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January 14, 2008

Ms. Delores Brown, Chief Office of Environmental Compliance  
California Department of Water Resources  
3251 S Street  
Sacramento, CA 95816  
delores@water.ca.gov

Re: Draft Environmental Impact Report Monterey Plus

Dear Ms. Brown:

The Butte Environmental Council is submitting the following comments and questions regarding the Draft Environmental Impact Report Monterey Plus (DEIR).

#### Page 2-16

Will you please elaborate on the implications and impacts that would follow implementing article 18(b), which would reduce Table A allocations and use article 21 water?

#### Chapter 4 - Project Description

The DEIR fails to state that a goal of the proposed Project is to increase export water through the Delta. This is misleading and does not provide the public with the opportunity to address this component nor does it identify, analyze or propose mitigation for impacts.

It is not acceptable to alter the definition of Section 18(a) on page 4-3 to read that, "...shortage provisions apply to conditions due to any cause whatsoever instead of only temporary causes." The alarming increase in DWR's discretion would place far too much authority into the agencies hands, therefore, the language should not be changed.

#### Chapter 7.2 Groundwater Hydrology and Quality

This chapter does not include any description of groundwater, groundwater management plans, or groundwater plans for conjunctive use in the Sacramento Valley. DWR needs to incorporate into a revised DEIR the analysis and planning efforts it has either directly created, indirectly funded/supported, or formed independently in the Sacramento Valley and recirculate the revised DEIR for public review and comment. This would at a minimum include:

- Sacramento Valley Integrated Regional Water Management Plan - [http://www.norcalwater.org/int\\_program/irwmp.shtml](http://www.norcalwater.org/int_program/irwmp.shtml)
- Butte County Integrated Management Plan - [http://www.buttecounty.net/water-andresource/int\\_water\\_res\\_plan.htm](http://www.buttecounty.net/water-andresource/int_water_res_plan.htm)
- Sacramento Valley Water Management Agreement - [http://www.norcalwater.org/pdf/sac\\_valley\\_water\\_mgmt\\_agrmt.pdf](http://www.norcalwater.org/pdf/sac_valley_water_mgmt_agrmt.pdf)
- Sacramento Valley Regional Water Management Agreement - [http://www.usbr.gov/mp/watershare/mgmt\\_plan/Regional\\_Plan.pdf](http://www.usbr.gov/mp/watershare/mgmt_plan/Regional_Plan.pdf)

Will the SWP Agreements add to the impacts of the SVIRWMP, BCIMP, SVWMA, and the SVRWMA? These four documents have not been analyzed under CEQA or NEPA to date. In addition, the SVIRWMP, the BCIMP, and the SVRWMA are not even identified in Table 10.1.1. This must be corrected in the table and each plan must be presented in a thorough fashion in a revised DEIR. It must be clarified whether or not the Monterey Agreement will add to the impacts of the planning and implementation of these local and regional planning documents.

Regarding northern Sacramento Valley groundwater, there are significant impacts already occurring in the geographic area and yet there is little knowledge about the water budget for the region, natural recharge, interdependence between surface and groundwater, and hydrologic connectivity between down gradient and up gradient users. Despite these major factual gaps, the SVIRWMP emphatically states, "...groundwater levels associated with the Sacramento Valley have remained steady, declining moderately during extended droughts and generally recovering to their pre-drought levels during subsequent wetter periods." In reality, for example, the Butte Basin Groundwater Status report 2006 notes that groundwater levels in many of Butte County's groundwater dependant sub-areas have steadily declined since the late 1990's in spite of several years of "normal" precipitation. Water policy analysts must expand their frame of reference to include data pertaining to natural precipitation regimes that include periods of drought that persist 100-400 years.

<http://www.yosemite.org/naturenotes/paleodrought2.htm>

[http://ceres.ca.gov/snep/pubs/web/v1/ch01/v1\\_ch01\\_02.html](http://ceres.ca.gov/snep/pubs/web/v1/ch01/v1_ch01_02.html)

In addition, the draft SVIRWMP concludes that, "...groundwater in both the Sacramento Valley and Redding Groundwater Basins is typically replenished through the deep percolation of precipitation and applied irrigation water." There have been no detailed examinations of recharge mechanisms in these basins. Theories regarding the Tuscan aquifer unit range from suggesting a narrow band of recharge along the base of the Sierra foothills (where the Tuscan interfaces the surface and includes creek interactions) to hard rock fissures connecting the aquifer to Plumas County hydrology. DWR staff (Dudley and McManus) have suggested for years that the confined nature of the Lower Tuscan eliminates irrigation percolation as a mechanism of recharge.

It is abundantly clear that not only is the DEIR insufficient at identifying, disclosing, and mitigating impacts, so is the SVIRWMP.

### **Chapter 8 Growth Inducing Impacts**

This "administrative action" is the mechanism that will allow for an additional 400,000 - 561,000 residents and all of the associated direct and indirect impacts. While the DEIR lists categories of possible impacts, here again, there is no detailed disclosure of the impacts, analysis, or proposed mitigation. This task is left to others. This is not acceptable and must be presented in a revised DEIR. A revised DEIR must also disclose the status of the General Plans in any county that could be impacted by the SWP Amendments. Many, such as Butte County's are illegal (Attorney General Lockyer, August 2000), so to assume that local planning will successfully analyze the potential secondary impacts is a fairy tale. We encourage DWR to apply greater analysis to this significant omission in the DEIR.

Economic impacts to areas of origin, both positive and negative are ignored in the DEIR. This must be rectified.

### **Chapter 10 Cumulative Environmental Impacts**

This chapter is supposed to analyze cumulative impacts. The document mentions the SVWMA because it is a related project, but does not really analyze how the SWP Amendments will intersect with and/or increase the impacts from it. As mentioned above, the SVIRWMP, BCIMP, and the SVRWMA are not even acknowledged as related projects. They, too, must be added to a revised DEIR with it clearly elucidated how the SWP Amendments intersect with and/or increase the impacts from them. The three planning documents all include

conjunctive management of the groundwater resources in northern California. The answers to the following questions must be incorporated in a revised DEIR, or if DWR declines to produce one, we request that you answer in the FEIR the following:

- How will the SWP benefit from integrating the groundwater of the Sacramento Valley into the state water supply?
- How will the “integration” occur, where will it occur, who will it benefit, and what funds will facilitate all of these activities?
- How will DWR analyze the impacts, at the local, regional, and statewide levels and propose mitigation?
- How will it be presented to the public?

### **Conclusions**

DWR must form a new decision based on this new DEIR, and should not ignore alternative approaches merely because they do not mirror the shape and form of the original agreement that was reached in 1994. DWR must consider what has been mentioned above and the following:

- Circumstances have changed dramatically since 1994. Endangered species concerns have and will continue to dramatically alter the way the SWP is managed. DWR also acknowledges in the DEIR that climate change may reduce reliability of the SWP by 25% in dry years. These facts should cause DWR to pause before it considers adopting contract changes that will encourage even greater reliance on the Delta
- Rather than adopt the amendments as proposed, which will increase demands on the fragile Delta, DWR should fully analyze an alternative that maintains the urban drought safeguards, provides a reassessment of the capacity of the SWP, utilizes the Kern Water Bank for drought mitigation and environmental restoration, and establishes other incentives to reduce demands on the Delta.
- If DWR nevertheless decides to move forward with the SWP Amendments, the DEIR should condition implementation of the Amendments on a package of mitigation measures designed to redress the impacts anticipated to result from the Amendments.

