentation • Flood control • Hydroelectric power generation • Recreation • Sediment transport management	• Permitting requirements • Environmental mitigation • Cost • Limited sites available • Failure impacts • Beneficiary determination • Property tax losses • Habitat losses • Operational control

Strategy	Benefits	Impacts
Drinking Water Treatment and Distribution	• Protect public health • Maintain regulatory compliance • Regionalization/Consolidation of facilities	• Increased O&M costs • Increasingly stringent regulations
Groundwater Remediation/ Aquifer Remediation	• Contamination spread abated • Protect public health • Maintain regulatory compliance • Avoided costs of purchasing additional supply	• Costly • Highly trained operations staff • Public perception/acceptance of treated water
Matching Quality to Use	• Best use of available local water supplies • Most economical choice • Treatment avoided or limited	• Possible environmental impacts • Infrastructure costs • Conveyance costs
Pollution Prevention	• Improved water quality • Consistent with anti-degradation policies • More cost effective than “end of the pipe” treatment	• Increased regulations • Increased costs • Increased management needs • Increased monitoring costs
Urban Runoff Management	• Water source for local recharge • Improve flood protection • Reduce surface water pollution • Minimize soil erosion and sedimentation problems • Local resource from waters historically lost to an area • Mimic natural hydrologic cycles	• Cost to treat and manage runoff • Increased cost to urban developments • Vector breeding • Groundwater contamination potential

Strategy	Benefits	Impacts
Flood Risk Management	• Enhanced flood protection • Reduce risk to lives and property • Recharge possible if captured • Riparian habitat improvements • Possible floodplain restoration	• Structural approaches are costly • Permitting requirements involved • Long term ongoing maintenance of facilities • Emergency response planning required • Planning may limit development in some areas • Revisions to flood insurance mapping
Agricultural Lands Stewardship	• Reduces pressure to agricultural lands from urban development • Increased economic viability for agricultural lands • Habitat improvement • Encourages agricultural practices which also benefit environmental and restoration concerns	• Conservation easement costs • Cost to implement BMPs • Reduction in tax base
Economic Incentives (Loans, Grants and Water Pricing)	• Decreased costs for grant recipients • Reduced wait for needed infrastructure • Reduction in water demand from water pricing structures	• Burdensome application processes • Increased federal or state directives in local issues • Increased administrative costs • Funding is intermittent
Ecosystem Restoration	• General quality of life increase • Protection and enhancement of fish and wildlife resources • Species recovery	• Increased short term costs to goods and services • Water supply loss

Strategy	Benefits	Impacts
Land Use Planning and Management	• Improved communication among different agencies • Proper planning helps ensure new developments have reliable and sufficient water supplies • Potential for reduced water demands based on development designs • Opportunities to reduce flooding and increase recharge	• Difficulty in getting some land and water use planners to cooperate • Increased costs to coordinate efforts
Watershed Management	• Community level solutions • Water quality improvement • Protection of local water rights • Flow attenuation	• Difficulty of diverse stakeholders working together
Crop Idling for Water Transfers	• Drought water supply reliability • Stable farm income in water short years	• Introduction of wildlife, weeds, pests and trash dumping to the area • Changes to local community way of life
Irrigated Land Retirement	• Generation of stable water supplies • Reduction in agricultural drainage to an area	• Taxpayer burden of land cost • Increased management costs of government owned retired lands • Lower income and higher unemployment • Growth inducement • Security needs

Lower Tule River Irrigation District. The Kaweah Basin region is experiencing overdraft conditions in defined areas and water management strategies between the areas differ only in the aspect that the annual yield of the Kaweah River is greater than the Tule River. Both regions are affected by Friant Division, CVP contractors within and adjacent to their boundaries.

14.1.4.2 South – Kern and Poso Plan Areas

The Kern Basin has recently formed an IRWM Planning Area covering the valley floor area of Kern County not covered by the Poso Plan area. The plan areas operate independent from each other with separate advisory committees. Groundwater supplies are common at the Plan boundaries with little to no recharge capabilities in the vicinity of the boundary area. There are, however, a number of common and strong water management ties between these two areas.

14.1.4.3 West – Tulare Lake Basin

The Tulare Lake Basin is located west of the DCTRA IRWM Planning Area. This region is not currently covered by an IRWMP. Historically, Kaweah River and Tule River flows flooded this area, but now this only occurs during very wet years. Consequently, DCTRA IRWM flood control and diversion projects could negatively or positively impact the Tulare Lake Basin.

14.1.4.4 East – Southern Sierra IRWMP

The Southern Sierra IRWM Plan area occupies lands to the east of the DCTRA IRWMP Planning Area. These lands are upstream and at higher elevation than the Tule River Basin, so activities in the Tule River Basin would not influence the Southern Sierra IRWMP. The Southern Sierra IRWM region includes, however, the Tule River

watershed. The DCTRA IRWM Group has and can provide support to and help coordinate forest management and watershed management in the Southern Sierra IRWMP area that benefits both regions.

14.1.5 Benefits and Impacts to DACs and Other Parties

The steps taken in recent years to engage all water related parties in Tule River Basin water resources issues have succeeded as to engagement of DAC stakeholders and representatives, environmental justice representatives and tribal representatives in the further development and improvement of the IRWM process. Multiple parties with specific DAC ties have a voting seat on the IRWM Stakeholders Advisory Group and can actively participate at the IRWM Plan governance and policy development levels. Specific benefits accrue to all participants as a result of the engagement of these stakeholders and representatives including the following:

(1) Forum for discussion – The IRWM process provides an opportunity for DAC, environmental justice and tribal stakeholders and representatives to discuss water management issues, including problems, concerns and priorities. It also allows for DAC – non DAC project coordination;

(2) Creation of and dissemination of information – the opportunity to develop and/or share information is facilitated by meetings of DAC/EJ stakeholders and representatives and water management professionals in the IRWM setting. Opportunity to interface with state and county regulators is also facilitated. Meetings are conducted pursuant to Brown Act regulations and minutes are taken and kept; and

(3) Funding opportunities – The forum created by the IRWM Plan process offers specific opportunity to access information regarding funding to be provided and further offers unique opportunity to coordinate projects otherwise difficult to tie together. The DCTRA IRWM Plan offers special opportunity for participation for DACs, including opportunity for advanced and technical planning assistance for designated projects.

No significant impacts are anticipated to accrue to DAC related parties or tribal related parties or projects as a result of IRWM efforts. Positive outcomes coordinated with other MOU participant sponsored projects is the desired end result.

14.2 COMPLIANCE WITH STATEWIDE PRIORITIES

Statewide priorities, at least as to topic, are embodied within the Resource Management Strategies topics associated with the California Water Plan Update. The Resource Management Strategies were presented and discussed in Chapter 9. It is envisioned that, with impacts related to population changes, changes in locations of populations within the geography of the State, changes driven by elected officials and associated politics and paradigm shifts such as may be associated with climate change, modest changes will occur with the current state-listed Resource Management Strategies. The goal of this IRWMP is to remain flexible, with the ability to visit issues from a different perspective or from a changed base. It is the opinion of the Board of Directors of DCTRA that such has been the case over recent history and with their IRWM efforts summarized in a written plan form, that they do not envision that flexibility to be diminished.

14.3 IRWMP IMPLEMENTATION ISSUES

14.3.1 Project Cost Related Benefits

If it is agreed that the IRWM process results in outcomes which are improved over those which exist when exercising other procedures, then it should be agreed that the economic side of the project development issue should result in like benefits. Whether in the vein of initial capital cost, or in long-term operations and maintenance costs, intense scrutiny of a project by separate parties with differing interests results in an improved analysis. Improved analysis results in an improved project, or the elimination of a project, either case resulting in an improved financial picture for any proposed project.

14.3.2 Potential Beneficiaries

The simplistic response to the analysis of who the potential beneficiaries are of the IRWM process is “all.” Maybe not all at the same time, maybe not for every policy, procedure or project, but given the involvement of water and life of each individual within the IRWMP Area, the process eventually is of benefit to all individuals. One only has to look at the benefits of the outcome of various projects, whether water supply, water quality or flood control, for instance, to see the width and breadth of the impact on people that these types of projects have.

14.3.3 Obstacles

As the IRWM process has been in place within the Tule River Basin for a couple of decades and formalized by agreement for in excess of 20 years, there are no obstacles to its implementation, as it already has been implemented. There are, however, obstacles which could arise which could derail the effort. For example, withdrawal of a number of parties from the process and, in particular, the Stakeholders Advisory Group, would deal

a damaging blow to IRWM planning efforts. Likewise, the lack of a coordinated review of projects and critical critiques of the advantages and disadvantages of combining projects would result in a similar outcome.

Other potential scenarios also exist, but of a far greater draconian nature. An overhaul of California water rights could cause a shift from an emphasis of local management of available water resources to a state level. This action could result in situations where parties now at the table on a cooperative basis would be across the table fighting over specific allocations and their related process and procedures. The displacement of guiding water management plans from the local level to the state level would have a like effect. One only has to look at states with groundwater under the control of a state designated engineer to determine that the process of integrated regional water management involving local stakeholders is not the same as the current IRWMP structure. As no direction from the governing board of the DCTRA exists to evaluate potential outcomes under these types of scenarios, same are not laid out in this IRWMP. Suffice it to say, however, that there is potential to provide sufficient obstacles to cease the IRWM process.

14.3.4 Ongoing Support and Financing

On a brighter note, the DCTRA IRWMP is supported by the participants within the IRWMP area. Whether it is in the form of attendance, document generation, document review and comment, project generation, project evaluation, local share funding or funding of application costs, support has been proven to exist. Financing of costs related to IRWMP activities are based on a dividing process with the principal burden of the cost being assumed related to the IRWM Plan by DCTRA. This is felt to be

appropriate by the Board of Directors as they are the lead agency for the Tule River Basin relative to satisfaction of the IRWM Guidelines. When it comes to application and project related costs, however, a shift in this cost share will occur. Participants in applications for funding will share the cost on an equal basis for applications, notwithstanding the estimated cost of a project's differential. In others, the majority of the application cost has been borne by a single applicant. As project proponents are required to bring to the table documents related to their project ready to be inserted into a project application, these costs are felt to be appropriately divided on an equal basis. These procedures are currently memorialized in the draft Memorandum of Understanding located in Appendix E. With respect to the local cost share component of projects, project applicants determine what their capability is to participate in structuring their individual project. One of the harsher evaluation steps which is taken at the Stakeholders Advisory Group level is the points spread which is estimated to exist based on the level of financial participation in any given project. The pressure and the evaluation procedures are even more critical when the viewpoint is what an underfunding of a particular project does to the prospect of the total application succeeding when against other like project applications from competing IRWM groups.

14.4 IRWMP'S ROLE IN THE FUTURE

In their assessment of the preparation of this formalized, written IRWMP, the Board of Directors of the DCTRA, as well as the Stakeholders Advisory Committee, evaluated where they thought the IRWM process was headed in the long-term. Their conclusion was that, given the strength of the process, particularly as compared against alternatives, a strong argument exists for it being the principal mechanism for

development of guidance related to water management and development of water management related project. Their review of actions at the State level, including those of the Governor's office, the agencies of jurisdiction and the staff of the various agencies all contributed to the thought that the IRWM process was, at least for the near term, going to be the vehicle of choice for creation of water management policies and procedures and for the development and vetting out of water management related projects. In short, the IRWM process is where it's at with respect to water management planning efforts.

14.5 PROJECT RELATED BENEFITS/IMPACTS ANALYSIS

14.5.1 General

DCTRA, as a public agency and the lead with respect to implementation of IRWM based projects has adopted guidelines implementing the California Environmental Quality Act (CEQA). It is a procedural requirement that impacts and benefits associated with specific projects be evaluated in conformance with CEQA Guidelines. Where applicable, this analysis must be expanded to include the National Environmental Policy Act (NEPA) process. Projects that have adverse impacts will not be supported absent a thorough mitigation plan being developed. Project impacts and benefits must be described when projects are submitted for funding consideration. Completion of the CEQA (and NEPA) process is not required during the project evaluation phase, but a thorough discussion of benefits and impacts is required. A complete and approved CEQA or NEPA analysis would, however, be viewed more positively than a preliminary assessment as it provides greater assurance of project feasibility.

As a minimum, the benefit/impact analysis should address the topics found in a CEQA analysis including: aesthetics, air quality, biological resources, cultural resources,

geology and soils, hydrology and water quality, land use and planning, noise, population and housing, public serves and utilities, recreation and transportation and circulation.

14.5.2 Project Development Philosophy

In the development of projects, the IRWM process demonstrates its unique characteristics. Being able to identify projects and to describe those projects is a process familiar to all in the water management arena. Being able to bring projects to the table where they are dissected, criticized, stripped and rebuilt with the intended goal of improvement is unique. The true uniqueness comes about, however, in the form of viewing projects in the context of other projects. Projects, which on a singular basis may not appear to have characteristics which would lead to their eventual implementation, are put in the context, however, of being strengthened and augmented by another project or having the capability to have that effect on yet another project. This is a unique characteristic of the IRWM process. Sentiment has even been expressed regarding the process that being forced to work outside of the “box” or outside of one’s comfort zone, as is often required by state and federal imposed guidelines, is not all that bad and often results in an improved outcome. This applies both in the arena of policy and procedure development, as well as project development. Very little of this critiquing capability exists outside of the process, other than internally within some consulting firms. In the latter case, however, the parties at the table engaged in the critiquing process do not offer the width and breadth of basic interests that the IRWM process does.

This process may require a revisit of completed CEQA/NEPA documents for a given project if the combining or revision to the project is recommended. The project

evaluation process can be categorized as a process with benefits, but having a requirement of undertaking additional impact analysis.

14.5.3 Required Impact Analysis Elements

In order to provide overall IRWMP guidance to efforts such as existed with the Stakeholders Advisory Group in development of project evaluation criteria and scoring, the IRWM Plan at this juncture, sets forth a minimum set of resource-specific impacts which are to be considered in project development and evaluation. Similar in approach to the checklist orientation of an Environmental Assessment related to CEQA, setting forth these specific areas of potential impact which must be evaluated ultimately on water management projects is felt to be a necessary component of this IRWM Plan. Some elements may be covered by the required CEQA analysis of each project, but have been determined to apply to project analysis, if only for this analysis step. Set forth as follows are the current resource specific impacts which have been established by DCTRA, which list was developed by the Stakeholders Advisory Group:

(1) Aesthetic/visual resources;

(2) Agricultural resources;

(3) Air quality;

(4) Biological resources;

(5) Cultural resources;

(6) Environmental Justice/Disadvantaged Communities;

(7) Geology and soils;

(8) Hazards and hazardous materials;

(9) Hydrology and water quality;

(10) Land use and planning;

(11) Noise;

(12) Population and housing;

(13) Public services;

(14) Recreation;

(15) Transportation and circulation; and

(16) Utilities/service systems.

The addressing of these topics can either be in the required technical report associated with a project, or in a separate dedicated document. If sufficient reference is supplied, each of these topics can be addressed in the project's environmental document(s).

14.5.4 Stakeholder Contact and Input Procedures

Public outreach, particularly to affected stakeholders and principal interested parties, is a fundamental aspect of the DCTRA IRWM process. Only through successful implementation of this process can the IRWM Plan governing body insure that affected parties, agencies of jurisdiction and tribal representatives be informed as to the project proposal and, further, be assured that steps were taken to request and receive all potential project related input.