We look forward to your responses to our comments and questions.

Regards,



Barbara Vlamis, Executive Director

## **4 Assessment of Water Management Strategies**

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A wide range of water management strategies has been considered for the Sacramento Valley IRWMP. These strategies, which are based on the 20 water management strategies identified by the Department, are presented in response to the objectives identified in Chapter 2 of this IRWMP. In turn, the strategies outlined below also account for “resource management strategies” used in the California Water Plan. As defined in the California Water Plan, a strategy is “a project, program, or policy that helps California’s local agencies and governments manage their water and related resources.”

Water leaders in the region have formulated the region’s objectives and priorities through extensive discussions, negotiations, and agreements over more than a decade. Local governments and water purveyors have and continue to work closely with state and federal agencies, local water interests, and others to formulate projects and identify necessary future efforts to meet these objectives. The result of this work has been the development of projects recommended for implementation that are listed and summarized in Appendix A. These projects represent the current collection that is considered technically, economically, and environmentally feasible while ensuring each project is consistent with and supports the IRWMP objectives and priorities identified and agreed on for the region. As the participants in the IRWMP process continue to work together and gain additional participants, the package of projects and proposed actions will continue to grow in response to local and regional needs in accordance with the IRWMP objectives.

### **4.1 Water Management Strategies**

The following summarizes the valley’s current and future state with respect to 20 different water strategies, including those strategies that are currently considered to not be directly applicable to the region. The California Water Plan Update 2005 also identifies 25 resource management strategies, many of which are directly applicable. It is the intent and desire of the participants in this IRWMP that the ongoing planning process identified in this IRWMP continue to drive and develop regionwide policy. These policies, recommendations, and priorities are intended to inform the Department, and other water resource agencies such as Reclamation, of regional needs to support these agencies’ planning (including Bulletin 160 updates), prioritization, and funding recommendations and support.

Some water management strategies, such as “groundwater management” and “conjunctive use” have been combined into one discussion because of their similarity with respect to this IRWMP. Others, such as “water supply reliability” are included in this IRWMP as an objective rather than a “strategy” because many of the strategies discussed below support improving water supply reliability. Lastly, some strategies, such as “water conservation” are incorporated into strategies relevant to existing efforts in the region. In this case, the term

“system improvement” is used to reinforce potential water district/company facility or operational improvements that could be implemented to improve overall water management flexibility.

In support of these strategies, a number of water management planning efforts are currently proposed or underway across the region that are designed to advance and enhance the management of the region’s surface water and groundwater resources. These plans, investigations, or projects generally span numerous water management strategies and, in many cases, represent an initial stage of exploration and coordination. Appendix A lists such efforts proposed to date. Table 4-1 (at the end of this section) identifies which IRWMP objectives are met and which water management strategies are addressed for each effort/project.

#### **4.1.1 Groundwater Management and Conjunctive Management Strategies**

A central part of the IRWMP is to preserve the region’s groundwater resources for the long-term viability of the region’s economic prosperity and environmental well-being. Local public agencies have adopted groundwater management plans under the AB3030 process (Water Code Section 10750 et seq.) and other specific authorities. Additionally, counties across the region have adopted groundwater ordinances designed to protect the health and welfare of the citizens within these areas. As a result of legislation in 2002 (SB1938), these local public agencies are now undertaking more comprehensive efforts to manage groundwater, including the development of BMOs and more extensive monitoring. Many of the region’s local entities have plans in place that are consistent with SB1938, and others are working toward compliance.

For the past 5 years, these various agencies, water districts, and local interests have been developing integrated regional water monitoring and management to evaluate and better understand the groundwater resources in the region and to promote active groundwater management. This integrated management, by coordinating the local public agencies’ efforts to protect and manage the groundwater resources in the region, will provide stability that will be critical to meet the water supply needs for farms, cities, fish, and waterfowl.

Conjunctive water management and monitoring is an increasingly key water management strategy to assist in improving water supply reliability across the region. As discussed in Section 6, Land and Water Use/Development Trends, groundwater use is anticipated to continue to increase across the valley associated with urban development and conversion to orchard crops. Each of the following program areas is critical to better understanding the groundwater resources in the Sacramento Valley. Together, these various actions will help foster improved knowledge and significantly enhance the ability of all of the water managers to cooperatively manage the shared resources in a manner that is economically and environmentally sustainable. Most importantly, this approach is intended to avoid conflicts among Sacramento Valley groundwater pumpers and to ensure local guidance in (1) the further development of local groundwater management as well as (2) the appropriate local mechanisms to avoid adverse impacts to groundwater resources. Additionally, coordination

of local activities to address regional and statewide issues will remain vital. All actions and investigations will continue to need to be coordinated with local, state, and federal agencies to share information and ensure compliance with all applicable ordinances, BMOs, and laws.

#### **4.1.1.1 Groundwater Monitoring**

This IRWMP intends to build on the existing monitoring network in the valley to gain a better understanding of the groundwater resources. Groundwater monitoring is an integral part of this program for the region to ensure the proper management and protection of the resource. A list of proposed or ongoing groundwater management and monitoring programs is provided in Appendices A and B to this IRWMP. These programs and projects include groundwater monitoring well pilot programs and the installation of recommended monitoring wells.

Balanced development and operation of a conjunctive water management project requires well-designed and well-managed monitoring and data management. Objectives of monitoring and assessment include the following:

- Promote development and operation of facilities to avoid impacts.
- Enable adjustments in operation to avoid or mitigate impacts (adaptive management).
- Assess and evaluate performance of the conjunctive water management project.
- Encourage cooperation among valley entities by providing a common data pool for analysis and decisionmaking.
- Monitor and assess data collection, storage, and analysis capabilities. Data will originate both from monitoring facilities developed as part of the Sacramento Valley IRWMP implementation and from coordinating with ongoing Department and county efforts across the region.

The groundwater management and monitoring program under the Sacramento Valley IRWMP is a continued ambitious effort to improve local and regional water supply reliability in accordance with the objectives identified in Section 2, Sacramento Valley IRWMP Objectives. The proposed IRWMP Performance and Monitoring Plan is included as Appendix B.

#### **4.1.1.2 Groundwater Recharge**

The Sacramento Valley IRWMP recognizes that groundwater recharge is an important issue that merits additional investigation across the valley. Phase 1 recharge activities involve identifying natural recharge areas, identifying the most promising new recharge areas, and developing specific programs to protect existing recharge areas. Phase 2 of the recharge program will focus on measures to protect and enhance recharge capacity of the basin, including construction of recharge facilities. Among the investigations being proposed is the

joint Tehama and Butte County monitoring and recharge effort that will include assessment of potential recharge areas and characteristics, including with respect to the Lower Tuscan Formation. Groundwater recharge activities are being conducted in conjunction with activities being undertaken across the region and are discussed further in Section 6, Land and Water Use/Development Trends.

#### **4.1.1.3 Groundwater Modeling**

Hydrologic experts have developed numerous models in the Sacramento Valley. These models can assist in a better understanding of existing groundwater resource conditions and how these resources would be expected to respond to a variety of situations. The Department, working with the local interests, is undertaking a review of these models and others in the Sacramento Valley to determine how these models can best be used in the future to help decisionmakers make informed decisions to ensure the wise use and sustainability of this resource. This review summary will help inform future efforts toward the development and appropriate use of models throughout the region.

#### **4.1.1.4 Groundwater Production**

Thousands of production wells use groundwater throughout the Northern Sacramento Valley, including more than 335 wells in the Lower Tuscan.

As demands for Northern California water increase, additional production wells will be used to meet Northern California water demands and to help strategically protect the water rights and supplies in the region for all uses. With limited data in certain parts of the region, the groundwater use will be an important tool to better understand the aquifer characteristics. Numerous wells are currently or in the future will be used to ensure water supply reliability in Northern California and to explore the conjunctive management as part of broader water management objectives within the Sacramento Valley. This includes strategically placed production and monitoring wells to conduct aquifer performance tests.

#### **4.1.1.5 Regional Coordination**

To help advance these coordinated efforts for groundwater, a Coordinating Group has been meeting to better understand and manage the groundwater resources for the benefit of Northern California. The Coordinating Group is a forum convened by local governments, local water purveyors, groundwater users, conservation organizations, state and federal agencies, and other interested parties that overlie the groundwater resources in the Northern Sacramento Valley to coordinate their respective efforts to better understand and manage this important resource for the benefit of Northern California. Specific objectives of the Coordinating Group include the following:

- Inventory and maintain a working knowledge base on groundwater resources and identify critical information gaps.

- Formulate and conduct data gathering and investigations to build a credible body of knowledge about the groundwater resources.
- Prepare and distribute factual information to ensure that the public has an opportunity to become better informed about this important groundwater resource.
- Identify policy issues that need to be considered by or recommended to the respective entities in the region.

Additionally, the Coordinating Group will help facilitate and clarify the respective roles of the Department, special districts, and counties. This discussion may form the basis for an MOU or similar arrangement that will articulate the respective roles necessary for a cogent and coordinated integrated plan for groundwater management in Northern California.

#### **4.1.2 System Improvement/Water Conservation Strategies**

For this IRWMP, the system improvement strategy refers to potential projects or operational changes that will improve water management at the district or farm level, and actions that can be taken related to urban use. System improvement projects include canal lining, installation of facilities to reduce operational spills, or changes in management that can result in decreased river diversions or additional reuse of water.

The system improvement/water conservation strategies are designed to provide multiple benefits and serve multiple objectives. They provide for agricultural water recycling, water conservation, drainwater management, system automation, and associated water quality improvements. These types of projects help meet local and regional water supply needs, improve water quality, and enhance water system flexibility. Common elements among these strategies follow:

- They are locally formulated.
- They provide local/districtwide water supply reliability.
- They improve water system operation at the district level.
- They generally provide water quality benefits.
- They enhance district water system flexibility and system operations.

Numerous water use efficiency projects have been implemented recently, with additional projects seeking funding either underway or awaiting final approvals to proceed. A list of proposed projects formulated under system improvement strategies is provided in Appendix A.

In October 2002, NCWA, working with various agencies throughout Northern California, developed a regional agricultural water use efficiency program to encourage water use efficiency in the region and to help implement cost-effective local and regional programs to use water more efficiently. The regional program was based on meeting Quantifiable Objectives and/or Targeted Benefits established by CALFED and the Department. The

IRWMP provides an opportunity to further this regional water use efficiency program by a more detailed review of the potential opportunities and limitations for water use efficiency in the Sacramento Valley and then providing a framework for additional system improvements or other water use efficiency measures.

#### **4.1.2.1 Urban Water Management**

The Urban Water Management Planning Act of 1983 requires that every urban water supplier (public or private) who provides water for municipal purposes either directly or indirectly to more than 3,000 customers or supplies more than 3,000 ac-ft of water annually must prepare and submit to the Department an urban water management plan. The plan is to be updated at least every 5 years. Urban water management plans include the area served, quantity and sources of water, groundwater management plans, and future supply and demand projections. The Department reviews all submitted urban water management plans. All cities across the region have prepared these plans, and many urban purveyors have also completed and are implementing water master plans that guide their provision of water services.

#### **4.1.2.2 Agricultural Drainwater Recycling and Management**

Drainwater management, in the form of controlling releases of drainwater from fields, reusing drainwater for onfield irrigation, and monitoring inflows to and outflows from drains, is a common practice in much of the Sacramento Valley. On a subbasin or larger scale, the management actions of the farmers within the individual districts can result in major cumulative influences on regional hydrology. These influences could include changes in river diversions (reduced or increased diversions as drainwater supplies change relative to irrigation demand); changes in flow rates in many natural sloughs, streams, and drains; the creation of habitat along the watercourses; and water quality and temperature effects at points of discharge to receiving waters. In addition to these influences on regional hydrology and habitat, drainwater management provides critical, regional-scale benefits by increasing the overall subbasin efficiency through repeated use of field tailwater runoff.

All of these impacts and benefits result from the largely independent actions of many irrigators who respond daily to changes in their local water supply and demand conditions. With some level of regional coordination, drainwater management could be expanded in conjunction with actions to address the water quality of return flows and other regulatory issues. The most logical and effective geographic unit for regional drainwater management appears to be the hydrologic subbasin. The following are the key objectives and related benefits of a regional drainwater management program:

- Improved measurement of drainage flows.
- Improved water quality sampling and real-time monitoring.
- Coordinated management of drainwater flow rates.
- Increased water management flexibility and potential for benefits.

### **4.1.3 Flood Management, Stormwater Capture, and Management Strategies**

Major flood and/or stormwater management activities are currently underway to improve flood protection in many critical areas across the region. Given recent disasters in other portions of the country, significant flood-related damage over the last decade throughout the region, and concerns related to climate change and the potential for greater flood risk, flood management is a priority issue for much of California. Managing flooding is vital for protecting private property and public facilities, and is often an element of surface water storage projects. An array of flood management actions/projects are being planned under the flood management strategies for the region. These include activities authorized by the Sacramento River Flood Control Project and the Sacramento River Bank Protection Project; various efforts conducted by YCWA and Sutter County on the Yuba and Feather Rivers; the YCFCWCD; the Colusa Basin Drainage District (CBDD); and the numerous local projects undertaken by reclamation districts and other local entities such as Hamilton City. A large component of the Yuba County IRWMP now underway is the evaluation of flood management strategies for the Yuba and Feather Rivers. A list of flood management efforts for the region is provided in Appendix A.

### **4.1.4 Water Quality Protection and Improvement/Non-point Source Control**

Significant efforts are underway in the region to identify and address water quality issues. Agricultural water conservation, tailwater recovery, and reuse projects reduce return flows to streams and rivers and improve surface water quality. Additionally, groundwater monitoring and assessment strategies planned for the region include ensuring groundwater levels and quality are protected while agricultural tailwater recovery and water recycling, and water conservation strategies are implemented. The California Rice Commission and the Coalition are implementing a watershed approach to improve water quality in the region and to help implement the Water Board's Irrigated Lands Program. The coalitions continue to implement a monitoring and reporting program to improve water quality and address non-point source pollution control from irrigated lands and managed wetlands. The coalitions and the subwatersheds will also implement management practices to improve water quality in areas where water quality standards are exceeded. A summary of the Coalition's monitoring plan is included in the Performance and Monitoring Plan included as Appendix B to this IRWMP and can be viewed on the Internet ([www.svwqc.org](http://www.svwqc.org)). The coalitions will also coordinate with municipal entities in the region regarding their stormwater and effluent programs.