The Regional Water Management Group (RWMG) and the IRWM Plan Stakeholders Advisory Group includes a diverse group of members and interested parties, which is the result of on-going public outreach efforts since the inception of DCTRA. The California Water Code (CWC) §10541(g) identifies 13 different stakeholder categories. The Stakeholders Advisory Group includes a representative of each of the

stakeholder categories. Appendix J contains a list of the members and interested parties and their primary affiliation. The Plan RWMG satisfies the definition of a Regional Water Management Group provided in the California Water Code.

Critical water supply and water quality issues of Disadvantaged Communities (DACs) are important Tule River Basin concerns. Most of the communities in the Basin meet the state definition of DAC, which is having a median household income less than 80 percent of the statewide average. While most small DACs are not signator to the Plan MOU, many do participate on the same basis as signator parties. Special efforts have been made to educate and engage DACs within the planning area. These efforts are described in Chapter 13.

DCTRA performed extensive outreach while preparing the initial submittal of its IRWM Plan. These on-going outreach efforts have attracted more stakeholders. As a result, most of the stakeholders in the region are actively participating in the IRWM process. A few potential parties are not involved as they did not respond to previous outreach efforts.

The DCTRA has a Public Affairs Plan which is employed in the Stakeholders Advisory Group process. The Plan is a living document and is the principal element of the DCTRA public outreach effort. The plan identifies the following goals for the public outreach process:

(1) Recognizes the DCTRA as a regional entity addressing water reliability, quality, agricultural, urban and natural resource issues;

(2) Educate the public about the Basin's water resources issues;

(3) Promote an IRWM approach to gain support for water management strategies being considered by the DCTRA; and

(4) Inform and educate the electorate regarding projects and bond issues that improve regional water supply reliability and quality.

The DCTRA is in the process of developing a website that will post a variety of information on regional water management efforts including: Board of Directors meeting schedules, agendas and minutes, Stakeholders Advisory Group meeting schedules, agendas and minutes, list of members and interested parties, recent news and Basin documents of general interest (governing documents, reports, technical papers, applications and proposals). This website is to be updated regularly and will serve as an archive for important documents developed by the DCTRA.

14.5.5 Consideration of Greenhouse Gas Emissions in Project Benefits (Impacts Analysis)

Climate change mitigation can be achieved by reducing energy demands, improving energy efficiency and carbon sequestration. These will help to reduce greenhouse gas (GHG) concentrations in the atmosphere. Climate change mitigation will require global cooperation, but the Regional Water Management Group supports reasonable efforts to make their own local contribution. As a result, it has been determined to consider impacts to GHG when selecting and prioritizing projects. This criterion will generally be a lower priority than water supply or water quality, but it is still considered an applicable criteria.

When projects are reviewed and prioritized the project proponents will need to address the following:

1. Will this project increase greenhouse gas emissions? If yes, explain how and quantify; and
2. Will this project result in reduced greenhouse gas emissions? If yes, explain how and quantify.

14.5.6 Consideration of Climate Change in Benefits/Impact Analysis

Climate change has the potential to cause adverse effects on the region, including changes in the timing and amount of precipitation, increased evaporation and transpiration from higher temperatures, increased frequency of droughts and floods, reduction in water quality, increased wildfires and increased presence of certain pests. Developing projects that can address these issues is a desired goal. When projects are reviewed and prioritized, their contribution to addressing climate change will be considered. In particular, project proponents will need to address the following:

(1) Will the proposed project reduce vulnerability to anticipated impacts from climate change? If yes, explain and quantify;

(2) Will the proposed project help the IRWM Planning Area to adapt to climate change impacts, or increase resiliency to climate change impacts? If yes, explain and quantify; and

(3) Will the proposed project help to increase the region's understanding of climate change impacts and local vulnerabilities? If yes, please explain.

14.6 IRWM PLAN BENEFITS AND IMPACTS CONSIDERATIONS REVISIONS AND UPDATES

The impacts and benefits associated with IRWM Plan implementation will be revised according to the following procedures:

(1) Impacts and benefits will be reviewed and revised whenever the IRWM Plan is updated or DWR establishes new guidelines for this standard. It is expected that the Plan will be updated at least every five (5) years;

(2) Impacts and benefits will be revised, as appropriate, to reflect anticipated or observed changes in regional climate patterns; and

(3) The impacts and benefits analysis will be revised to reflect the results of experience, new impacts or benefits identified during implementation of local projects.

14.7 OVERSIGHT AND IMPLEMENTATION OF PROJECTS

14.7.1 General

The tasks involved with oversight and evaluation of project implementation differ from the tasks associated with construction management for a number of elements. There are, however, some common elements, particularly those related to schedule and budget matters. The functions of oversight and evaluation have as their primary objectives monitoring and evaluating the success and generated benefits of a project, that the project is being operated to an optimum level and to insure compliance with applicable rules, regulations, ordinances and laws.

The project sponsor is responsible for development of the project and for developing the monitoring and reporting program(s) necessary to define the degree of satisfaction of intended project goals. The project sponsor is also responsible to convey such information to the IRWM RWMG and Stakeholders Advisory Group as is necessary to clearly define project benefits and required progress as against pre-agreed to benchmarks.

14.7.2 Project Monitoring Elements

The following sets forth the established minimum elements of a project monitoring and reporting program. The final project monitoring and reporting program is to be submitted to the DCTRA prior to completion of construction and disbursement of the final funds due pursuant to any applicable funding agreement. The elements are as follows:

(1) Project description including a narrative description of the project site(s);

(2) Project location including GPS coordinates and location map;

(3) IRWM Plan objective(s) targeted;

(4) Workplan including a detailed division of project elements;

(5) Schedule including construction start and completion dates and applicable permit elements;

(6) Description of operation & maintenance elements and issues related to optimum implementation;

(7) Budget categorized as to construction elements, operation & maintenance elements and oversight reporting elements;

(8) Desired goals described in sufficient detail to allow for use as benchmark against which to measure success;

(9) Monitoring elements including:

(a) CEQA/NEPA mitigation elements;

(b) General monitoring categories:

(i) Rates and quantities of flow;

(ii) Water quality parameters;

(iii) Depths to groundwater;

(iv) Flood frequency;

(v) Habitat Development;

(vi) Species inventory; and

(vii) Operation & maintenance activities; and

(c) Frequency of monitoring and reporting activities;

(10) Data management;

(11) Responsible parties; and

(12) Conclusions and observations.

14.7.3 Project Reporting Elements

The reporting element shall be sufficient in content to allow for the following information to be conveyed:

(1) Satisfaction of IRWM Plan objective(s);

(2) Success of project against benchmark goal(s);

(3) Financing goals achieved;

(4) Budget compliance; and

(5) Satisfaction of operation & maintenance requirements.

14.7.4 Monitoring Period

The project proponent shall submit to the RWMG an outside target time period for conclusion of monitoring and reporting activities. In no case shall such time period be less than five (5) years. In the event of lack of agreement with respect to said time period, the default shall be to have same established by the Director of the Department of Water Resources.

CHAPTER 15

PLAN PERFORMANCE, DATA MANAGEMENT AND ONGOING COORDINATION

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

15.1 TECHNICAL ANALYSIS AND PLAN PERFORMANCE EVALUATION

15.1.1 Performance Measures and Monitoring Methods

Measurement methods have been developed to evaluate the Plan objectives presented in Chapter 3. These measurement methods are to be utilized to determine if a specific objective is being met as elements of the IRWM Plan are being implemented. In order to facilitate future evaluation procedures, the measurement methods are presented in Table 15-1 along with the IRWM Plan objective.

15.1.2 Evaluation of Capacity to Evaluate and Implement Projects

The project development process, culminating in project evaluation using the adopted criteria and scoring system currently in place, is designed to be periodically reviewed. This review process includes not only the response of the scoring criteria and

TABLE 15-1

PLAN OBJECTIVE MEASUREMENT METHOD
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
DEER CREEK AND TULE RIVER AUTHORITY

Objective No.	Objective	Measurement Method
3.1.1	Work toward achievement of sustainable balanced surface and groundwater supplies	Continue spring and fall measurements of depths to groundwater utilizing those measurements and the numeric groundwater model, determine the trend of groundwater storage
3.1.2	Protect and improve water resources through land use practices	Report efforts, successes and failures relative to efforts associated with land use policy development and implementation as those policies effect water resource planning and implementation
3.1.3	Protection of life, structures, equipment and property	Report policy and structural development progress related to improving the level of protection. Separately, report policy changes and/or structural failures which diminish the level of protection
3.1.4	Provide multiple benefits of management of water resources and related diversion and conveyance infrastructure	Report planning level and implementation level efforts where projects achieve water management, habitat restoration or protection and storm water control benefits
3.1.5	Reduction of contamination of surface and groundwater resources	Report targets for efforts and specific steps taken to reduce exposure or direct contamination of surface and/or groundwater resources
3.1.6	Meet applicable Regional Water Quality Control Board Basin Plan objectives	Report specific IRWM Participant successes in planning and/or implementation of water resource related projects. Report failures within the Tule Basin to meet the Basin Plan objectives and if a Participant project would have a beneficial impact on the cause of the failure

Objective No.	Objective	Measurement Method
3.1.7	Management of recreational activities to minimize impacts on water resources	Report recent test results indicating presence/absence of impacts and educational efforts undertaken to reduce impacts
3.1.8	Conserve, enhance and regenerate riparian habitats	Create list of new projects and opportunities and any specific species benefits. Report on status of maintenance of existing inventory of riparian habitat
3.1.9	Reduce impacts and optimize benefits from assisting other drought-related areas with Basin-to-Basin transfers of water	Report efforts undertaken to facilitate Basin-to- Basin transfers. Report on status of return obligations related to prior assistance transfers
3.1.10	Evaluation of the need for supplemental water management strategies related to the effects of climate change	Report data collected and evaluation of changes needed to address impacts that are other than those projected to occur
3.1.11	Optimize efficient use, conservation and recycling of water resources	Report data collected and evaluate changes in Tule Basin water conditions and approaches to use, conservation and recycling
3.1.12	Identify and promote strategies for hydroelectric generation facilities	Report on planning, design and implementation efforts related to new hydroelectric generation facilities
3.1.13	Evaluate and modify water diversion and conveyance infrastructure	Report on project planning, design and construction activities
3.1.14	Promote city, community and regional storm water management plans	Report modifications to existing plans and any new plans designed to meet the goals of this objective

Objective No.	Objective	Measurement Method
3.1.15	Increase knowledge regarding groundwater conditions and establish groundwater management practices	Report data collected, observed trends, recognized impacts and areas requiring additional policy direction and/or project development
3.1.16	Conserve and restore native species and related habitats	Report status of current protection and restoration efforts. Report as to new facilities opportunities and development of project related benefits
3.1.17	Sustain agricultural and urban viability through effective water management	Report evaluation efforts and conclusions related to efficiencies of storage and delivery systems. Report educational efforts related to conservation. Report on actions taken in response to development related CEQA documents

scoring system to funding offer guidelines, but also with respect to the quality of the projects being proposed and, most importantly from an IRWMP perspective, the degree to which efforts were undertaken to integrate projects together for improved efficiencies, reduced capital and operation and maintenance costs, or both. It remains to be determined by the Board of Directors of DCTRA as to whether this evaluation will be placed on a routine calendar schedule, similar to other plan review processes which are in place within DCTRA, or will remain on an "as-needed" basis.

15.2 DATA MANAGEMENT

15.2.1 Current Database

The DCTRA currently maintains a database in which is contained information necessary to support operating the numeric groundwater model and in preparation of the various reports which it currently publishes including the Annual Groundwater Management Reports, the annual update to and five-year Water Management Plans required under Friant Division, CVP member units' contracts with the U.S. Bureau of Reclamation and publication of the various reports associated with the Tule River Association. An overall summary of the data which is maintained is contained in Table 15-1.

In addition to this database, a complete water quality database related to surface water is maintained. Constituents monitored within that program are as shown in Table 15-2. Both the contents of and the parameters contained within these databases are updated frequently. Water level information, for instance, is updated at least semiannually and water quality information is updated monthly, when flows are present at the monitoring locations.

15.2.2 Data Collection

Data is generated from a number of sources. Those sources include the DCTRA itself, the Tule River Association, the Friant Water Authority, the Tule Basin Water Quality Coalition and numerous state and federal agencies with whom the DCTRA and its member units have cooperative data sharing agreements. In addition, the DCTRA has an informational sharing arrangement with both the County of Kings and the County of Tulare with respect to information available in both of their ArcView databases and, to a certain extent, in their AutoCAD databases.

15.2.3 Database Maintenance

At the current time, with the governance of the IRWMP residing with DCTRA, DCTRA assumes the responsibility and lead role position of maintaining their database. Transition is occurring between the DCTRA with respect to the maintenance of the water quality database. As acceptance of the Tule Basin Water Quality Coalition by the Regional Water Quality Control Board has occurred, the water quality database maintenance is now by said Coalition. In addition, this database will be expanded from its current format of being the repository for surface water quality data and will expand to include groundwater quality data.

15.2.4 Data Sharing

In addition to responding to Public Records Act requests, the DCTRA routinely shares all of its information with parties, upon request. Numerous requests for water level information, water management information and project related performance measurements are satisfied, upon request.

15.2.5 Interface with State Database Systems

Data is currently automatically uploaded to State databases such as the California Environmental Resources Evaluation System (CERES), to CEDEN, the Water Data Library (WDL), CASGEM, of which the DCTRA is a signator participant and the California Environmental Information Catalog (CEIC). Water quality data is currently entered into the Groundwater Ambient Monitoring and Assessment Program (GAMA) of the State Water Resources Control Board and into the Surface Water Ambient Monitoring Program (SWAMP) of the same agency. DCTRA member units have long transmitted both spring and summer groundwater elevation readings to the State Department of Water Resources, with additional readings now being introduced on a separate basis into the California Statewide Groundwater Elevation Monitoring Program (CASGEM).

15.3 PLAN UPDATES

15.3.1 Interim Updates

Not having had the IRWMP in a written formal format has allowed the DCTRA and interested stakeholders the flexibility to modify elements of their water management procedures on almost an instantaneous basis. Obviously, modification of a formal written document will need to take on expression in a process which will yield a written modification to the IRWMP, thus necessitating the ability to readily amend the plan and to reflect those amendments in an accessible form.

As a matter of current policy, the DCTRA routinely updates its various plans in five (5) year increments. This applies currently to its Groundwater Management Plan, for example. If this length of examination and rewrite was established by the

Board of Directors, the need would exist for interim updates to the IRWMP and a methodology to associate the amendments with the proper section(s) of the IRWMP. Where elimination of certain policies and procedures have been caused by the interim modification, a reasonable way to note that a particular segment or segments of the previously adopted IRWMP is no longer valid would need to be created. To date, this process has not been devised, as previously noted, the Plan was in a development position.

15.3.2 Formal Plan Changes

Given that the Board of Directors of the DCTRA has chosen to select an interval for review and update of other plans created and maintained under the jurisdiction of the DCTRA, action to establish a review and update period can be assumed to be taken soon for this IRWMP. At the time of the establishment of that interval, the update format policy will also be established by the Board of Directors. Looking again to existing plan update policies, formal plan updates are usually accompanied with a complete replacement of the plan document. It has been proven in other cases to not be as efficient to issue amendment additions to critical plans, thus causing a party utilizing the particular plan to circuit back and forth between an auxiliary amendment documents and the principal plan document. The authority to affect this policy resides currently with the DCTRA Board of Directors.