### **4.1.5 Conservation Strategies for the Sacramento Valley**

Conservation and enhancement of aquatic and terrestrial species and their habitats is a continued priority for the region. The overall proposed conservation strategy for the Sacramento Valley is presented in Section 5, Conservation Strategies, of this IRWMP. The following summarizes key subcomponents of the proposed strategy in the context of the three water management strategies related to species/habitat conservation. Ecosystem enhancement strategies are embedded in most strategies developed for the region as fully described in

Section 5, Conservation Strategies. These strategies include further advancing fisheries improvement programs and waterfowl and wildlife improvement programs, and developing ricelands habitat.

#### **4.1.5.1 Environmental and Habitat Protection and Improvement**

Environmental enhancement and habitat protection are fully integrated with most of the other water management strategies and projects for the region. As described in Section 5, Conservation Strategies, it is proposed that existing efforts and partnerships be continued and enhanced toward supporting additional ecosystem improvement and enhancement. Projects included as part of this IRWMP range from those that are anticipated to assist in improving water quality through re-managed flows to those that will help improve water quality through reduced river diversions. Those projects that are proposed to reduce diversions will also aid in meeting temperatures objectives for fish, as well as provide additional flexibility in meeting water quality objectives.

Installation of state-of-the-art fish screens at diversion points is a continuing priority along the Sacramento River and its tributaries to protect the fishery resources of the region while allowing water diversions for agricultural and urban uses. Numerous fish screens have been installed in the region, and additional fish screens are being planned and designed. A list of ongoing or recently completed major fish screen projects is provided in Appendix A to this IRWMP.

#### **4.1.5.2 Wetlands Enhancement and Creation**

The management and creation of wetlands is integrated with other water management strategies and is a component of various projects in the region. For example, levee setback projects and retention basins under flood control strategies are designed to create wetlands and habitat along the floodways. Providing conveyance capacity for wildlife refuges in the region ensures reliable water supplies for enhancement, creation, and preservation of the wetlands in the region. Section 5, Conservation Strategies, provides more detailed information about future wetlands enhancement actions.

#### **4.1.6 Surface Storage**

New surface water storage in the Sacramento Valley has been one of the most exhaustively considered regional water supply and management alternatives, primarily because of the significant potential benefits that new storage could offer. The CALFED Integrated Storage Investigation Program evaluated a wide range of surface water and groundwater storage locations throughout Central and Northern California, including in-Delta, south-of-Delta, and north-of-Delta locations. The two Integrated Storage Investigation projects that are most relevant to integrated planning in the Sacramento Valley are the Shasta Dam enlargement and the potential Sites Reservoir project.

When these two projects are considered as part of an integrated Sacramento River Basin water supply and management program, the following key questions need to be answered:

- Which projects are most likely to move forward, and what are the critical factors in determining their implementation?
- What is the framework, in terms of participating parties and institutional agreements, under which the projects will be financed, built, and operated?
- What will be the direct and secondary benefits and impacts on Sacramento River Basin water users?
- What are the costs of these benefits, and how do the unit benefit costs compare with other actions or alternatives?
- How do these projects tie in with or influence the effectiveness of other regional options under consideration?

These two surface storage projects represent major undertakings that will require additional detailed evaluation efforts, including regional water system (CVP and SWP) operations studies, site investigations, cost/benefit studies, environmental studies, and determination of an institutional framework to allow for implementation of these important and necessary projects.

In addition to the Integrated Storage Investigation projects, a local surface water storage project is being developed in Yuba County. The Garden Bar Water and Power Project is located on the Bear River immediately upstream of Camp Far West Reservoir about 8.5 miles east of Wheatland in Yuba County. The Garden Bar Reservoir will have a usable storage capacity of approximately 250,000 ac-ft and a surface area of 2,000 acres at elevation 612 feet above mean sea level (msl). The Garden Bar Project will increase existing water supply deliveries by approximately 50,000 ac-ft. The project will also satisfy the peak power demands of area and reserve capacity requirements with an installed power generation capacity of 210 megawatts. In addition, the project could also provide instream flow benefits below Camp Far West Reservoir, residual flood control benefits resulting from increased storage capacity, and potential groundwater recharge.

#### **4.1.7 Water Recycling**

As agricultural, urban, and environmental water demands increase and constraints on developing new water sources tighten, water recycling is increasingly becoming a viable source of new water for the region. Water reclamation and beneficial reuse is a relatively mature practice in Southern California and much of the arid west. Recycled water as a water management strategy offers a new, relatively “drought-proof” source of supply that improves both the total water supply and the overall reliability of the supply.

The benefits of water recycling have been evaluated extensively by the Department's Recycled Water Task Force. The task force report, *Water Recycling 2030: Recommendations of California's Recycled Water Task Force* (2003b) identified the potential for 1.5 million ac-ft per year (af/yr) of recycled water statewide. Limited recycling of domestic wastewater is currently practiced in the Sacramento Valley, but the potential exists for the development of up to 80,000 af/yr of recycled water from domestic wastewater effluent by the year 2020.

Water recycling strategies are generally implemented at the local level but can have regional and statewide benefit by reducing surface water diversions and making that water available for other urban, agricultural, and environmental uses. These actions in turn can have a direct benefit to overall Bay-Delta water quality. Water recycling allows a local agency to avoid or reduce the costs of developing, treating, storing, and distributing additional potable supplies. Recycling can also reduce pollutant loads in receiving waters, aid in meeting TMDL requirements, and reduce treatment costs and concerns for downstream water purveyors.

#### **4.1.8 Land Use Planning**

Land use planning is an important tool to influence land development to promote economic health while ensuring adequate and reliable water supplies. Section 6, Land and Water Use/Development Trends, summarizes current and future land and water use projections and primary planning issues at the county level. This section was developed in close coordination with each of the eight counties within the region and summarizes current and future land and water use trends, where known. Key issues and knowledge of a given county's resources varies greatly depending on evaluations done to date and funding available to conduct such investigations. More detailed information about these strategies and specific projects developed to address land use issues can also be found in the subregional county IRWMPs either currently being developed or recently completed.

#### **4.1.9 Recreation and Public Access Strategies**

Most major recreation facilities in the region are operated and managed by state and federal agencies, and are not under the jurisdiction of the participants in this planning process. Local agencies in the region, however, are working to improve recreational facilities and to provide better public access where possible. An example of this is YCWA's New Bullards Bar facility. Significant improvements to this facility were recently made by YCWA, with the potential for additional recreation and public access improvements addressed in the Yuba County IRWMP. Potential management changes that potentially impact recreational opportunities along the Sacramento River, its tributaries, or water storage facilities that provide substantial recreational opportunities (e.g., Shasta Reservoir) will need to be tracked and evaluated.

#### **4.1.10 Watershed Planning**

Numerous local watershed efforts have and continue to be implemented in concert with various state and federal agencies. Local planning efforts have tended to be associated with key Sacramento River tributaries, including efforts along Mill, Clear, Stony, Deer, Cottonwood, Butte, Battle, and other creeks throughout the region. These grassroots efforts will continue depending on leadership, availability of funding, and continued membership commitment. Additionally, entities such as the CBDD have developed integrated watershed management plans to evaluate a range of management actions and structural/nonstructural measures to improve watershed health, assist in flood control, and enhance the environment.

#### **4.1.11 Water and Wastewater Treatment**

Cities, towns, and small to large municipalities continue to make improvements to existing wastewater and water treatment plants in response to continued urban growth and/or aging infrastructure. Depending on the size and funding capability of a given municipality, facility improvements and/or expansions can be difficult to fund. Project proponents will continue to seek assistance from sources including the State Revolving Fund to obtain grants or loans in maintaining and improving facilities. Continued maintenance of existing facilities in response to growth will continue to be an important factor in ensuring regional water quality in the Sacramento River and its tributaries.

#### **4.1.12 Water Transfers**

Improved management of water supplies for use within the Sacramento Valley is necessary to ensure that water can be put to reasonable and beneficial use to the maximum degree practicable within the area of origin, while at the same time protecting water rights, the environment, and the citizens that reside within the watersheds of origin. Water transfers can provide improved reliability, local and regional operational flexibility, and environmental benefits depending on the timing and quantity of the transfer. Most water transfers in the Sacramento Valley are intra-basin water transfers or neighbor-to-neighbor transfers. These transfers help the region meet its needs, particularly during drought periods. For example, the transfer of water is common in dry years among many of the Sacramento River Settlement Contractors through the Sacramento River Water Contractors' Association Project Water Pool, which was formed and has been active since 1974.

Additionally, increased environmental awareness and the enactment of various statutes such as the Central Valley Project Improvement Act (CVPIA) have increased the transfer of water for environmental purposes. An important part of the conservation strategy identified in Chapter 5 is an environmental water program that includes water acquisitions to help meet environmental needs within the region.

Water transfers to assist in meeting the water needs in other parts of the state have occurred, and will continue in response to need and ensuring regional needs are met. Water right holders within the region may pursue changes in its water rights as part of a strategic decision

to protect water rights, help provide flood protection to citizens and property within the region, and help contain costs for local landowners and businesses.

#### **4.1.13 Inapplicable Water Management Strategies**

Because of its setting, some forms of water management that are appropriate in other areas of California are not applicable in the Sacramento Valley at this time. Current water rights and availability in the Sacramento Valley do not necessitate the need for imported water other than through relatively local water transfers within the region. Desalination is also not a relevant water management strategy given the valley's location and relative costs.

## **4.2 Integration of Water Management Strategies**

The Sacramento Valley IRWMP presents a mix of water management strategies to address regional and statewide water issues. This approach emphasizes integration among projects presented under the IRWMP, integration in attainment of statewide and regional benefits, and integration of water management and land use planning. As presented above, a wide range of water management strategies and projects, from water supply reliability and quality improvements to ecosystem restoration and fishery protection, have been developed and evaluated for the Sacramento Valley IRWMP. These projects and strategies are designed to meet the objectives of improving regional economic health, water supply reliability and quality, ecosystem enhancement, and flood management across the region as identified in Section 2, Sacramento Valley IRWMP Objectives, of this IRWMP. In meeting these objectives, proposed projects and actions include continued investigations, coordination, and monitoring, all of which will be integrated to the extent appropriate for each project.

Integration within and across water management strategies will continue to be key to meeting the IRWMP objectives, as well as ensuring local support and project performance as the following examples illustrate:

- Integrated management of the region's surface water and groundwater resources could significantly improve water supply reliability for the region and California. Conjunctive management strategies that enhance water supply, together with use of surface water, recharge of groundwater basins, and monitoring and assessment of the resources, will assist in improving the region's water supply reliability while protecting the region's groundwater resources.
- Integration of groundwater monitoring and assessment strategies with conjunctive management strategies is key to ensuring stakeholder support and wise management of the resource.
- Integration of local water supply reliability strategies with water quality and water use efficiency strategies can improve water supply reliability while improving water quality. However, care must be taken to ensure that those that rely on drainwater from upstream sources are not adversely affected.

- Conjunctive water management and system improvement projects can be implemented to integrate water supply reliability with water quality and ecosystem restoration improvement strategies by providing additional water supplies for local use while also providing water for instream flows, ecosystem enhancements, and refuge water supplies.
- Integration of flood management and environmental and habitat improvement strategies such as the levee setback and flood retention basins can integrate flood management with the development of wetlands and wildlife habitat areas in the region.

### 4.3 Meeting Statewide Priorities

Strategies developed for the Sacramento Valley IRWMP are designed to meet local and regional needs while also assisting in meeting statewide priorities stated in this IRWMP. As stated previously, the objectives identified in Section 2, Sacramento Valley IRWMP Objectives, of this IRWMP include seeking opportunities to meet statewide needs and priorities assuming local and regional needs can be met. Among the programs and associated projects included in this IRWMP that help meet statewide needs is the implementation of the SVWMA. Implementation of these projects will help improve water supply reliability, increase in-river flows, and improve CVP and SWP flexibility to support making more water available to the Delta in late spring through early fall. Additionally, the SVWMA calls for the development of a Long-Term Workplan to evaluate regionally beneficial projects that could potentially result in water being made available to the Delta, including use by export interests, assuming local and regional needs can be met first. Appendix A identifies how each of the proposed programs/projects meets regional and statewide objectives while addressing the water management strategies.

An important initial planning process originally conducted to identify projects that could improve water management across the valley culminated with the completion of the *Sacramento Valley Water Management Agreement Short-Term Workplan*, released in October 2001. This process included local and regional interests as well as federal and state agencies and statewide water interests. The workplan identified numerous projects, programs, and necessary investigations or planning processes across the valley, many of which had been discussed or formulated through other ongoing local efforts throughout the region. These following types of projects, in turn, became the basis of this IRWMP:

- Water management (facilities or programs to use and monitor surface water and groundwater)
- System improvement (canal lining, tailwater recovery, or improved operations)
- Surface water/groundwater planning (monitoring, areawide inventory, or assessment)
- Institutional (regulatory hurdles including transfer of water within the region)

Regional long-term priorities include actions that might take more than 5 years to implement. These programs are more regional in nature and include the following:

- Advancing the regionalization vision described earlier
- Expanding short-term programs throughout the region
- Securing new surface storage (including Sites Reservoir and the enlargement of Shasta Dam)
- Conducting regional monitoring and measurement

In general, implementing regional options will need to meet the needs of regional water users, while providing environmental benefits such as improved temperature and flow conditions for aquatic species, protection of riparian or wetlands habitats, or improving surface water quality. Assuming these needs can be met, projects and programs that simultaneously make water available to meet statewide needs must be encouraged given local and regional support. Implementation on a regional or subbasin level will entail continued coordination with all relevant stakeholders, including the formation of regional coalitions, either through existing forums or through project-specific agreements.