CHAPTER 16
PLAN PREPARATION, GOVERNANCE AND AMENDMENT

INTEGRATED REGIONAL WATER MANAGEMENT PLAN
TULE RIVER BASIN

16.1 NOTICES AND HEARINGS

16.1.1 Notice and Hearing on Intent to Prepare an Integrated Water Management Plan

On _____, 20__ a Notice of Public Hearing was published in the _____ by a Regional Water Management Group, formed pursuant to California Water code Section 10539. The aforementioned Notice of Public Hearing states that a public hearing will be held to consider whether or not the aforementioned entities would "prepare an Integrated Regional Water Management Plan." A copy of a Certificate of Publication of the aforementioned Notice of Public Hearing is attached hereto as Appendix L. As noticed, the public hearing was held on _____. This IRWM Plan for the Tule River Basin has been prepared pursuant to said notice.

16.1.2 Notice and Hearing on Intent to Adopt an Integrated Water Management Plan

On _____, 2015, and _____, 2015, a Notice of Intent to Adopt an Integrated Regional Water Management Plan was published in the _____. It provided notice that "the Regional Water Management Group comprised of the member units, less the Stone Corral Irrigation District, of the Deer Creek and Tule River Authority" would hold a public hearing on _____, 2015, regarding "their intent to adopt an Integrated Regional Water Management Plan for the Tule River Basin." The Notice stated that "the public may comment on the proposed plan during the public hearing." A copy of the Certificate of Publication of the aforementioned Notice of Intent to Adopt an Integrated Regional Water Management Plan is attached hereto as Appendix M. The public meeting was held on _____, 2015, as noticed. A copy of a document memorializing the decision of the Regional Water Management Group is attached hereto as Appendix N.

16.2 GOVERNANCE

16.2.1 Governing Board

As the primary body involved with the governance of the Plan, the RWM Group as described in the Memorandum of Understanding, dated _____ , a copy of which is attached as Appendix O ("MOU"), shall be led by a governing board ("RWM Group Governing Board") composed of one designated primary representative from each of the parties (individually "Party" and collectively "Parties") to the MOU, one designated member from the Tule River Basin RWM Stakeholder Advisory Group, together with those who may hereafter be added as members of the RWM Group by any

subsequent majority vote of the Parties. Each Party shall also designate an alternate representative to attend meetings of the RWM Group Governing Board when the designated primary representative is unable to do so and in such situations the alternate representative shall represent the Party. The Chair of the RWM Group Governing Board shall be elected for a two (2) year term by the members of the RWM Group Governing Board from among its members, the members shall also elect a Vice Chair, which will also have the same two-year term.

16.2.2 Stakeholder Advisory Group

A joint Kaweah River Basin/Tule River Basin Stakeholder Advisory Group has participated extensively in many of the details involving the formation of the Plan. The Tule River Basin RWM Stakeholder Advisory Group has elected from among its members a Chair and a Vice Chair to conduct the meetings of the RWM Stakeholder Advisory Group. The Tule River Basin RWM Stakeholder Advisory Group shall appoint one (1) individual and one (1) alternate to serve on the Tule River Basin RWM Group Governing Board for a term of two (2) years. Actions of the RWM Stakeholder Advisory Group shall be by majority vote of those present at a duly called and noticed meeting and shall be limited to action to advise the RWM Group Governing Board and to appoint members to such Board in the manner provided in this paragraph 16.2.3.

16.2.3 Actions of the RWM Group Governing Board

Actions requiring the approval of the RWM Group Governing Board shall only be taken after approval of a majority of the Parties during a duly noticed meeting of the RWM Group Governing Board with a quorum present. The quorum for the RWM Group Governing Board to conduct a valid meeting is a majority of the parties to the

Memorandum of Understanding dated _____. The aforementioned actions include how formal changes to the Plan will be performed. Before taking any action to direct the performance of formal changes to the Plan, the RWM Group Governing Board shall hold a public hearing and consider any and all advice from the RWM Stakeholder Advisory Group and comments from other members of the public.

16.2.4 Meetings

All meetings of the RWM Group Governing Board or the RWM Stakeholder Advisory Group may be called by the Chair of the respective group or any two (2) members of the group by providing the notice of such meeting as required by law. Meetings of either shall be held in the Board Room at the office of the Lower Tule River Irrigation District, located at 357 Olive Avenue, Tipton, California, or other meeting place designated by the Authority, unless the RWM Group Governing Board or the RWM Stakeholder Advisory Group takes action to hold one or more of its meetings at a different location. All meetings of the RWM Group Governing Board and the RWM Stakeholder Advisory Group shall be in compliance with the requirements of the Ralph M. Brown Act found in California Government Code Sections 54950 *et seq*.

16.3 PLAN ADMENDMENTS

16.3.1 Plan Review

Whenever the RWM Group Governing Board deems it necessary to keep the Plan current, but not less frequently than four (4) years after the date of the adoption of the Plan and every five (5) years thereafter, the Chair of the RWM Group Governing Board shall appoint individuals who shall constitute a committee ("Plan Review Committee") composed of an equal number of members of the RWM Group Governing Board and the

RWM Stakeholders Advisory Group, which shall be tasked with reviewing the Plan and recommending Plan updates or amendments ('amendments") to the RWM Group Governing Board. The Plan Review Committee shall elect a Chair and an alternate Chair. Each Plan Review Committee shall complete its review and make its recommendations to the RWM Group Governing Board within one (1) year after its formation. The Chair of the Plan Review Committee shall set the frequency of the meetings and call as many meetings as he or she deems necessary to timely complete its assigned tasks. The Plan Review Committee shall obtain the permission of the RWM Group Governing Board to employ consultants to assist it in reviewing the Plan and in preparing any recommended amendments.

16.3.2 Interim Change

The Plan shall be subject to adaptive management processes in order to timely respond to changing conditions. A minor process, organizational, or water management change ("Interim Change") that occurs relatively frequently may be made informally and without formal action of the RWM Group Governing Board pending the next scheduled meeting of the RWM Governing Board. The RWM Stakeholders Group may take action to recommend an Interim Change. Either staff of a Party or the RWM Stakeholders Group may ask the RWM Group Governing Board to determine whether a minor process, organizational, or water management change constitutes an Interim Change.

16.3.3 Consideration of Recommendations by the Plan Review Committee

The Plan Review Committee shall provide its recommendation to the RWM Group Governing Board, which shall review the same and consider whether to adopt the

recommendation in whole, in part or not at all. The RWM Group Governing Board may consider other amendments to the Plan not recommended by the Plan Review Committee.

16.3.4 Notice and Hearing on Intention to Adopt Amendments to Plan.

If the RWM Group Governing Board decides that it will consider adopting amendments to the Plan, it shall publish notice of its intention to amend the Plan in accordance with California Government Code Section 6066.

16.3.5 Adoption of Amendments to Plan

After providing the notice required above in paragraph 16.3.3, the RWM Group Governing Board shall have a public meeting at which it may adopt amendments to the Plan. If it decides to adopt amendments to the Plan, the RWM Group Governing Board shall determine whether to adopt the amendments by amending the Plan or by adopting an amended or restated Plan.

APPENDIX A

REFERENCES

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

REFERENCES

APPENDIX A

INTEGRATED REGIONAL WATER MANAGEMENT PLANT

TULE RIVER BASIN IRWMP GROUP DISTRICT

1. *California Water Plan Update 2013*; Department of Water Resources, State of California; 2012.
2. *Groundwater Management Plan Update*; Kaweah Delta Water Conservation District; 2007.
3. *Groundwater Quality Protection Strategy*; Regional Water Quality Control Board, 2010.
4. *Time Series Evapotranspiration and Applied Water Estimates from Remove Sensing*; Kaweah Delta Water Conservation District; Davids Engineering, Inc.; 2013.
5. *Tulare County General Plan 2030*; County of Tulare, State of California; 2012.
6. *Water Resources Investigation of the Kaweah Delta Water Conservation District*; Fugro West, Inc.; 2003.

APPENDIX B

DEER CREEK AND TULE RIVER AUTHORITY JOINT POWERS AGREEMENT

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

MEMORANDUM OF UNDERSTANDING

THIS MEMORANDUM OF UNDERSTANDING ("MOU"), effective this _____ day of _____, 2007, by and between the COUNTY OF TULARE ("County"), the EXETER IRRIGATION DISTRICT ("EID") , the CITY OF LINDSAY ("LINDSAY"), and the KAWEAH DELTA WATER CONSERVATION DISTRICT ("KDWCD"), is made in light of the following:

RECITALS:

WHEREAS, both the Integrated Regional Water Management Planning Act of 2002, found in Division 6, Part 2.2 of the California Water Code, and the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, found in Division 26.5 of the California Water Code, authorize and encourage public entities to develop an integrated regional water management plan ("IRWMP");

WHEREAS, KDWCD has created and the State of California has recognized KDWCD as having a "substantially equivalent" IRWMP for the Kaweah River Basin, known as the "Kaweah River Basin Integrated Water Management Plan";

WHEREAS, it is in the interest of the County, KDWCD, EID, and LINDSAY (hereinafter collectively "Parties" and individually "Party"), and the region served by the Parties, to have the water resources of each Party responsibly managed, protected and conserved to the extent feasible;

WHEREAS, the Parties desire to form a regional water management group, as defined in California Water Code §10537, to take the steps outlined in the Integrated Regional Water Management Planning Act of 2002 to determine whether to prepare an IRWMP for the Kaweah River Delta Basin ("KAWEAH BASIN") in accordance with the provisions of said Act; and

WHEREAS, the creation of a new IRWMP for the KAWEAH BASIN may subsume the aforementioned Kaweah River Basin Integrated Water Management Plan,

NOW, THEREFORE, it is mutually understood and agreed as follows:

Section 1: Definitions

1.1 "KAWEAH BASIN" shall mean the basin generally comprised of all of the lands on which is situated any of the following: (a) the KDWCD; (b) portions of the County in which is located any part of Dry Creek, Yokohl Creek or Cottonwood Creek; and (c) any portion of the Kaweah River or its distributaries located below Terminus Dam.

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1.2 "Lead Party" shall mean KDWCD.

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1.3 "KAWEAH BASIN IRWMP" shall be the initial name for the IRWMP, the preparation of which is the objective of this MOU.

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Section 2: Purposes and Goals

2.1 The parties desire to coordinate their efforts to do the following:

2.1.1 Prepare this MOU.

2.1.2 Follow the notice, hearing and other procedures outlined in California Water Code §10541, paragraphs (a) and (b), together with all other applicable law, to determine whether to prepare the KAWEAH BASIN IRWMP.

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2.1.3 Apply for and obtain a grant of funds necessary to pay the costs of preparing the KAWEAH BASIN IRWMP.

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2.1.4 Use any grant funds obtained by the Parties, to timely prepare the KAWEAH BASIN IRWMP and adopt said IRWMP, all in accordance with the provisions of California Water Code §10541, paragraphs (c) and (d), together with all other applicable law.

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Section 3: Cost Sharing

3.1. Each Party agrees to pay its equal share of the costs to accomplish the purposes and goals identified above in sections 2.1.1, 2.1.2 and 2.1.3.

3.2 The Parties do not agree to share the costs of actually preparing the KAWEAH BASIN IRWMP, but intend to use grant funds to pay for such work. If no grant funds are obtained for the preparation of the KAWEAH BASIN IRWMP, the Parties will not perform such work, without a further written agreement regarding the costs for the same.

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3.3 The Lead Party shall be the recipient of all bills incurred in connection with the work authorized by this MOU. Further, the Lead Party shall be responsible for notifying the other Parties of such bills. Each of the Parties shall pay its respective share of each bill within forty-five (45) days of notification of the same by the Lead Party. The Lead Party shall keep an accurate accounting of the bills it receives and all monies received for the payment of same. Each of the Parties shall be entitled to inspect the records of the Lead Party with respect to the matters described in this Section 3.

Section 4: Authority of Lead Party

4.1 The Lead Party shall be authorized to prepare and publish the notice referred to in California Water Code §10541, paragraph (a). Further, the Lead Party shall have the authority to hold the public hearing described in California Water Code §10541, paragraph (b).

4.2 After the aforementioned public hearing, the Lead Party shall poll the other Parties to determine whether they are still in favor of proceeding towards the preparation of a KAWEAH BASIN IRWMP. If all of the Parties are still in agreement with the Parties proceeding to prepare a KAWEAH BASIN IRWMP, then Lead Party is hereby authorized to retain Dennis R. Keller, Consulting Engineer, on behalf of the Parties, to prepare the application for a grant to fund the costs of preparing the KAWEAH BASIN IRWMP.

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Section 5. General Provisions

5.1. Term. This MOU shall become effective on the date first above written and shall terminate one year thereafter, unless the parties have obtained the grant providing the funds necessary to pay for the costs of preparing the KAWEAH BASIN IRWMP. Any Party may terminate its participation in this MOU upon 60 days notice to the remaining Parties; provided, however, any Party so terminating its participation in this MOU shall be responsible for its share of the costs incurred by the Parties through the date of said notice.

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5.2 Additional Parties. Upon written approval of all of the Parties, other local public agencies, as defined in California Water Code §10533, may become parties to this MOU.

5.3 Construction of Terms. This MOU is for the sole benefit of the Parties and shall not be construed as granting rights to any person other than the Parties, or imposing obligations on a party to any person other than another Party.

5.4 Good Faith. Each Party shall use its best efforts and work in good faith for the expeditious completion of the purposes and goals of this MOU and the satisfactory performance of its terms.

5.5 Rights of the Parties and Constituencies. This MOU does not contemplate the Parties taking any action that would:

5.5.1 Adversely affect the rights of any of the Parties; or

5.5.2 Adversely affect the constituencies of any of the Parties.

5.6 Execution. This MOU may be executed in counterparts and the signed counterparts shall constitute a single instrument. The signatories to this MOU represent that they have the authority to sign to bind the Party for whom they are signing this MOU.

IN WITNESS WHEREOF, the Parties hereto have executed this Memorandum of Understanding to be effective as of the date first above written.

Dated:_____

County:

COUNTY OF TULARE

By_____

Title: _____

Dated:_____

Approved as to form:

_____
TULARE COUNTY Counsel

EID:

EXETER IRRIGATION DISTRICT

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Attorney for EID

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CITY OF LINDSAY

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By_____

Title: _____

Approved as to form:

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Attorney for LINDSAY,

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KDWCD:

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KAWEAH DELTA WATER
CONSERVATION DISTRICT

Dated:_____

By_____

Title: _____

Approved as to form:

Dated:_____

_____
Attorney for KAWEAH DELTA WATER
CONSERVATION DISTRICT

_____:

Dated:_____ By_____

Title: _____

Approved as to form:

Dated:_____ _____

Attorney for _____

Subj: **(no subject)**
Date: 8/31/2007 11:33:27 A.M. Pacific Daylight Time
From: Zsmith@visalialaw.com
To: kelweg1@aol.com
CC: bgeorge@kdwcd.com, mlarsen@kdwcd.com

Dennis,

Attached please find the Memorandum of Understanding, that you faxed to us a few days ago, on which I have now shown, as marked-up changes, the modifications that you have requested.