**TABLE 4-1**  
Sacramento Valley IRWMP Objectives and Strategies/Projects

Project Title	Project Sponsor	Counties	Objectives					Related Water Management Strategies	
			Improve the Economic Health of the Region	Improve Regional Water Supply for Local Water Users, the Region, and California	Improve Flood Protection and Floodplain Management	Improve and Enhance Water Quality	Enhance the Ecosystem		
<b>Integrated Regional Planning</b>									
Redding Basin Water Resources Management Plan	Shasta County Water Agency	Shasta	X	X			X	X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, System Improvement/Water Conservation, Water Transfers, Water Quality Protection and Improvement/NPS Control, Land Use Planning
Butte County IRWP, Model Calibration and Water Use Forecast	Butte County	Butte	X	X			X	X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment
YCWA IRWMP	YCWA	Yuba	X	X	X		X	X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, System Improvement/Water Conservation, Flood Management, Water Quality Protection and Improvement/NPS Control, Land Use Planning
YCFWCWD IRWMP	YCFWCWD	Yolo	X	X	X		X	X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, System Improvement/Water Conservation, Flood Management, Water Quality Protection and Improvement/NPS Control, Land Use Planning
<b>Groundwater Management</b>									
Groundwater Modeling Program	Butte County	Butte	X	X					Groundwater Management and Conjunctive Use, Groundwater Management and Assessment
Colusa County Groundwater Management Plan	Colusa County and water purveyors	Colusa	X	X					Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
<b>Project Planning</b>									
Tehama-Colusa Canal Authority Canal Extension	TCCA	Tehama, Colusa, and Yolo	X	X			X	X	Groundwater Management and Conjunctive Use, System Improvement/Water Conservation, Water Transfers, Water Quality Protection and Improvement/NPS Control
Sacramento Valley Water Management Agreement Long-Term Workplan	NCWA/SVWMA Signatories	All	X	X	X		X	X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, System Improvement/Water Conservation, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control, Surface Storage
Stony Creek Conveyance Options/Constant-head Orifice Operations	TCCA	Tehama and Glenn	X	X				X	System Improvement/Water Conservation
Butte County Integrated Water Resources Program	Butte County	Butte	X	X	X		X	X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, System Improvement/Water Conservation, Water Transfers, Water Quality Protection and Improvement/NPS Control, Land Use Planning
Ricelands Habitat/Winter Flooding Program	Multi-district/landowner	Multi-county	X	X				X	Ecosystem Enhancement
Stony Creek/OUWUA Investigation	OUWUA	Glenn	X	X					Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, System Improvement/Water Conservation, Ecosystem Enhancement, Surface Storage
<b>Groundwater Monitoring and Assessment Projects</b>									
Lower Tuscan Monitoring, Recharge, and Data Management Element	Butte County	Butte and Tehama	X	X					Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
ACID Water Management Program, Phases 1c and 1d	ACID	Shasta	X	X					Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Glenn County Groundwater Monitoring Program	Glenn County	Glenn	X	X					Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control

**TABLE 4-1**  
Sacramento Valley IRWMP Objectives and Strategies/Projects

Project Title	Project Sponsor	Counties	Objectives				Related Water Management Strategies
			Improve the Economic Health of the Region	Improve Regional Water Supply for Local Water Users, the Region, and California	Improve Flood Protection and Floodplain Management	Improve and Enhance Water Quality	
Butte County Groundwater Monitoring Program	Butte County	Butte	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Implementation of the Groundwater Subcommittee Groundwater Monitoring Well Pilot Program	Various districts	All	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Colusa Groundwater Monitoring Program	Colusa County	Colusa	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Installation of Groundwater Monitoring Wells Recommended by SVWMP Groundwater Subcommittee (Phase I)	Department and local entities	All	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Joint Sutter Basin Groundwater Management Program	Sutter Mutual Water Company and RD 1500	Sutter	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Basin Management Objective Information Center	Butte County	Butte	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Cooperative Program for Groundwater Studies between the County of Glenn and the Colusa Basin Drainage District	Glenn County	Glenn and Colusa	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Stony Creek Fan Partnership Conjunctive Management Program	Orland Artois, Orland Unit, and GCID	Glenn	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
Tehama County Groundwater Monitoring	Tehama County	Tehama	X	X			Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
<b>Groundwater Production Projects</b>							
Lower Tuscan Water Supply Reliability Project	Butte County	Butte	X	X		X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Princeton-Codora-Glenn Irrigation District Water Management Project	Princeton-Codora-Glenn Irrigation District	Glenn	X	X		X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Provident Irrigation District Water Management Program	Provident Irrigation District	Glenn	X	X		X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
GCID Water Management Program	GCID	Glenn	X	X		X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
ACID Water Management Program Phase 2	ACID	Shasta	X	X		X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Collins/Bullards Bar Groundwater Substitution	Browns Valley Irrigation District	Yuba	X	X		X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Browns Valley Irrigation District Water Management Project	Browns Valley Irrigation District	Yuba	X	X		X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control

**TABLE 4-1**  
Sacramento Valley IRWMP Objectives and Strategies/Projects

Project Title	Project Sponsor	Counties	Objectives					Related Water Management Strategies
			Improve the Economic Health of the Region	Improve Regional Water Supply for Local Water Users, the Region, and California	Improve Flood Protection and Floodplain Management	Improve and Enhance Water Quality	Enhance the Ecosystem	
Maxwell Irrigation District Water Management Project	Maxwell Irrigation District	Colusa	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
RD 108 Water Management Project	RD 108	Colusa, Yolo	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
South Sutter Water District Conjunctive Water Management Program	South Sutter Water District	Sutter	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Natomas Water Management Project, Phase 1	Natomas Central Mutual Water Company	Sutter, Sacramento	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
River Garden Farms Water Management Project	River Garden Farms	Yolo	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Garden Highway Mutual Water Company Water Management Program	Garden Highway Mutual Water Company	Sutter	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
RD 1004 Water Management Project	RD 1004	Colusa	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Meridian Farms Water Management Project	Meridian Farms	Sutter	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Pelger Mutual Water Company Water Management Project	Pelger Mutual Water Company	Sutter	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Pleasant Grove-Verona Mutual Water Company Water Management Project	Pleasant Grove-Verona Mutual Water Company	Sutter	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Feather Water District Water Management Project	Feather Water District	Sutter	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Plumas Mutual Water Company Water Management Project	Plumas Mutual Water Company	Sutter	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Sutter Extension Water District Water Management Project	Sutter Extension Water District	Sutter	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Water Management Project	Lewis Ranch	Colusa	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
<b>Groundwater Recharge Projects</b>								
Butte Water District Conjunctive Water Management Program	Butte Water District	Butte	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Yuba County Second Point of Diversion	YCWA	Yuba	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Wheatland Canal In-lieu Recharge Project	YCWA	Yuba	X	X			X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control

**TABLE 4-1**  
Sacramento Valley IRWMP Objectives and Strategies/Projects

Project Title	Project Sponsor	Counties	Objectives					Related Water Management Strategies
			Improve the Economic Health of the Region	Improve Regional Water Supply for Local Water Users, the Region, and California	Improve Flood Protection and Floodplain Management	Improve and Enhance Water Quality	Enhance the Ecosystem	
<b>Sacramento Valley Water Quality Coalition (Water Quality Projects)</b>								
Butte-Sutter-Yuba		Six locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Colusa Basin		Six locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
El Dorado		Two locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Lake-Napa		Three locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Pit River		Three locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Placer-Nevada-South Sutter/ North Sacramento		One location				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Sacramento-Amador		Two locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Shasta-Tehama		Two locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Solano-Yolo		Four locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Upper Feather River		Three locations				X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
<b>Agricultural Tailwater Recovery</b>								
Maxwell Irrigation District Integrated System Improvement Project	Maxwell Irrigation District	Colusa		X		X		System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Butte Water District Main Canal Automation Project	Butte Water District	Butte	X	X		X	X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Colusa Basin Drain Study	NCWA	Colusa County and Lower Sacramento River	X	X				Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Water Quality Protection and Improvement/NPS Control
<b>Wastewater Treatment and Reuse</b>								
Various projects listed in Table A-4	Multiple agencies	Sutter and Yuba	X	X		X	X	Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
<b>Agricultural Water Conservation</b>								
Browns Valley Irrigation District Dry Creek Pump Station	Browns Valley Irrigation District	Yuba	X	X		X	X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Paradise Ridge Water Supply Reliability Project	Butte County	Butte	X	X		X	X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
RD 1004 Canal Lining Project	RD 1004	Colusa	X	X		X	X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Lewis Ranch Canal Replacement Project	Lewis Ranch	Colusa	X	X		X	X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Sutter Mutual Water Company Irrigation Recycling Project	Sutter Mutual Water Company and RD 1500	Sutter	X	X		X	X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Sutter Mutual Water Company Canal Lining	Sutter Mutual Water Company	Sutter	X	X		X	X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
ACID Churn Creek Bottom Improvements, Phase 1b	ACID	Shasta	X	X		X	X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement

**TABLE 4-1**  
Sacramento Valley IRWMP Objectives and Strategies/Projects

Project Title	Project Sponsor	Counties	Objectives					Related Water Management Strategies
			Improve the Economic Health of the Region	Improve Regional Water Supply for Local Water Users, the Region, and California	Improve Flood Protection and Floodplain Management	Improve and Enhance Water Quality	Enhance the Ecosystem	
Deer Creek Irrigation District Long-term System Improvements Feasibility Investigation	Deer Creek Irrigation District	Tehama	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Deer Creek Irrigation District Near-term System Improvements Project	Deer Creek Irrigation District	Tehama	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Heritage Center Water-Wise Irrigation Demonstration Site Project	Placer County Water Agency	Placer	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
South Feather Water and Power Canal Seepage Reduction Program	South Feather Water and Power	Butte	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control
<b>Automation and Measurement Projects</b>								
ACID Main Canal Modernization Project	ACID	Shasta	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
GCID Flow Measurement Devices in Main Canal, Lateral System, and Drain Outflow Points/Automation Program	GCID	Glenn and Colusa	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Sacramento River Basinwide Water Management Plan Cooperative Water Measurement Study	Sacramento River Settlement Contractors/ Reclamation	Regional	X	X				System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control
Sacramento River Basinwide Water Management Plan Subbasin-level Water Management Study	Sacramento River Settlement Contractors	Regional	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Proposal for Utilizing GIS-Based Pesticide Permitting Application to Facilitate Advancing Water Management	Glenn County	Glenn	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control
Regional Water Measurement Program for the Feather River Service Area	BWGWD		X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Replacement and Automation of Elevation Control Structure 875	Western Canal Water District	Butte	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control
Yuba City Water Meter Retrofit Project	Yuba City	Sutter	X					System Improvement/Water Conservation
Tehama-Colusa Canal Automation Upgrade	TCCA	Tehama	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Yolo/Colusa Flow Lab.	YCFCWCD	Yolo	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control
Maxwell Irrigation District Integrated System Improvement Project	Maxwell Irrigation District	Colusa		X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Main Canal Automation	Butte and Sutter Extension Water Districts	Feather	X	X			X	System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
<b>Water Recycling</b>								
Regional Reclaimed Water Facilities Feasibility Study	Yuba City/Marysville/Linda County Water District	Yuba	X	X			X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement
Reclaimed Water Facility Upgrade, Marysville	City of Marysville	Sutter	X	X			X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement

**TABLE 4-1**  
Sacramento Valley IRWMP Objectives and Strategies/Projects

Project Title	Project Sponsor	Counties	Objectives				Related Water Management Strategies	
			Improve the Economic Health of the Region	Improve Regional Water Supply for Local Water Users, the Region, and California	Improve Flood Protection and Floodplain Management	Improve and Enhance Water Quality		Enhance the Ecosystem
Reclaimed Water Facility Upgrade, Linda County Water District	Linda County Water District	Yuba	X	X		X	X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement
Reclaimed Water Facility Upgrade, Yuba City	Yuba City	Yuba	X	X		X	X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement
Reclaimed Water Distribution System, Marysville	City of Marysville	Sutter	X	X		X	X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement
Reclaimed Water Distribution System, Linda County Water District	Linda County Water District	Yuba	X	X		X	X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement
Reclaimed Water Distribution System, Yuba City	Yuba City	Yuba	X	X		X	X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement
Yuba City Water Conservation Program	Yuba City	Sutter	X	X		X		System Improvement/Water Conservation, Water Quality Protection and Improvement/NPS Control, Ecosystem Enhancement
Agricultural Reclaimed Water Distribution System, Yuba City	Yuba City	Sutter	X	X		X	X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement
Joint Reclaimed Water Conveyance Project, Yuba City and Linda County Water District	Yuba City/Linda County Water District	Sutter	X	X		X	X	Water Recycling, Water or Wastewater Treatment, Ecosystem Enhancement
<b>Ecosystem Restoration (Fish Screen and Fish Passage Projects)</b>								
Red Bluff Diversion Dam	TCCA	Tehama					X	Ecosystem Enhancement
Meridian Farms Fish Screen	Meridian Farms Water Company	Sutter					X	Ecosystem Enhancement
Natomas Fish Screen	Natomas Central Mutual Water Company	Sutter/Sacramento					X	Ecosystem Enhancement
Pleasant Grove-Verona Fish Screen	Pleasant Grove-Verona Mutual Water Company	Sutter					X	Ecosystem Enhancement
Fish Screen	RD 2035	Yolo					X	Ecosystem Enhancement
Fish Screen	Bella Vista Water District	Shasta					X	Ecosystem Enhancement
Fish Screen	Small Diversion Fish Screen Program	Multiple					X	Ecosystem Enhancement
Yuba South Canal Fish Screen	YCWA	Yuba					X	Ecosystem Enhancement
Feather Water District Fish Screen	Feather Water District	Sutter					X	Ecosystem Enhancement
Yuba City Water Supply Phase 1 Fish Screen Project	Yuba City	Sutter					X	Ecosystem Enhancement
Fish Screen	South Sutter Water District	Sutter					X	Ecosystem Enhancement
Fish Screen	White Mallard	Colusa					X	Ecosystem Enhancement
<b>Wildlife Habitat Improvement</b>								
Implementation of the Lower Yuba Accord	YCWA	Yuba						
Yuba River Habitat and Restoration Conservation Project	Yuba County Resource Conservation District	Yuba						
<b>Flood Management Projects</b>								
Bear-Feather Levee Setback	Three Rivers Levee Improvement Authority	Yuba	X	X		X		Flood Management
Yuba-Bear Levee Improvement	Three Rivers Levee Improvement Authority	Yuba	X	X		X		Flood Management

**TABLE 4-1**  
Sacramento Valley IRWMP Objectives and Strategies/Projects

Project Title	Project Sponsor	Counties	Objectives					Related Water Management Strategies	
			Improve the Economic Health of the Region	Improve Regional Water Supply for Local Water Users, the Region, and California	Improve Flood Protection and Floodplain Management	Improve and Enhance Water Quality	Enhance the Ecosystem		
Forecast-Coordinated Operations	YCWA	Yuba	X	X	X			Flood Management, Surface Storage	
Colgate Powerhouse Tailwater Depression	YCWA	Yuba	X	X	X			Flood Management, Surface Storage	
Yuba City Flood Control Projects	Yuba City	Sutter	X	X	X			Flood Management	
New Bullards Bar Reservoir Outlet Capacity Increase	YCWA	Yuba	X	X	X			Flood Management, Surface Storage	
Wheatland Flood Protection Improvement	City of Wheatland	Yuba	X	X	X			Flood Management	
<b>Stormwater Management Projects</b>									
Yuba City Stormwater Quality Improvement Project	Yuba City	Sutter					X	X	Flood Management, Ecosystem Enhancement, Water Quality Improvement
Design of Recharge/Detention Basins	Colusa Basin Drainage District	Glenn	X	X	X			X	Flood Management, Ecosystem Enhancement
<b>Surface Water Supply Reliability Projects</b>									
Shasta Reservoir Enlargement Study		Shasta	X	X	X				Water Supply Reliability, Flood Protection
Sites Reservoir Study		Colusa	X	X	X				Water Supply Reliability, Flood Protection
Magalia Dam	Paradise Irrigation District	Butte	X	X	X				Water Supply Reliability, Flood Protection
Garden Bar Water and Power Project	South Sutter Water District	Nevada, Placer, Yuba, and Sutter	X	X	X				Water Supply Reliability, Flood Protection
<b>Surface Water Delivery Systems</b>									
Wheatland Canal In-lieu Recharge Project	YCWA	Yuba	X	X			X	X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control
Yuba County Second Point of Diversion	YCWA	Yuba	X	X			X	X	Groundwater Management and Conjunctive Use, Groundwater Management and Assessment, Groundwater Recharge, Ecosystem Enhancement, Water Quality Protection and Improvement/NPS Control