Please let me know if you would like further changes to the document.

Zack

D. Zackary Smith
Ruddell, Cochran, Stanton, Smith, Bixler & Wisehart, LLP
E-mail: zsmith@visalialaw.com
Telephone: (559) 733-5770

WARNING: This e-mail and any attachments are intended only for use by the addressee(s) named on the e-mail and may contain legally privileged and/or confidential information. If you are not the intended recipient of this e-mail, you are hereby notified that any dissemination, distribution or copying of this email or its attachments is strictly prohibited. If you receive this e-mail in error, please immediately notify the sender by replying to this message. You must then permanently delete the original e-mail and any copies or printouts you may have made. Delivery of this e-mail and any attachments to any person other than the intended recipient(s) is not intended in any way to waive any claims of confidentiality or privilege.

APPENDIX C

OUTLINE – JOINT POWERS AUTHORITY

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

Outline for Development of the

Tulare Basin Water Authority

The following is the beginnings of a concept paper that would outline why and how we could put together an organization charged with coordinating the development of a Tulare Basin–wide regional water planning effort. The first step is to "outline the outline" to make sure we are providing the right background and informational setting as well as addressing the right questions. The next step would be to "flesh out" the outline into a conceptual paper.

1) **Background:**

   a) Local planning efforts;

   b) Costa planning effort;

   c) The Governor's SJV Partnership Initiative;

   d) The SJV Blue Print effort;

   e) San Joaquin Valley Water Coalition;

   f) Coordination/interface with the San Joaquin River Region;

2) **Purposes:**

   a) To be complimentary to existing planning efforts which are primarily being done on a watershed basis…not to replace them;

   b) To accommodate the areas where existing plans don't address known water management needs:

      i) From a geographic perspective;

      ii) From the kind of need;

   c) To provide a certain degree of coordination between the existing planning efforts;

   d) To increase the likelihood and "reasonableness" of state and federal grant and loan funding by having a coordinated program to address the Region's needs;

   e) To provide a framework for inter-regional cooperation on projects/programs of mutual benefit.

3) **State and Federal Funding Opportunities** (discussion of state and federal preference/desires relative to regional planning efforts, moneys available, etc.)

a) State Funding:

i) Prop 13;

ii) Prop 50;

(1) IRWMP Program:

(a) Planning grants;

(b) Implementation grants;

iii) Prop 84;

iv) Prop 1E;

v) AB 303;

vi) Partnership monies.

b) Federal monies.

4) **Potential Membership/Involvement:**

a) Those actively planning:

i) Those that have prepared Integrated Regional Plans:

(1) Upper Kings;

(2) Poso Creek;

(3) San Luis and Delta Mendota Water Authority;

b) Those that are intending to prepare Integrated Regional Plans:

c) Those that are planning water resource activities under other authority:

i) Kaweah Delta WCD;

ii) Deer Creek and Tule River Authority;

iii) Kern County Water Agency;

iv) Friant Water Authority;

v) Tulare Lake Basin WSD;

d) Those entities/needs that logically fit under the auspices of an existing local planning effort but have not been invited or for other reasons are on the sidelines;

e) Those entities/needs that don't logically fit under the auspices of an existing local planning effort but are still within the Tulare Basin Region;

f) Involvement of County governments;

g) Involvement of incorporated cities (use of COGs or CAGs?);

h) Involvement of environmental interests/needs;

5) **How the TBWA Would Interact with Existing Planning efforts:**

a) Existing planning efforts would be acknowledged as part of organizational framework…interaction would be described in detail in organizational creation documents.

b) Description of interaction would include mechanism for deciding when a project falls under the auspices of one of the existing planning efforts or under the auspices of the new organization (TBWA).

6) **Potential Organization Forms and Governance:**

a) Degree of organization formalization needed?

i) Being able to accept funding and grant accountability;

ii) Being able to make decisions and set priorities;

iii) Having the proper authorities relative to planning, construction (?) other authorities (?)

b) Does it need to be a public agency?

c) Who would sit as the governing body?

d) How would voting be done?

e) How would the general public be involved?

f) Discuss alternative organizational formats that could meet the agreed-to requirements – plusses and minuses (once we have answers to the above questions);

g) Operational funding requirements and sources;

h) Staffing.

7) **Timelines – What Controls?**

a) To be effective in dictating the allocation of the Prop 84 - $60 million earmarked for the Tulare Basin. Required milestones:

   i) (list dates and events)

   ii)

b) To meet the Governor's Partnership water planning element needs – Required milestones:

   i) (list dates and events)

   ii)

c) To meet Costa Planning effort needs – Required Milestones:

   i) (list dates and events)

   ii)

8) **Frequently Asked Questions:** (start a list)

9) **Who to Contact:**

APPENDIX D

JPA – TULARE LAKE HYDROLOGIC REGION WATER RELATED ENTITIES

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

JOINT POWERS AGREEMENT
FOR
TULARE LAKE HYDROLOGIC REGION WATER-RELATED ENTITIES

THIS JOINT POWERS AGREEMENT (hereinafter referred to as the "Agreement") is made this ____ day of _____, 2007, by and between the KAWEAH DELTA WATER CONSERVATION DISTRICT (hereinafter "KDWCD"), KINGS RIVER CONSERVATION DISTRICT (hereinafter "KRCD"), SEMITROPIC WATER STORAGE DISTRICT (hereinafter "STWSD") and the other undersigned signatories (hereinafter individually referred to as "Party" and collectively as "Parties").

RECITALS

A. WHEREAS, KDWCD is a water conservation district formed pursuant to the Water Conservation Act of 1927 located in the western portion of Tulare County and the eastern portion of Kings County; and

B. WHEREAS, KRCD is a conservation district formed pursuant to the Kings River Conservation District Act of 1951; and

C. WHEREAS, STWSD is a water storage district formed pursuant to the California Water Storage District Act; and

D. WHEREAS, a portion or all of each of the Parties is located in a hydrologic region sometimes referred to as the "Tulare Lake Hydrologic Basin" (hereinafter "Basin"), the general locale of the Basin being outlined in red on the map attached hereto as Exhibit A;

E. WHEREAS, each of the parties is either a public entity with authority to manage water resources in the Basin and managing such resources or a mutual water company that provides water service in the Basin; and

F. WHEREAS, it is in the interest of the Parties, and the region served by them for the water resources of the Basin to be responsibly developed, managed, protected and conserved to the extent feasible; and

G. WHEREAS, both the Integrated Regional Water Management Planning Act of 2002, Division 6, Part 2.2 of the California Water Code, and the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, Division 26.5 of the California Water Code, authorize and encourage public entities to develop an integrated regional water management plan ("IRWMP"); and

H. WHEREAS, KDWCD, representing a substantial number of other water-related entities, has created and the State of California has recognized the Kaweah River Basin Integrated Water Management Plan; and

I. WHEREAS, KRCD and STWSD, each acting as the lead agency for a substantial number of other water-related entities, have already initiated the process to create separate IRWMPs for other parts of the Basin not covered by the Kaweah River Basin Integrated Water Management Plan; and

J. WHEREAS, the Parties desire to improve the integration of programs and strategies among the municipal, industrial, agricultural and environmental uses of water in the Basin: and

K. WHEREAS, the Parties desire to form a regional water management group, as defined in California Water Code §10537, to take the steps outlined in the Integrated Regional Water Management Planning Act of 2002, to work towards the preparation of a comprehensive IRWMP for the Basin; and

L. WHEREAS, the preparation of such a comprehensive IRWMP for the Basin will likely take many months to complete; and

M. WHEREAS, pursuant to the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (hereinafter referred to as "Proposition 50"), and the Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (hereinafter referred to as "Proposition "84"), certain grant monies may be made available by the State of California for water-related projects in the Basin prior to the completion of a comprehensive IRWMP for the Basin; and

N. WHEREAS, other monies may be made available to the Parties by the United States of America and from other sources for water-related projects in the Basin; and

O. WHEREAS, the Parties desire to enter into this Agreement, pursuant to California Government Code §§6500 et seq., in order to further their efforts to develop, manage, protect and conserve the water resources of the Basin whether or not they are able to complete the development of an IRWMP for the Basin,

NOW, THEREFORE, in and for consideration of the mutual covenants, conditions and promises hereinafter set forth, the Parties hereby agree as follows:

1.0 Purposes and Goals

1.1 Objectives. The Parties desire to work together to accomplish the following:

a. To facilitate the integration of programs and strategies among municipal, industrial, agricultural and environmental users for enhancing the water supply, water quality and watershed management of the Basin;

b. To improve the reliability of the imported and local water supplies of the Basin;

c. To protect and enhance the viability of the watersheds of the Basin;

d. To seek, obtain, administer and distribute grant and/or loan funds from the State of California, the United States of America or other sources for qualifying water-related projects in the Basin; and

e. To create an IRWMP for the Basin.

1.2 Combined Efforts. The Parties believe that by executing this Agreement and coordinating and combining their respective resources, they will be able to better and sooner achieve the aforementioned objectives for a substantial number of water-related entities located within the Basin, by acting as designated lead agencies with respect to this Agreement and their effort to establish an IRWMP, both for their regional areas and for the Basin. Attached hereto as Exhibit B is a listing of the other aforementioned water-related entities and a brief description of their IRWMP-related involvement with the Parties.

1.3 Immediate Collaboration. The Parties agree that once KDWCD, KRCD and STWSD have duly approved and signed this Agreement, they will immediately cease efforts to separately obtain or compete against each other for Proposition 50 and Proposition 84 grant funds (hereinafter referred to as "Grant Funds") and will commence to collaborate and cooperate to achieve the purposes and goals described in this Section 1, including, but not limited to their objective to seek and obtain Grant Funds for qualifying water-related projects in the Basin. The aforementioned collaboration and cooperation shall commence with each Party immediately designating a representative and an alternate representative to attend monthly meetings, to share all relevant information and documents and to coordinate their efforts to collaborate as described in this Section 1.3. Further, each Party will make a good faith effort to cooperate in every reasonable way towards the expeditious accomplishment of the purposes and goals described in this Section 1.

2.0 Management of Funds

2.1. Deposit of Funds. The Parties hereby authorize the State of California to distribute Proposition 50 and Proposition 84 Grant Funds to KDWCD to be held by it in its own name and distributed for use pursuant to the provisions of this Agreement. All Grant Funds received by KDWCD on behalf of it and the Parties shall be held by it in one of two designated and separate accounts. One account shall be an interest-bearing account with the State of California Local Agency Investment Fund and the other account shall be an interest-bearing or non-interest bearing checking account with a federally-insured financial institution (hereinafter collectively "Accounts"). The only monies deposited into the Accounts by KDWCD shall be Grant Funds and other funds,

of any type, if related to the achievement of the purposes and goals set forth in Section 1 of this Agreement.

2.2. Designated Officials. Pursuant to Government Code section 6505.1, KDWCD shall designate a minimum of two individuals (hereinafter referred to as the "Designated Officials") employed by it who will have charge of, handle and have access to the Grant Funds held in the Accounts. The names of the Designated Officials shall be provided to the Parties, once said individuals are designated by KDWCD. Should any of the Designated Officials change, KDWCD shall so notify the Parties of the same.

2.3. Bond. Pursuant to Government Code Section 6505.1, KDWCD shall obtain a surety bond for each of the Designated Officials. Such bonds shall provide coverage in the amount of $250,000 for the theft or other malfeasance by the Designated Officials related to the Accounts. The premiums for said bonds shall be paid from funds held in the Accounts.

2.4. Accounting Records. KDWCD shall keep precise and accurate records of all deposits and disbursements from the Accounts, including the current balance in the Accounts. The aforementioned records shall include all interest accrued on the monies deposited in the Accounts.

2.5. Access to Accounting Records. Any current party to this Agreement shall be allowed to review the records of the Accounts and obtain copies of the same from KDWCD, upon 72-hours written notice to KDWCD.

2.6 Audits. KDWCD shall be responsible for the performance of all audits of the Accounts required by law. KDWCD may hire any qualified accounting or auditing firm to perform any required audit of the Accounts. The costs of the aforementioned audits may be paid for by funds held in the Accounts.

3.0 Availability of Grant Funds

3.1. Distribution from the Accounts. Subject to the limitations set forth in this section, Grant Funds will be available to the Parties as determined by the provisions of this Agreement, the terms of any grant, together with any amendments to either.

3.2. Limitation on IRWMP Grants. No more than $500,000 will be distributed to any entity for the development of an IRWMP. Any proposed IRWMP must be for an area located within the Basin.

4.0 Selection of Proposals

4.1. Solicitation Notice. KDWCD will solicit grant applications for Grant Funds within 30 days after this Agreement is signed by KDWCD, KRCD and STWSD.

4.2. Project Proposals. All applications for Grant Funds shall be submitted to KDWCD in a format to be determined by the Parties. Within 10 days thereafter, KDWCD shall distribute a copy of any submitted applications to all of the Parties, together with a score sheet for each.

4.3. Voting. Each Party with an IRWMP approved by the State of California Department of Water Resources shall be entitled to score each application. Additionally, all other Parties shall be entitled to together, acting as one, score each application, with such scoring to be accomplished in accordance with a procedure established by a majority vote of such other Parties. The scores received for each application shall be submitted to KDWCD and tallied by KDWCD for each application. Such scoring shall be deemed completed 45 days after the date KDWCD distributes the application for scoring. As to any decision to be made by the Parties that do not involve the scoring of applications, a majority vote of the Parties shall govern.

4.4. Scoring. Each application shall be scored by the Parties entitled to do so, pursuant to section 4.3 above, using the State of California Department of Water Resources statewide priorities and eligibility criteria or other priorities and criteria established by written agreement of a majority of the Parties, which may also be modified by such a majority. The Parties shall each review the priorities and eligibility criteria for each application, prior to scoring such application.

4.5. Results. Within 60 days of its mailing out any application to the Parties, KDWCD shall notify the Parties of the scoring tallies for such application.

4.6. Verification of Need. The records of each entity submitting an application shall be subject to review in order to verify that the proposed project described in an application is among the highest ranking needs of the submitting entity in accordance with the requirements of the State of California.

5.0 Reimbursement of Costs

5.1. Costs. KDWCD will be reimbursed for its actual costs in acting as lead agency under this Agreement. KDWCD shall be entitled to reimburse itself for such costs by distributions from the Accounts.

5.2. Other Parties. Any other Party that incurs a cost in connection with the performance of a duly authorized duty arising under this Agreement shall be entitled to reimbursement for its costs from the Grant Funds in the Accounts, within 45 days of submission of a written request for reimbursement to KDWCD. KDWCD may request documentation sufficient to substantiate any request for funds.

5.3 Financial Statements. A summary of revenues and expenses, including beginning and ending cash balances in the Accounts, shall be prepared annually and submitted to the Parties by KDWCD.

6.0 Governance

6.1 Decision Making. Except as otherwise specified in part 4.0 of this Agreement, all decisions made by the Parties to this Agreement shall be made by a majority vote of those present at a duly called, noticed and convened meeting.

6.2 Call of Meetings. A meeting may called by any two Parties.

6.3 Notice of Meetings. Except in emergency situations, written notice of all duly called meetings shall be provided to all Parties at least ten (10) days prior to any meeting so called.

6.4 Convened Meeting. A duly called and noticed meeting shall be convened, if a majority of the Parties are present at the time, on the date and at the location where the meeting was noticed to occur.

6.5 Conduct of Meetings. All meetings of the Parties, regarding the subject matter of this Agreement, shall comply, in all respects, with the provisions of the Ralph M. Brown Act, currently found in California Government Code Sections 54950, *et seq.*, or any replacement legislation, except as to meetings that are exempted by law from such compliance.

6.6 Public Forum. Persons and entities that are not Parties shall have the right to speak and otherwise comment on all actions at any meeting of the Parties or by a writing submitted to the Parties and mailed to KDWCD.

7.0 Termination

7.1 Withdrawal by Party. Any Party may terminate its participation in this Agreement, without cause, by providing the other Parties with ten (10) days written notice.

7.2 Termination of a Party. Any Party that fails to sufficiently participate in the activities of the Parties pursuant to this Agreement may, at the sole discretion of the other Parties, be terminated as a party to this Agreement by a vote of a majority of the Parties.

7.3 Notice to Cure. Prior to the termination of any Party pursuant to Section 7.2 of this Agreement, KDWCD shall provide such Party with a notice to cure such Party's deficiencies within ten (10) days from the time of such notice or be subject to being terminated as a party to this Agreement as allowed in said Section.

7.4. Termination of this Agreement. This Agreement may be terminated by a written agreement signed by a majority of the Parties to the Agreement.

8.0 General Provisions

8.1. New Parties. Any public agency and any mutual water company that has the authority or right to manage water resources in the Basin, or any part of it, may, with the written consent of a majority of the Parties, become a Party by signing this Agreement and providing all of the other Parties with a copy of such signed Agreement. Any new Party shall be subject to this Agreement, together with all rules, regulations and separate agreements promulgated by or entered into by the Parties as part of or in relation to this Agreement.

8.2. Construction of Terms. This Agreement is for the sole benefit of the Parties. It shall not be construed as granting rights to any person other than the Parties, or imposing obligations on any person or entity other than another Party.

8.3. Good Faith. Each Party shall use its best efforts and work in good faith for the expeditious completion of the purposes and goals of the Agreement and the satisfactory performance of its terms.

8.4. Execution. This Agreement may be executed in counterparts and the signed counterparts shall constitute a single instrument. The signatories to this Agreement represent that they have the authority to sign to bind the entity for whom they are signing this Agreement.

8.5 Amendment. This Agreement may only be amended by a written amendment signed by a majority of the Parties.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the date first above written.

Date:_____

KDWCD:

KAWEAH DELTA WATER CONSERVATION DISTRICT

By:_____

Date:_____

KRCD:

KINGS RIVER CONSERVATION DISTRICT

By:_____

Date:_____

STWSD:

SEMITROPIC WATER STORAGE DISTRICT

By:_____

PARTIES:

Date:_____

By:_____

Date:_____

By:_____

Date:_____

By:_____

Date:_____

By:_____

Date:_____

By:_____

Date:_____

By:_____

MEMORANDUM OF UNDERSTANDING
Tule River Basin IRWMP Group

THIS MEMORANDUM OF UNDERSTANDING ("MOU"), effective this_____, by and between the LOWER TULE RIVER IRRIGATION DISTRICT ("Lower Tule"), the PIXLEY IRRIGATION DISTRICT ("Pixley"), the PORTERVILLE IRRIGATION DISTRICT ("Porterville ID"), the SAUCELITO IRRIGATION DISTRICT ("Saucelito"),the TEA POT DOME WATER DISTRICT ("Tea Pot Dome") , the TERRA BELLA IRRIGATION DISTRICT ("Terra Bella"), the VANDALIA WATER DISTRICT ("Vandalia"), (the foregoing Parties shall hereafter be referred to as the "DCTRA Parties") the DEER CREEK & TULE RIVER AUTHORITY ("Authority"), the COUNTY OF TULARE ("County"), the CITY OF PORTERVILLE ("City"), ANGIOLA WATER DISTRICT, ("Angiola"), DEER CREEK STORM WATER DISTRICT, ("Deer Creek"), hereinafter collectively "Parties" and individually "Party", is made in light of the following:

RECITALS:

WHEREAS, both the Integrated Regional Water Management Planning Act of 2002, found in Division 6, Part 2.2 of the California Water Code, and the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002, found in Division 26.5 of the California Water Code, authorize and encourage public entities to develop an Integrated Regional Water Management Plan ("IRWMP");

WHEREAS, it is in the interest of the Parties, and the region served by the Parties, to have the water resources of each Party responsibly managed, protected and conserved to the extent feasible;

WHEREAS, the Parties desire to form a regional water management group, as defined in California Water Code §10539, to take the steps outlined in the Integrated Regional Water Management Planning Act of 2002 to prepare an IRWMP for the Tule Basin;

WHEREAS, the Parties are aware and acknowledge that this Agreement and the IRWMP are intended to comply with the Integrated Regional Water Management Planning Act of 2002 and the MOU is not for the purpose of forming a "groundwater sustainability agency" and the IRWMP is not intended to be a "groundwater sustainability plan" as those terms are defined by the Sustainable Groundwater Management Act of 2014 (SB 1168, AB 1739 and SB 1319, signed into law on Sepember 16, 2014 referred to as "SGMA");

NOW, THEREFORE, it is mutually understood and agreed as follows:

Section 1: Definitions

1.1 "Tule River Basin" for the purposes of the IRWMP shall mean the area covered by the parties to this IRWMP, which will hereafter be determined by the Parties that become a party to the IRWMP. Parties acknowledge the boundaries of this Tule River Basin IRWMP are not the same boundaries of the Tule Basin as defined in California Department of Water Resouces Bulletin 118.

1.2 "Tule River Basin IRWMP" shall be the name for the IRWMP, the preparation of which is the objective of this MOU.

1.3 "Tule River Basin IRWMP Group" shall mean the group of parties that have agreed to be a party to this MOU, which the parties hereto agree shall be responsible for preparation and implementation of the Tule River Basin IRWMP. The Tule River Basin IRWMP Group shall be governed and managed as provided in Section 4 herein.

1.4 "Special Project Agreement" shall mean an agreement between one or more of the Parties to this MOU and the remaining Parties of the Tule River Basin IRWMP Group for the administration of special project grant applications and for grant implementation for projects as may be identified in the Tule River Basin IRWMP or through subsequent procesesses thereunder. Costs in administering a Special Project Agreement shall not be shared under the terms of this agreement, specifically Section 3 hereof, and instead shall be paid by the proponents of the projects as shall be set forth in the Special Project Agreement.

1.5 "Authority" shall mean the Deer Creek and Tule River Authority a joint powers authority covering approximately 289,448 acres in Tulare County comprised of the the Lower Tule River Irrigation District, Pixley Irrigation District, Portervillve Irrigation District, Saucelito Irrigation District, Stone Corral Irrigation District, Tea Pot Dome Water District, Terra Bella Irrigation District, and Vandalia Water District.

Section 2: Purposes and Goals

2.1 The Parties desire to coordinate their efforts to do the following:

2.1.1 Act as a regional water management group as defined in California Water Code §10539.

2.1.2 Follow the notice, hearing and other procedures outlined in California Water Code §10543, paragraphs (a) and (b), together with all other applicable laws, required for preparation of the Tule River Basin IRWMP.

2.1.3 Timely prepare the Tule River Basin IRWMP and adopt said IRWMP, all in accordance with the provisions of the Integrated Regional Water Management Planning Act of 2002 (California Water Code §10530 et seq.), together with all other applicable law.

2.1.4 Create a governing structure for the implementation and operation of the Tule River Basin IRWMP as more specifically identified herein.

2.1.5 Provide for project grant preparation, submission and implementation services for identified water supply and management enhancement projects to ensure that such projects are pursued in a manner that is consistent with the provisions of the adopted Tule River Basin IRWMP. It is understood that such services shall only be provided pursuant to Special Project Agreements providing for the payment of the costs of such services by project proponents.

Section 3: Cost Sharing

3.1. Each Party agrees to share the costs to accomplish the purposes and goals identified above in Section 2 according to the cost share allocations as provided in Exhibit A.

3.2 If no grant funds are obtained for the preparation of the Tule River Basin IRWMP, the Parties will perform such work only upon a majority vote of the Governing Board. No costs shall be incurred for a period of 60 days following such decision to allow for the withdrawal of a Party from this MOU pursuant to Section 5.1 below, unless all parties in writing consent to immediate incursion of costs.

3.3 The Authority shall be the fiscal agent for of all costs incurred in connection with the work authorized by this MOU. The Authority shall be responsible for notifying the other Parties of such costs. Each of the Parties shall pay its respective share of the costs within forty-five (45) days of notification of the same by the Authority. The Authority shall keep an accurate accounting of the invoices it receives and all monies received for the payment of same. Each of the Parties shall be entitled to inspect the records of the Authority with respect to the matters described in this Section 3.

3.4 Costs for Special Project Agreements. Costs in administering a Special Project Agreement shall not be shared under the terms of this agreement, specifically this Section 3 hereof, and instead shall be paid by the beneficiaries of the projects as shall be set forth in the Special Project Agreement.

Section 4: Governance

4.1 Governing Board. As the primary body involved with the governance of the Plan, the Tule River Basin IRWMP Group shall be led by a governing board ("the Governing Board") composed of one member of the Tule IRWMP Advisory Group (defined in Section 4.3) and one designated primary representative from each of the Parties to the MOU except for the Authority, together with those who may hereafter be added as members of the Tule River Basin IRWMP Group. Each Party shall also designate an alternate representative to attend meetings of the Governing Board when

the designated primary representative is unable to do so and in such situations the alternate representative shall represent the Party. A Chair and Vice Chair of the Governing Board shall be elected for a two year term by the members of the Governing Board from among its members. The Chair shall be the presiding officer at all Board meetings, and the Vice Chair shall serve in the absence of the Chair. The Governing Board members shall also appoint a Secretary by a majority vote. The Secretary is not required to be a member of the Board. The Secretary shall be responsiblve for keeping the minutes of all Board meetings and all of the official records of the Board.

4.2 Capacity of the Authority. It being recognized that the Authority is a Joint Powers Agency made up of the DCTRA Parties, among other public agencies, the Authority's interests are represented fully by the DCTRA Parties and therefore the Authority does not have the need for separate representation on the Governing Board and is not a party to the cost sharing provisions of this Agreement. However, the Authority is Party to this Agreement for the purpose of being designated as the fiscal agent of all of the Parties as described in Section 3.3 above for the purposes of implementing this MOU, and shall act in such capacity as requested and directed by the Governing Board. The Authority shall not otherwise be considered a separate party to this MOU, it does not have separate membership or representation on the Governing Board and the presence of an Authority representative shall not be included in determing whether a quorum is present for the Governing Board to take action. To the extent the Governing Board directs the Authority to undertake specific administrative actions in support of this MOU, the Governing Board shall authorize reimbursement of costs of such actions to be shared as shared costs pursuant to Section 3 of this Agreement.

4.3 Stakeholder Advisory Group. A stakeholder advisory group has participated extensively in many of the details involving the formation of the Tule River Basin IRWMP that preceded this MOU and will continue to be involved in reviewing the preparation, approval and implementation of the IRWMP. A group comprised of many of the same individuals and entity representatives, together with all other persons interested in the plan who desire to be a member of such group ("Tule IRWMP Advisory Group"), shall be formed to participate in advising the Governing Board on the drafting, adoption and implementation of the Plan. The initial members of the Tule IRWMP Advisory Group shall be as provided in Exhibit B. The Parties to this MOU are represented by their designee to the Governing Board. It is not the intention of this MOU that the Parties be members of both the Governing Board and the Advisory Group.

The Tule IRWMP Advisory Group shall elect from among its members a Chair and a Vice Chair to conduct the meetings of the Tule IRWMP Advisory Group. The Chair shall be the presiding officer at all Board meetings, and the Vice Chair shall serve in the absence of the Chair. The Tule IRWMP Advisory Group shall appoint one individual and one alternate to serve on the Governing Board for a term of two years each. The Tule IRWMP Advisory Group shall also select by a majority vote a Secretary for the Advisory Group. The Secretary is not required to be a member of the Advisory

Group. The Secretary shall be responsiblve for keeping the minutes of all Advisory Group meetings and all of the official records of the Advisory Group. Any votes by the Advisory Group shall be based on one vote per listed member.

The first meeting of the Tule IRWMP Advisory Group shall be called by the Chair of the Governing Board. Actions of the Tule IRWMP Advisory Group shall be by majority vote of those present at a duly called and noticed meeting and shall be limited to actions to advise the Governing Board and to appoint members to such Board in the manner provided in this paragraph 4.3.

4.4 Actions of the Governing Board. Actions requiring the approval of the Governing Board shall only be taken after approval of a majority of the Parties during a duly noticed meeting of the Governing Board with a quorum present. The quorum for the Governing Board to conduct a valid meeting is a majority of the Parties to this MOU. The aforementioned actions include, but are not limited to, adoption of the final recommended Tule River Basin IRWMP, any formal changes to the Plan, and changes to this MOU. Before taking any action to direct the performance of formal changes to the Plan, the Governing Board shall hold a public hearing and consider any and all advice from the Tule IRWMP Advisory Group and comments from other members of the public.

4.5 Upon preparation of the Tule River Basin IRWMP, the Governing Board shall conduct any required hearings and shall consider and take action as determined to recommend adoption of the plan by the governing bodies of the Parties hereto. The Tule River Basin IRWMP shall not be considered adopted until it has been accepted by all of the Parties through action of their governing legislative bodies. After such adoption, the Governing Board shall have decision making authority as described in the adopted Tule River Basin IRWMP.

4.6 Meetings. All meetings of the Governing Board or the Tule IRWMP Advisory Group may be called by the Chair of the respective group or any two members of the group by providing the notice of such meeting as required by law. Meetings of either shall be held in a location as designated by the Authority, unless the Governing Board or the Tule IRWMP Advisory Group takes action to hold one or more of its meetings at a different location. All meetings of the Governing Board and the Tule IRWMP Advisory Group shall be in compliance with the requirements of the Ralph M. Brown Act found in California Government Code Sections 54950 et seq.

Section 5. General Provisions

5.1. Term. This MOU shall become effective on the date first above written and shall remain in effect until termintated by the Parties. Any Party may terminate its participation in this MOU upon 60 days notice to the remaining Parties; provided, however, any Party so terminating its participation in this MOU shall be responsible for its share of the costs incurred by the Parties through the date of said notice. To the extent a Special Project Agreement involving the withdrawing Party is in effect at the

date of notice of termination, the terms of such Special Project Agreement shall remain in effect notwithstanding termination of that Party's interest in this MOU.

5.2 Additional Parties. Upon written approval of this MOU by all the Parties hereto, other local public agencies, as defined in California Water Code §10535, may become parties to this MOU.

5.3 Construction of Terms. This MOU is for the sole benefit of the Parties and shall not be construed as granting rights to or imposing obligations on any person other than the Parties.

5.4 Good Faith. Each Party shall use its best efforts and work in good faith for the expeditious completion of the purposes and goals of this MOU and the satisfactory performance of its terms.

5.5 Rights of the Parties and Constituencies. This MOU does not contemplate the Parties taking any action that would:

5.5.1 Adversely affect the rights of any of the Parties; or
5.5.2 Adversely affect the constituencies of any of the Parties.

5.6 Execution. This MOU may be executed in counterparts and the signed counterparts shall constitute a single instrument. The signatories to this MOU represent that they have the authority to sign this MOU and to bind the Party for whom they are signing.

IN WITNESS WHEREOF, the Parties hereto have executed this Memorandum of Understanding to be effective as of the date first above written.

Dated:_____

Lower Tule River Irrigation District

By:_____

Title:_____

Dated:_____

Approved as to form:

_____

Attorney for Lower Tule River ID

Dated:_____ Pixley Irrigation District

By:_____

Title:_____

Dated:_____ Approved as to form:

_____

Attorney for Pixley ID

Dated:_____ Porterville Irrigation District

By:_____

Title:_____

Dated:_____ Approved as to form:

_____

Attorney for Porterville ID

Dated:_____ Saucelito Irrigation District

By:_____

Title:_____

Dated:_____ Approved as to form:

_____

Attorney for Saucelito ID

Dated:_____ Terra Bella Irrigation District

By:_____

Title:_____

Dated:_____ Approved as to form:

_____

Attorney for Terra Bella ID

Dated:_____ Tea Pot Dome Water District

By:_____

Title:_____

Dated:_____ Approved as to form:

_____

Attorney for Tea Pot Dome WD

Dated:_____ Vandalia Water District

By:_____

Title:_____

Dated:_____ Approved as to form:

_____

Attorney for Vandalia Water District

Dated:_____

Deer Creek & Tule River Authority

By:_____

Title:_____

Dated:_____

Approved as to form:

_____

Attorney for DCTRA

Dated:_____

County of Tulare

By:_____

Title:_____

Dated:_____

Approved as to form:

_____

Tulare County Counsel

Dated:_____

City of Porterville

By:_____

Title:_____

Dated:_____

Approved as to form:

_____

Attorney for City of Porterville

Dated:_____

Angiola Water District

By:_____

Title:_____

Dated:_____

Approved as to form:

_____

Attorney for Angiola WD

Dated:_____

Deer Creek Storm Water District

By:_____

Title:_____

Dated:_____

Approved as to form:

_____

Attorney for Deer Creek Storm Water District

Exhibit A
Cost Sharing Allocations

The costs of the items described in Section 2.1.1 – 2.1.4 shall be shared between the member agencies, Lower Tule, Pixley, Porterville ID, Saucelito, Tea Pot Dome, Terra Bella, Vandalia, County, City, Angiola, and Deer Creek with each member agency paying an equal share of the costs.

Costs under Section 2.1.5 shall be paid for by the beneficiaries as specified in the applicable Special Project Agreement.

Each of the eleven parties to this Agreement shall equally share the intiial costs of this Agreement.

Exhibit B
Initial List of Stakeholder Group

Allensworth Community Services District

Alpaugh Community Services District

Campbell Moreland Ditch Company

Community Water Center

Ducor Community Services District

Pioneer Water Company

Pixley Public Utility District

Poplar Community Services District

Porta Vista Public Utility District

Self-Help Enterprises

Teviston Community Services District

Tipton Community Services District

Woodville Public Utility District

APPENDIX F

2014 EDUCATIONAL OUTREACH PROGRAMS

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

TO BE PROVIDED BY 4-CREEKS ENGINEERING

APPENDIX G

STATEMENT OF POLICY REGARDING WATER TRANSFERS AND EXCHANGES

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

TO BE PROVIDED BY 4-CREEKS ENGINEERING

APPENDIX H

REGIONAL ACCEPTANCE PROCESS DOCUMENTS

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

REGIONAL ACCEPTANCE PROCESS
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
KAWEAH RIVER BASIN/TULE RIVER BASIN

INTRODUCTION

The development and management of comprehensive regional water management activities has been coordinated over the last several decades in both the Kaweah River Basin and the Tule River Basin. Leadership activities, including development of Integrated Regional Water Management Plan elements have been conducted under governance provided by the Kaweah Delta Water Conservation District (KDWCD) in the Kaweah River Basin and by the Deer Creek and Tule River Authority (DCTRA) in the Tule River Basin.

With the passage of bond propositions by the California electorate, state leadership with respect to IRWM activities has been directed by the Resources Agency to the Department of Water Resources (DWR). DWR has developed IRWM guidelines addressing numerous planning issues including issues such as Plan formatting, stakeholder development and participation guidelines and solicitations for and criteria for evaluation proposals for the funding of capital projects designed to enhance integrated water management.

As a part of the determination of the adequacy of local efforts to address IRWM planning goals and criteria, DWR embarked on a process identified as the Regional Acceptance Process or RAP for short. As a part of the RAP, DWR conducted interviews of IRWM lead agencies and participants and provided recommendations and opinions, particularly as they applied to SBXX1 funds. As a part of the RAP for the Kaweah River Basin, interview conclusions were prepared containing the conclusions and recommendations of DWR.

For a period of time, the efforts of the KDWCD and DCTRA were oriented toward the interview conclusions which were received at the close of the RAP process which stated, "…the Kaweah River Basin RWMG must consolidate their IRWM planning efforts with the Tule River RWMG. The Kaweah River Basin and Tule River IRWM Regions must explore options on how best to structure the regional boundaries in this area." Several meetings with DWR have occurred over time attempting to clarify the intent of this instruction and to determine if the RAP condition could be agreed upon by the IRWM areas and, if so, how the coordinated structure would be developed. Additional light was shed on the subject when the RAP summary was posted to the DWR website. A copy of this summary is included herewith as Appendix A.

This document clarified that for funding eligibility in subsequent rounds, "…the Kaweah River Basin and Tule River IRWM Regions must explore options on how best to structure the regional boundaries in this area. DWR's intent is to facilitate future communication and cooperation between the Kaweah River Basin and Tule River IRWM Regions, to develop a single IRWM Region that fosters integration and cooperation, and does not result in overlapping and competing planning efforts." Significant discussions have reinforced this conclusion between the General Manager of KDWCD and the IRWM program management of DWR. It is the purpose of this document to place before the governing boards of KDWCD and DCTRA the request of DWR as expressed in the RAP documents and to have both governing entities provide policy direction with regard to the IRWM structure for each river basin.

CURRENT STATUS

There are currently three (3) critical status elements that exist which are related to the IRWM process. The first of these is the integrated regional water management elements which exist within each river basin and which are currently functional. On an every-day basis, water

management occurs in each of the basins, both with respect to the local Kaweah River and Tule River supplies, as well as the Friant Division, CVP supply. In addition, both KDWCD and DCTRA have adopted Groundwater Management Plans with current annual updates.

Specific IRWM planning efforts began in the Kaweah Basin in 1992 and are based in a Memorandum of Understanding which includes the County of Tulare, four (4) cities, three (3) irrigation districts and KDWCD. DCTRA was formed specifically for IRWM purposes with the agreement forming the Authority specifically detailing the integrated regional water management elements.

Second in the status of issues is that of a plan acceptable to DWR. For KDWCD, DWR has determined that KDWCD has a "Deemed Equivalent" Plan. DWR has determined the eligibility of KDWCD for Round 1 and Round 2 funding with a plan reformatted to DWR criteria currently being prepared in order to satisfy Round 3 eligibility requirements. For the Tule River Basin, efforts are currently underway, a portion of which is this RAP related exercise, leading to a written plan for the Tule River Basin.

The third element is that related to the advisory committee function of an IRWM area. The KDWCD has a functioning Advisory Committee through which membership issues, disadvantaged community issues, project planning functions, project evaluation functions and funding applications are directed. From its inception, DCTRA has participated in these efforts with at least one (1) if not more, representatives of the Tule River Basin area attending for input and coordination purposes.

As a fourth and adjunct venue, both KDWCD and DCTRA participate in the overall Tulare Lake Basin Joint Powers Group which meets on a monthly basis. The Group has taken steps to officially form, however, has been advised that such step was premature and the

formation and functional implementation of separate advisory groups. The only point of coordination in satisfaction of the DWR requirement to coordinate planning efforts would be that related to project evaluations. At properly timed intervals, projects which have been developed, initially scored and prepared for application would be placed before the individual advisory groups and then the governing boards for both IRWM Plan areas. The project elements would be analyzed from the standpoint of improvement due to coordinated efforts between the Kaweah River Basin and the Tule River Basin. The principal basis for this coordination would be improvement of water management capability, with a shadow justification of improved capability to compete for available funding in a Tulare Lake Basin-wide competition, or even a state-wide competition arena. All other activities undertaken within the purview of an IRWM Plan area would be conducted by that area and with that area principally in mind, expanding the planning activities only with respect to project development opportunities.

Separate IRWM Plans/Single Advisory Group

The second alternative would involve creation of separate IRWM Plans with the formation of a single advisory group which would offer expanded coordination capability for planning purposes beyond that of the first option, which is directed solely at project development. At the current time, the Kaweah River Basin IRWM has a functioning advisory group which meets on a regular basis and includes representatives from all affected, impacted and regulatory groups within the Basin. Attending on a regular basis and providing input from the perspective of the Tule River Basin has been the DCTRA's secretary, along with periodic attendance from public agency managers which are member agencies to DCTRA. The expansion of this advisory group to contain member agency representation on a regular basis would satisfy

this option, as the representatives of the County, the regulatory agencies and the disadvantaged communities are common to both the Kaweah River Basin and the Tule River Basin.

Policy input and specific project development input could be provided to advisory group participant members in separate individual basin settings where strategies, project goals and financial issues could initially be worked out and direction provided prior to vetting at the advisory group level. It would appear that this option would lead to coordination between the basins on more than just a project development level, with only time telling whether separate advisory groups coordinated together as described in the separate advisory group option would be superior.

Joint IRWM Plan/Joint Advisory Group

The last of what appears to be the currently viable options would call for the creation of a joint IRWM Plan with a single advisory group. This option would necessitate the current governing entities to embark on an evaluation of governance options which would be viable for a combined basin effort and which would provide for a structure which would adequately address the individual needs of the basins. The goal would be to function on a completely coordinated, single-source planned basis yet addressing the needs of the individual basins. From a planning coordination perspective, this option allows for the most complete integration of the project development, project optimization and funding competition perspectives. The governing boards will have to determine, however, if this planning advantage allows for the capability to properly address the fact that actual water management activities do not currently take place on an integrated basis, most times not on even a coordinated basis. Project planning, financing and implementation are but an element of integrated water management with principal daily activities

No. 14 - Kaweah River Basin Integrated Regional Water Management Region

Region Acceptance Process Summary

General Description of Region

The Kaweah River Basin Integrated Regional Water Management (IRWM) Region is comprised of approximately 340,000 acres in the counties of Tulare and Kings. This Region is within the Tulare Lake Hydrologic Unit. This Region is defined primarily by hydrologic boundaries, except the southern boundary which is defined by the Tule River IRWM Region. Kaweah River Basin IRWM Region boundaries follow the watershed boundary formed by in-part by Cottonwood Creek to the north. However, this creates a small overlap with the Upper Kings Water Forum IRWM Region's southern boundary. Also, small islands of non-participation within the proposed Kaweah River Basin Region exist, such as the City of Exeter.

The Kaweah Delta Water Conservation District (KDWCD) has acted as the lead agency in the management of water resources available to the Kaweah River Basin, particularly as they have applied to groundwater resources and flood and storm water control.

Several agencies have executed a Memorandum of Understanding (MOU) and include KDWCD, Exeter Irrigation District, and the City of Lindsay. Several petitions also have been recently submitted to join in the MOU, including the City of Visalia, the County of Tulare, the Tulare Irrigation District, the City of Tulare, the Ivanhoe Irrigation District, and the St. Johns Water District. Principal water management activities undertaken by the cooperating agencies within the Kaweah River Basin have joined together with multiple agencies for management of pre-1914 water rights, groundwater management, and development of a formal IRWM Plan. The Kaweah River Basin IRWM Region has a functionally equivalent plan. This IRWM Region has indicated that there is ongoing coordination and cooperation with neighboring IRWM Regions, in particular with the Tule River IRWM Region.

Interview Conclusions- Conditional Approval for SBXX1 Funds

DWR approves the Kaweah River Basin IRWM Region to allow this Region to complete for planning and implementation funding from Senate Bill XX1 (Perata, Stats. 2008, Ch. 1), California Water Code §83000-

83002.7. However, for subsequent funding rounds, the Kaweah River Basin and Tule River IRWM Regions must explore options on how best to structure the regional boundaries in this area. DWR's intent is to facilitate future communication and cooperation between the Kaweah River Basin and Tule River IRWM Regions, to develop a single IRWM Region that fosters integration and cooperation, and does not result in overlapping and competing planning efforts. Nearby "gap" areas, not covered by the Kern County, Poso Creek, Tule River, Kaweah River, or Southern Sierra IRWM Regions should also be considered for inclusion in the IRWM planning effort.

The stated communication and cooperation, region boundary structure, as well as inclusion of "gap" areas, will be considered when determining future region approval and eligibility for subsequent funding rounds.

STAFF RECOMMENDATION
REGIONAL ACCEPTANCE PROCESS
INTEGRATED REGIONAL WATER MANAGEMENT PLAN
KAWEAH RIVER BASIN/TULE RIVER BASIN

JOINT BOARD MEETING

On Friday, June 21, 2013, the governing Boards of the Kaweah Delta Water Conservation District and the Deer Creek and Tule River Authority (DCTRA) met in joint session. The purpose of the meeting was to review a document related to the Regional Acceptance Process (RAP), in preparation for separate board meetings to be held in July, 2013. Prior to the end of July, 2013, the objective is to provide direction with respect to the implementation procedures which the governing boards desire to see included in the Integrated Regional Water Management (IRWM) planning process, including preparation of Plans formatted to meet the requirements of the State Department of Water Resources (DWR).

At the conclusion of the joint meeting of the Boards, the following were observations made by those present:

- It was the feeling of all present that the coordination which DWR desired to see in place between the Kaweah River Basin and the Tule River Basin was already in place and functioning.

- The Board members pointed to a number of specific coordination issues, including water exchanges, which have and continue to take place between the basins in response to the variable hydrology within the two (2) basins and out of the San Joaquin River. It was noted that there were participants from the Tule River Basin which were the recipients of water from two (2) different programs being implemented this year with Kaweah River water leaving the Kaweah River Basin to assist farmers outside of said basin.

- Board members noted that the Stone Corral Irrigation District was a member of DCTRA and had participated in the construction of the DCTRA recharge ponds and could enjoy the benefits of puts and takes from banking programs involving said ponds.

- In addition, the Stone Corral Irrigation District had participated in the DCTRA exercise which set the stage for many of the current DCTRA based programs wherein assets and needs of the member agencies were delineated and program matches were identified.

- The Boards further noted the coordination which occurs at the Friant Water Authority level based on the number of Friant Division, CVP contractors existing within each of the subject river basins. It was noted that this coordination extended beyond just project development coordination into significant policy and legislation arenas.

- As a final item, the Boards noted that the Tule River Basin has been participating in the IRWM Advisory Group formed for the Kaweah River Basin and has been treated as a member of said Advisory Group with specific coordination taking place on a number of levels between the river basins as a result of that participation. It was further noted that agencies such as Tulare County and disadvantaged community participants had parallel interests in both basins and coordination of issues related to Tule River Basin issues had and would continue to occur as a result of the open-door policy which exists with respect to the Advisory Group structure and participation rules.

The Board members and staff who were present noted that the extension of the current efforts to include a thorough vetting of proposed projects would be relatively easy to add to the existing process and that it appeared that a common Advisory Group orientation would satisfy the basis for this coordination to occur. It was noted that projects such as the merging of the current individual basin groundwater models and evaluation of the needs and capabilities of each of the existing water management entities within the Tule Basin could be expanded to include entities within both basins. In addition, the expansion of the Advisory Group membership to include additional Tule River Basin members beyond that which currently exist could be implemented readily.

RECOMMENDED ACTION

The meeting concluded with instruction being given to staff and consultants to formulate a recommendation based on the conclusions of the governing boards as of the date of their joint meeting and to provide recommendations prior to the July, 2013, meetings for consideration for policy instruction adoption by the governing boards.

It is therefore the recommendation of the participating member staffs and consultants for both river basins that the following policy instruction be ratified by each of the governing boards:

1. The Kaweah River Basin and the Tule River Basin would continue their existing Integrated Regional Water Management procedures and implementation of related policies as they apply to each specific basin;

2. That the IRWM Plan structures be developed on a DWR acceptable format specific to each river basin;

3. That the existing Kaweah River Basin Advisory Group be retained and expanded to include Tule River Basin membership. The Advisory Group meeting location would be rotated between the basins so as to encourage participation by water management entities and disadvantaged communities specific to each basin. A specific task being given to the Advisory Group would be to address the project evaluation process and, in particular, the evaluation of projects from the perspective of improvement if projects were designed on a multi-basin format, in lieu of just a single basin format;

4. That specific steps be taken to update and expand the prior activity of the DCTRA to delineate needs and capabilities within the participating entities between both Plan areas; and

5. The structure should be reviewed in no more than five (5) years to allow for the opportunity of strengthening, confirmation or modification of the policies and procedures based on the success of implementation.

STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY EDMUND G. BROWN JR., Governor

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

January 22, 2014

Mr. Mark Larsen
General Manager
Kaweah Delta Water Conservation District
2975 North Farmersville Boulevard
Farmersville, California 93233

Dear Mr. Larsen:

The purpose of this letter is to express concerns the Department of Water Resources' (DWR) has regarding communication with and timely action by Kaweah Delta Water Conservation District (KDWCD) by the Round 2 Planning grant agreement. The initial planning grant award was made over a year ago (November 29, 2012); DWR is still waiting for information from KDWCD so that the agreement can be drafted. Due to the length of time between the grant award and today, I had my staff review communications (letters, emails) that occurred over the past year regarding the planning grant. This review revealed two items of interest, one is that DWR was remiss on finishing the Region Acceptance Process (RAP) with KDWCD and that there seems to be long running confusion between our agencies regarding the planning grant.

Regarding the RAP, on July 23, 2013, KDWCD sent an email to DWR containing documentation supporting the consideration and ultimate decision by KDWCD and the Deer Creek and Tule River Association that the Kaweah and Tule IRWM regions remain separate and requesting a meeting to discuss the material. On August 23, 2013, I sent an email to you stating we did not need to meet. DWR should have formally acknowledged at that point the September 2009 RAP conditions were satisfied. DWR regrets the time it took to formalize this decision and has removed your conditional RAP acceptance and updated our website to reflect this decision. This letter serves as your official notice that the RAP condition has been satisfied and Kaweah and Tule IRWMs are fully accepted regions.

Regarding activity on the planning grant, when we met January 2013, you mentioned that a portion of the plan was already drafted. Our intent for asking to see the plan was so we could ensure the planning grant scope was complementary to the current plan status. To date our requests to view the plan so we could draft the scope of the grant have been continually delayed. The following is a brief overview of events related to the plan development.

- The planning grant award was made on November 29, 2012.
- In a letter to DWR dated January 16, 2013, you indicated that the draft IRWM plan was scheduled to be released in August of 2013 and adopted in October of 2013.
- In DWR's planning grant commitment letter dated February 7, 2013, DWR requested that a meeting be held prior to February 19, 2013 to discuss how the scope of the planning grant supplements the draft IRWM plan, and that the most recent draft of the IRWM plan was to be provided to DWR prior to this meeting.
- In an email dated February 27, 2013, KDWCD indicated that plan was not in readable format.
- In an email dated March 6, 2013, DWR clarified that our request was not related to distributing the draft plan to stakeholders for comment, and that we were asking KDWCD to share with DWR the current version of the plan to support agreement development.
- In a June 25, 2013 email, DWR stressed the need to review the draft IRWM plan prior to executing the agreement.
- On December 8, 2013 email from your staff to DWR included an attached schedule that appears to indicate that work on the draft IRWM plan has actually been ongoing and that the draft IRWM plan will be provided to DWR and stakeholders on February 4, 2014, and considered for adoption March 4, 2014.

It is interesting to note the timing of recent plan activities (release of draft to stakeholders) seems to coincide with the Round 2 Planning Grant Application schedule. This seems to indicate that KDWCD has proceeded with drafting a plan without use of the planning grant funding. The planning grant award is intended to aid IRWM practitioners in developing their plans. Therefore DWR is not certain if the grant is needed or if DWR can support the work of drafting the plan that is now scheduled for release in February. It is important that we meet to discuss the lack of progress on the planning grant agreement in light of the status of the draft IRWM plan and to discuss whether the grant is still viable. One of my staff will be contacting you to set a meeting.

If you have any questions, please contact Joe Yun at (916) 651-9222 or Joe.Yun@water.ca.gov.
Sincerely,

Tracie L Billington

Tracie Billington, P.E., Chief
Financial Assistance Branch
Division of Integrated Water Management

cc: Mr. Don Mills
President
Kaweah Delta Water conservation District
2975 North Farmersville Boulevard
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Mr. Shane Smith
Projects/Administrative Manager
Kaweah Delta Water Conservation District
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APPENDIX I

OUTLINE OF POTENTIAL TRAINING AND TECHNICAL ASSISTANCE

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

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MEMORANDUM

DATE: August 23, 2013

TO: Mark Larsen

FROM: Dennis Keller

SUBJECT: OUTLINE OF POTENTIAL TRAINING AND TECHNICAL ASSISTANCE ACTIVITIES - KAWEAH DELTA WATER CONSERVATION DISTRICT

A potential arena for IRWM activities related to disadvantaged area drinking water activities is that of technical assistance. The U.S. Environmental Protection Agency, Office of Water, Office of Groundwater and Drinking Water current funding opportunity entitled "Training and Technical Assistance to Improve Water Quality and Enable Small Public Water Systems to Provide Safe Drinking Water" provides an outline of training and technical assistance activities that are segregated into four (4) National Priority Areas. Summarized below are the training and technical assistance activities which fall under each of those areas which may have application to the Kaweah River Basin:

1. Training and Technical Assistance for Small Public Water Systems to Achieve and Maintain Compliance with the Safe Drinking Water Act:

    - Provide operator training and technical assistance on how to comply with the SDWA, with emphasis on regulatory requirements which present a particular challenge for small systems;
    - Provide training to decision makers and board members regarding SDWA requirements;
    - Provide training/technical assistance to diagnose and trouble-shoot system operational and compliance-related problems and identify solutions;
    - Provide training/technical assistance and solutions to address microbial, nitrate/nitrite and disinfection byproducts contamination;
    - Provide training and technical assistance to systems to help develop and implement source water protection plans;

- Conduct preliminary engineering evaluations to assess treatment, storage and distribution system issues and identify low-cost alternative technology and management techniques; and/or

- Provide training for operator certification and continuing education (CEU). Applicants should describe how they would obtain state approval for CEU credits for their training courses.

2. Training and Technical Assistance to Improve Financial and Managerial Capacity and Enable Small Water Systems to Provide Safe Drinking Water:

    - Provide training and technical assistance to improve the knowledge and skill competency of drinking water system personnel in the areas of managerial and financial capacity;

    - Provide training sessions for water system managers and board members in asset management, fiscal planning and other sustainable management topics;

    - Provide training and technical assistance in asset management program implementation;

    - Provide training and technical assistance to develop financial assessments and rate analyses;

    - Conduct energy audits and water loss analyses to determine potential energy and water efficiencies and cost savings;

    - Work with systems to conduct analyses on the potential benefits of partnerships and collaboration with other systems, including shared operators and treatment, restructuring and consolidation, thereby enabling them to become financially sustainable and to provide safe and affordable water to their communities; and/or

    - Assist systems to access and manage multiple infrastructure funding sources to address public health risks and achieve compliance.

3. Training and Technical Assistance for Small Publicly-Owned Wastewater Systems and On-Site/Decentralized Wastewater Systems to help improve water quality:

    - Preliminary needs analysis;

    - Consideration of alternatives for treatment options, including advanced treatment, nutrient control, low impact development and other green infrastructure practices;

    - Project planning and design;

    - Development of maintenance schedules;

- Assistance identifying and applying for funding sources;
- Assistance forming responsible management entities (RMEs) and supporting the development of a long-term business plan;
- Training of community leaders, service providers and regulatory officials to assist in consideration of alternatives, highlight the importance of management, facilitate certification of installers and operators;
- Outreach to individual system owners and the general public during the planning process to gain trust and support for solutions; and/or
- Outreach to individual system owners and the general public on proper maintenance techniques.

4. Training and Technical Assistance for Private Homeowners to Help Improve Water Quality:

    - Developing and/or providing online and hard copy information and materials on topics of interest to private well owners, such as well construction, well maintenance and operation, well testing, groundwater quality and protection, state regulations impacting private wells, water rights, and how to respond to well contamination emergencies;
    - Providing information, technical assistance and training to other organizations with activities that affect private well owners;
    - Adequately maintaining a hotline with a toll-free number for private well owners to call or timely assistance and advice on private well matters;
    - Providing electronic newsletters or using social media to provide topical or emergency information quickly to private well owners with internet access; and/or
    - Educating private well owners through face-to-face visits regarding potential or actual threats to their wells and whom to contact for help.

We have started to watch for funding opportunities for this approach to the water quality issue. We will not pursue any pathway related to this approach to the alternative ILRP process without specific direction from either you or the Board.

APPENDIX J

STAKEHOLDER ADVISORY GROUP

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

KAWEAH RIVER IRWMP STAKEHOLDER GROUP

MAILING LIST

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APPENDIX K

KDWCD IRWMP SCORING CRITERIA

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

KAWEAH RIVER BASIN IRWMP
PROJECT SUB-SCORING

Proposed DAC Scoring Criteria for IRWMP Projects

Each project in the plan will be scored using the following criteria:

Definitions

- Disadvantaged Community (DAC): Community Median Household Income (MHI) is 80% of statewide MHI.
- Severely Disadvantaged Community (SDAC): Community MHI is 60% of statewide MHI.
- Negative Impacts – includes, but is not limited to, emissions from stationary or mobile sources, discharges from project site that reduce area water quality, or water supply, increased likelihood of flooding, increase traffic, and noise.

Points Awarded for Projects Benefiting DACs

- +1 - Generalized Benefit: The project alleviates a general regional problem that is also experienced by DACs, but will not address a DAC-specific priority; ex. open space/natural restoration opportunities are near community, but not readily accessible; increases groundwater supply generally, but doesn't secure water supply for a DAC experiencing supply problems.

- +2 – Measurable Benefit to at least one DAC with no formal DAC participation: The project directly benefits a DAC (ex. community drinking water quality or supply, wastewater or flooding problem) but the project does not include DAC representation and consultation during the entire course of project planning, design, and development, as well as DAC representation and consultation during project implementation and monitoring.

- +3 – Measurable Benefit to at least one DAC with DAC participation: The project directly benefits a DAC (ex. community drinking water quality or supply, wastewater or flooding problem) and the project includes DAC representation and consultation during the entire course of project planning, design, and development, as well as DAC representation and consultation during project implementation and monitoring.

- +4 – Alleviates a public health & safety problem in at least one DAC with DAC participation: The project directly alleviates a priority public health and safety water problem in at least one DAC (ex. community drinking water quality or supply, wastewater or flooding problem) and the project includes DAC representation and consultation during the entire course of project planning, design, and development, as well as DAC representation and consultation during project implementation and monitoring.

- <u>+5 – Alleviates a public health & safety problem in at least one SDAC with SDAC participation:</u> The project directly alleviates priority public health and safety water problem in at least one SDAC (ex. community drinking water quality or supply, wastewater or flooding problem) and the project includes SDAC representation and consultation during the entire course of project planning, design, and development, as well as SDAC representation and consultation during project implementation and monitoring.

<u>No project will be approved if it may negatively impact a disadvantaged community or a community already impacted by environmental health hazards.</u>

-

Water Quality Proposed Scoring Criteria for IRWMP

<u>+1 Indirect impact</u>

Project has positive effect although it wasn't part of the project's vision

-Although the project is not to improve water quality it has an indirect affect such as increasing quantity

-Increases amount of surface water available which has an impact on quality

- Reduces the amount of pumping required
- Flood control
- Conservation/water use efficiency
- Education/ BMP*

<u>+2 Indirect impact</u>

Project has positive effect and it is part of the project's vision

Mitigates by dilution - Recharge projects

Urban runoff management

Matching quality to use

Education/ BMP*

<u>+3 Direct impact</u>

Project would address sources of potential pollution

Recharge areas protection from contamination

Education/ BMP*

<u>+4 Direct impact</u>

Project addresses public drinking water systems and private domestic wells directly - Secondary contaminants

Education/ BMP*

<u>+5 Direct impact</u>

Project mitigates or improves quality by addressing sources of pollution

Protect Water Quality

Remediate surface and groundwater contaminants

Properly destroy abandoned wells

Project addresses drinking water and domestic wells directly - access to SDW

Addresses Primary Drinking Water contaminants such as nitrate, DBCP, arsenic, radiological and bacteriological

Addresses salinity

Education/ BMP*

TO BE CONSIDERED:

- Time duration of value of action would effect scoring.
- Education/ BMP*could fit into any of these categories but should be scored based on impact and effectiveness
- Ranking would vary if project is in a vulnerable or non-vulnerable area
- **Projects that have a negative impact on water quality would not be recommended for funding**

Proposed Natural Resource Conservation and Restoration NRC&R) Scoring Criteria for IRWMP Projects

Prepared by Tulare Basin Wildlife Partners:
Revised: 9 March 2009

The primary environmental goals for the Tulare Basin are: (1) protection and restoration of riparian habitats; (2) protection and restoration of wetland habitats; (3) protection and restoration of upland habitats, corridors and linkages; 4) protection and restoration of natural habitat heterogeneity; (5) protection and restoration of functioning landscape-level ecological processes; and (6) protection and restoration of key ecosystem structures appropriate for the habitat.

The Environmental Scoring Matrix presented in Table 1 shows these goals or desired outcomes that can be applied to specific projects. It also shows tools that can be used to attain these desired outcomes. The scores in this matrix are above and beyond any habitat mitigation that state or federal agencies might require to fund a given project.

Table 1. Environmental Scoring Matrix for IRWMP

	Tools					
Desired Outcomes	Protect Existing Habitat	Create New Habitat	Develop and Use Best Management Practices	Develop and Implement Adaptive Management Plan	Unweighted Total	Weighted Total
Riparian Habitat	4	4	1	1	0-10	0-30
Wetland Habitat	4	4	1	1	0-10	0-30
Habitat Heterogeneity	4	4	1	1	0-10	0-30
Upland Habitat	4	4	1	1	0-10	0-10
Functioning Landscape Processes	4	4	1	1	0-10	0-10
Key Ecosystem Structures Appropriate for Habitat	4	4	1	1	0-10	0-10
Total	24	24	6	6	0-60*	0-120

* The total score can be apportioned so as to be proportionate to the maximum score that may be available for a given IRWMP category in any of the various IRWMP planning

efforts. Under the Kaweah Plan, for example (where there are a total of 5 IRWMP Environmental Scoring Points available), 12 Environmental Criteria Points are equal to 1 IRWMP Scoring Point.

Description of Desired Outcomes

Riparian Habitat - Stream-side or pond-side vegetation that is dominated by willows, cottonwoods, button willow, valley oak, or other native moisture-dependent vegetation. Riparian corridors and linkages are vitally important to the long-term sustainability of plant and animal populations. This is especially important in long-term planning for the effects of climate change.

Wetland Habitat - Areas that support native marsh or vernal pool vegetation (and wildlife that are dependent on these habitats). Wetlands can include areas that are managed for wintering waterfowl, summer breeding habitat, migratory shorebirds (including mudflat areas) or are year-round (permanent) wetlands.

Habitat Heterogeneity – Natural Tulare Basin landscapes tend to have relatively high habitat heterogeneity. Uplands grade into wetlands, often with a change of only a few feet in elevation.

Upland Habitat – Upland habitat is not dependent on stream-flow or surface runoff. Upland habitats in the Tulare Basin are chiefly grasslands, scrub habitats, and oak woodland. Upland habitat corridors and linkages are vitally important to the long-term sustainability of plant and animal populations. This is especially important in long-term planning for the effects of climate change.

Functioning Landscape Processes – These processes include fires (and their frequency), floods (and their frequency), type of grazing, and erosion (or lack thereof). Some of these processes provide society with vital ecological services such as purification of water or reduction of air pollution.

Key Ecosystem Structures Appropriate for Habitat – These ecosystem structures are important micro-habitats that could include nesting island in wetlands, micro-topography in valley uplands, cliffs in foothill or mountain areas, and old-growth trees and snags in forested areas.

Description of Point system

Protect Existing Habitat (0-4 scale)

In the following four categories, "protection" assumes that the land area under consideration (whether it is existing habitat, restored/created habitat, or is intended for ecological restoration/creation) has already been purchased in fee title or is covered by an appropriate easement (a conservation easement, a management easement, or an agricultural easement) in perpetuity. Points should be allocated according to the following guidelines:

1. **Strict Nature Reserve**: protected area managed mainly for science. A Strict Nature Reserve is an area of land and/or water possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring. These areas have a management plan operation to maintain a natural state within which disturbance events (of natural type, frequency, and intensity) are allowed to proceed without interference or are mimicked through management (Example: A nature reserve used exclusively for scientific research and/or environmental monitoring). Lands managed as Strict Nature Reserves earn the maximum score (4 points) in the *Protect Existing Habitat* column.
2. **Habitat/Species Management Area**: protected area managed mainly for conservation through management intervention. A Habitat/Species Management Area is an area of land and/or water subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species. Habitat/Species Management Areas have a mandated management plan operation to maintain a primarily natural state, but which may receive use or management practices that degrade the quality of existing natural communities (Example: National Parks). Habitat/ Species Management Areas earn 3 points in the *Protect Existing Habitat* column.
3. **Managed Resource Protected Area**: protected area managed mainly for the sustainable use of natural ecosystems. A Managed Resource Protected Area is an area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs. Managed Resource Protected Areas are subject to extractive uses of either a broad, low-intensity type of localized intense type. These areas also confer protection to federally listed endangered and threatened species throughout the area (Example: National Forests). Managed Resource Protected Areas earn 2 points in the *Protect Existing Habitat* column.
4. **Protected Landscape**: protected area managed mainly for landscape conservation and recreation. A Protected Landscape is an area of land and/or water, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological, recreation, and/or cultural value, and often with high biological diversity. Protected Landscapes allow for intensive use throughout the tract, or existence of such restrictions is unknown (Examples: County Parks and grazing easements on private land). Lands managed as protected landscapes earn 1 point in the *Protect Existing Habitat* column.

Create New Habitat (0-4 scale)
Projects that 'Create New Habitat' are assumed to include active intervention to improve highly degraded, severely damaged, or destroyed ecosystems. Points in this category should be allocated according to the following four guidelines.

NB: Any project that creates new habitat earns a minimum of 2 points; if this tool is not utilized, 0 points should be given.

1. **Restoration** – Ecological restoration can be defined as "an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability" (SER 2004). Ecological restoration usually has an end goal of establishing an ecological condition which closely approximates the pre-disturbance condition. This may include, to the greatest practicable extent, returning an ecosystem to its original community structure, restoring natural ecosystem processes, and reestablishing key indigenous species. The practice of ecological restoration includes a wide scope of projects including, but not limited to: erosion control, reforestation, removal of non-native species and weeds, revegetation of disturbed areas, daylighting streams, reintroduction of native species, as well as habitat and range improvement for targeted species. Ideally, the restored ecosystem should be self sufficient and adequately resilient to endure the normal periodic stress events in the local environment that serve to maintain the integrity of the ecosystem (SER 2004). Ecosystem restoration projects earn 4 points in the *Create New Habitat* column.
2. **Reclamation** – to return an ecosystem to a useful state. Reclamation may include the establishment of a functional vegetative composition different than the pre-disturbance condition, but consistent with the native vegetation for the region and regional habitat goals. Reclamation often includes the stabilization of the terrain, aesthetic improvement, and the reinstitution of productive or useable habitat. Reclamation may return an area to a more natural state after, for example, pollution, desertification or salination have made it unusable. Reclamation projects earn 3 points in the *Create New Habitat* column.
3. **Remediation** – to remove an undesirable condition from an ecosystem. Environmental remediation deals with the removal of pollution or contaminants from soil, groundwater, sediments, or surface water for the general protection of human health and the environment. Sometimes, due to fundamental changes to environmental conditions, an ecosystem cannot be restored and a new ecosystem will need to be created; this is remediation (New South Wales Department of Infrastructure, Planning and Natural Resources 2004). Remediation projects earn 2 point in the *Create New Habitat* column.

Best Management Practices (0-1 scale)
Best management practices (BMPs) are guidelines that show the best way to manage each habitat (after acquisition and/or restoration) to provide the benefit or outcome that is desired. If the goal is to manage for special status species (any species that is listed as Threatened, Endangered, Sensitive, Species of Special Concern, Rare, etc) such as Tipton kangaroo rats or blunt-nosed leopard lizards, intensive grazing of the habitat might be necessary. If high native plant diversity is the goal, lighter, rotational grazing might be prescribed. If BMPs are applied to a project, that project earns a point under the BMP column.

Adaptive Management Plan – (0-1 scale)
An adaptive management plan provides for monitoring to determine whether or not the desired outcomes are being met. This monitoring takes place over an appropriate timescale to determine these outcomes. If the desired outcome is not being achieved, the

monitoring data will be used to develop new management practices that will successfully lead to the desired outcome. Projects with adaptive management plans earn a point in the Adaptive Management Plan column.

Weighting Points According to Project Size

Larger protected areas typically support a greater diversity and abundance of plants and animals and are generally able to sustain more natural ecosystem processes than smaller areas. Larger protected areas also tend to contain a greater diversity of habitats, allowing greater populations of species to persist over time (Environmental Law Institute 2003). Correspondingly, projects that restore or protect large intact areas, or projects that supplement or connect existing critical habitat areas should be prioritized over smaller and more isolated projects.

The following guide will provide multipliers with which to 'weight' a given project based on size. Critical or beneficial threshold sizes differ for different habitats; the guidelines below and habitat descriptions on page 2 should be used to apply the appropriate weight to a given project. The weighting factor should be multiplied times the row total for the appropriate desired outcome. These weights may only be applied to projects containing Riparian Habitat, Wetland Habitat, and/or Upland Habitat.

If a project covers multiple habitats, weight the row total appropriately for each habitat type encompassed within the project area.

If a project connects, or is contiguous to an existing protected area *add* three points to the final project score.

An example is given on page 7.

Upland habitat:

- Less than 80 acres: Weighting Factor = 1
- 80 – 320 acres: Weighting Factor = 2
- Greater than 320 acres: Weighting Factor = 3

Riparian habitat

- Less than 1000 feet in length and less than 100 feet wide for at least 75% of the stretch: Weighting Factor = 1
- 1000 feet to 1 mile in length and 100 feet to 300 feet wide for at least 75% of the stretch: Weighting Factor = 2
- Greater than 1 mile in length and greater than 300 feet wide for at least 75% of the stretch: Weighting Factor = 3

Wetland habitat

- Less than 10 acres: Weighting Factor = 1
- 10-50 acres: Weighting Factor = 2
- Greater than 50 acres: Weighting Factor = 3

References:

1. New South Wales Department of Infrastructure, Planning and Natural Resources. 2004. *Georges River Catchment: Guidelines for Better Foreshore Works.* http://www.planning.nsw.gov.au/plansforaction/pdf/grc_better_practice_guideline.pdf
2. Environmental Law Institute. 2003. *Conservation Thresholds for Land Use Planners.* http://www.seagrant.noaa.gov/focus/documents/SCD/ConservationThresholdsforLandUsePlanners.pdf
3. Society for Ecological Restoration International Science & Policy Working Group. 2004. *International Primer on Ecological Restoration.* www.ser.org & Tucson: Society for Ecological Restoration International

Table 2. Project X will protect and reclaim 25 acres of wetland habitat adjacent to a 400-acre upland wildlife refuge. Project X will be subsequently maintained as a Managed Resource Protected Area. Waterfowl hunting will be allowed. Managers will use best management practices for targeted special status species and develop and adaptive management plan.

	Tools					
Desired Outcomes	Protect Existing Habitat	Create New Habitat	Develop and Use Best Management Practices	Develop and Implement Adaptive Management Plan	Unweighted Total	Weighted Total & Additional Points
Riparian Habitat	0	0	0	0	0	0
Wetland Habitat	2	3	1	1	7	14
Habitat Heterogeneity	2	3	1	1	7	7
Upland Habitat	0	0	0	0	0	0
Functioning Landscape Processes	2	3	1	1	7	7
Key Ecosystem Structures Appropriate for Habitat	2	3	1	1	7	7
Total	8	12	4	4	28	38

Water Supply Scoring Items

WATER SUPPLY SCORING

DESIRED OUTCOMES	TOOLS				Total
	SURFACE WATER STORAGE	GROUNDWATER	CONVEYANCE	SUPPLY	
QUANTITY	0 - 3	0 - 3	0 - 3	0 – 3	0 - 12
RELIABILITY	0 - 1	0 - 1	0 - 1	0 - 1	0 - 4
FLEXIBILITY	0 - 1	0 - 1	0 - 1	0 - 1	0 - 4
Total					0 - 20

QUANTITY:

- Does the project increase surface water storage? An increase of 0 acre-feet = 0 points, up to 200 acre-feet = 1 point, +200 - 4000 acre-feet = 2 points, +4000 acre-feet = 3 points.
- Does the project involve percolation to groundwater? A soil percolation of 0" inches per day = 0 points, up to 3" inches per day = 1 point, +3" – 6" = 2 points, +6" inches per day = 3 points.
- Does the project increase the amount of water that can be conveyed? 0 cfs increase = 0 points, up to 50 cfs = 1 point, +50 – 250 cfs = 2 points, +250 cfs = 3 points.
- Does the project increase the water supply to the area? 0 acre-feet increase = 0 points, up to 1000 acre-feet = 1 point, +1000 – 2500 acre-feet = 2 points, +2500 acre-feet = 3 points.

RELIABILITY: (No = 0 points, Yes = 1 point.)

- Does the project increase the reliability of the surface water storage in the area? For example: Will this additional storage improve the ability to distribute water according to demand?
- Does the project increase the reliability of groundwater in the area? For example: Will the increased ability to manage groundwater supplies reduce overdraft or increase safe yield?
- Does the project increase the reliability of the conveyance system in the area? For example: Will the project improve the ability of the conveyance system to be able to convey water when needed?
- Does the project increase the reliability of water supply to the area? For example: Will the project increase the firmness of the water supply?

FLEXIBILITY: (No = 0 points, Yes = 1 point.)

- Does the project increase flexibility to the area in regards to surface water storage? For example: Will the additional storage be a multiple use facility for recharge, and re-regulation, or is it a single use facility?
- Does the project increase flexibility to manage groundwater? For example: Will the additional groundwater recharge/extraction ability increase the ability to develop or utilize groundwater?
- Does the project increase flexibility to convey water in the area? Fore example: Will the addition of conveyance facilities allow more options for water distribution?
- Does the project increase flexibility to manage water supply? For example: Will the addition of the water supply to the area expanded the water management options through timing, place of use, or other options?

Flood Control Scoring Items

Flood Control Scoring Criteria

The following are criteria to be considered when evaluating/comparing the benefits of potential projects that portend to have a flood control function as part of an overall program of project evaluation for projects to be part of the Kaweah River Integrated Regional Water Management Plan. This criteria is not to be used for projects that have flood control as their primary function:

(1) Are there any flood control benefits to be provided by the subject project?
- Yes - 1 point;
- No – 0 points.

(2) Is life being protected as a result of the flood control aspects of the subject project (the flood control aspects of the project significantly reduce the depth of water to an area with a population of 50 persons or more)?
- Yes - 1 point;
- No – 0 points.

(3) The balance of the total of five points used to differentiate the flood control aspects of projects are all based around the benefit/cost ratio and the size of the project; where BC equals the dollar amount of the flood control benefit provided by the project divided by the incremental costs associated with providing just the flood control aspects of the project.
- If the magnitude of the annual flood control benefit is in excess of $1 million per year then:
  - For BCs of 1.0 to 2.0 – 1 point;
  - For BCs of 2.0 to 3.0 – 2 points;
  - For BCs of 3.0 or more – 3 points.
- If the magnitude of the annual flood control benefit is less than $1 million per year then:
  - For BCs of 2.0 to 3.0 – 1 points;
  - For BCs of 3.0 or more – 2 points.

There was also discussion of if a project has flood control aspects that result in adverse impacts being redirected to other areas whether the project should warrant being included in an integrated regional water management plan at all. Additionally, where there already exists storm water or flood control planning documents that call for certain projects or actions, that if a project is reflected in these planning documents it should be awarded higher consideration, similar to if a project is included in a groundwater management plan or an ag/urban water conservation plan.

APPENDIX L

NOTICE OF HEARING ON INTENT TO PREPARE AN IRWMP

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

FINAL DOCUMENT TO BE INSERTED AFTER PREPARATION AND POSTING

APPENDIX M

CERTIFICATION OF PUBLICATION OF NOI TO ADOPT AN IRWMP

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

FINAL DOCUMENT TO BE INSERTED UPON PUBLICATION

APPENDIX N

DOCUMENT MEMORIALIZING RWMG DECISION

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

FINAL DOCUMENT TO BE INSERTED UPON COMPLETION AND ADOPTION

APPENDIX O

RWMG MEMORANDUM OF UNDERSTANDING

INTEGRATED REGIONAL WATER MANAGEMENT PLAN

TULE RIVER BASIN IRWMP GROUP

FINAL DOCUMENT TO BE INSERTED UPON ADOPTION