Notes:  
 OUWUA = Orland Unit Water User's Association  
 NPS = non-point source

## 6.2 Tehama County

The following summarizes the local setting, current and future land and water use, and primary recommendations in the Tehama County area. Tehama County officials were interviewed and consulted as a part of the development of this IRWMP and identified the following key and/or highest priority water- and land use related issues (Ohlin, 2006):

- Potential groundwater impacts from urban development and protection of county groundwater resources.
- Lack of baseline groundwater information and the need for more monitoring (especially in the Redding Basin area of Tehama County).
- Potential development of the Lower Tuscan and Tehama Formations, and funding needed for further study and peer review of existing hydrogeologic data.
- Continued protection of water quality.
- Groundwater quality protection in the City of Corning.

### 6.2.1 Local Setting

Tehama County is located in the northern portion of the Sacramento Valley approximately midway between Sacramento and the Oregon border. The Sacramento River bisects the county. The western boundary is the Cascades Mountains, and the eastern boundary is the Sierra Nevada Mountain Range. The county consists of approximately 3,000 square miles and three incorporated cities: Red Bluff, Corning, and Tehama. The climate is typical of that found in the Central Valley, with summers being very warm and dry with mild, wet winters. The economy is based primarily on agriculture, including ranching, farming, and some timber production.

Tehama County is made up almost entirely of watersheds that feed the Sacramento River, and lies within the Sacramento Valley Hydrologic Region. Hydrologic regions are defined as “major drainage basins” by the California Water Plan. However, the western edge of the county contributes a small amount of drainage to the North Coast Region.

Agriculture and irrigated lands are the dominant land use in Tehama County along the Sacramento River. The RBDD, constructed in 1964, is on the Sacramento River just downstream from the City of Red Bluff. From this diversion, the TCCA conveys CVP water to 17 districts, which serve approximately 300,000 acres of farmland in Tehama, Glenn, Colusa, and Yolo Counties (TCCA, 2003). In Tehama County, approximately 6,000 acres are irrigated with CVP water from the Tehama-Colusa and Corning Canals.

Significant groundwater resources lie beneath Tehama County. Ninety-eight percent of public drinking water comes from groundwater sources. The northernmost portion of Tehama County overlies the southernmost part of the Redding Groundwater Basin. The southern

boundary of the Redding Basin is the Red Bluff arch in Tehama County. The Red Bluff arch is an east-northeastern trending combination of folds and a fault, which forms the northernmost barrier to groundwater flow in the Sacramento Valley Groundwater Basin. Because of this, the groundwater issues in the Redding Basin are different from the issues in the Sacramento Valley Groundwater Basin. Most of the remainder of the county overlies the Sacramento Valley Groundwater Basin, which extends several counties to the south along the Sacramento River.

Numerous water agencies and districts oversee the provision and development of water supplies in Tehama County. These include the following agricultural water purveyors, urban water purveyors, agencies with flood management responsibilities, and agencies with land use management responsibilities:

- **Agricultural Water Purveyors**

- Proberta Water District
- El Camino Irrigation District
- Thomas Creek Water District
- Corning Water District
- Stanford Vina Ranch Irrigation Company
- Deer Creek Irrigation District
- Los Molinos Mutual Water Company
- Anderson-Cottonwood Irrigation District
- Thomas Creek Water Users Association

- **Urban Water Purveyors**

- City of Red Bluff
- City of Tehama
- Gerber-Las Flores Community Services District
- City of Corning
- Rio Alto Water District
- Mineral County Water District
- Golden Meadows Estates Community Services District
- Los Molinos Community Services District

- **Flood Management Agencies**

- Tehama County Flood Control and Water Conservation District (FCWCD)
- Tehama County Building and Safety Department
- U.S. Army Corps of Engineers
- California Department of Water Resources

- **Land Use and Resource Agencies**
  - Tehama County
  - Tehama County Resource Conservation District
  - Vina Resource Conservation District

### **6.2.2 Land Use Patterns**

The majority of land use in the county is nonirrigated agriculture (ranch and grazing land), or other (timber or barren lands). Urban development is relatively limited, existing primarily in the Red Bluff and Corning areas and other small communities close to the Sacramento River corridor. Figure 6.2-1 demonstrates the relative gross values for the leading agricultural commodities in Tehama County.

Along the Sacramento River, agriculture and irrigated lands are the dominant land uses. Recent agricultural trends in Tehama County indicate an acreage increase in production of tree crops (almonds and walnuts) and a decrease in livestock. Between 2001 and 2004, cattle within the county have decreased from 79,000 to 66,000 (United States Department of Agriculture National Agricultural Statistics Service, 2006). Between 1998 and 2003, almond acreage increased by approximately 1,500 acres for a total of 7,426 acres, and an additional 2,300 acres of walnuts were planted in 2005, for a total of 15,587 acres. The trend towards increased acreage in tree crops results in additional groundwater demand.

Future urban growth is anticipated to be centered along the Interstate 5 corridor, which runs north-south through the center of the county. Tehama County urban land use grew by 1,733 acres between 1990 and 2002, from 9,811 to 11,544 acres. Large-scale housing developments (3,700 units, 3,950 units, and 1,200 units) are currently proposed in north-central Tehama County (northern end of the Sacramento Valley Groundwater Basin and in the Tehama County portion of the Redding Groundwater Basin). Urban growth is also expected surrounding existing urban centers of Red Bluff and Corning, including the South Avenue and Corning Road interchanges with Interstate 5.

### **6.2.3 Water Use and Water Supply Patterns**

In the early 1900s, Tehama County relied on surface water for most of its water demand. The CVP and completion of Shasta Dam and the Corning Canal allowed for surface water to be delivered to the west side of the Sacramento River in the county.

By the 1970s, two-thirds of irrigation water used in the county was derived from surface water supplies. Figure 6.2-2 shows the change in surface water and groundwater use over the years. However, since that time, CVP water has become more expensive, and demand has exceeded supply in some years. Other factors such as increased environmental water demands, water supply reliability, and changing land use patterns have also contributed to an increased reliance on groundwater. Many agricultural users are investing in micro-emitters or

similar high-efficiency watering systems that require a higher standard of water purity and more on-demand availability than surface water can supply. Small orifices become plugged with tiny debris that is inherently found in diverted river water, and the water needs to be delivered in an on-demand basis rather than by a weekly schedule.

By the 1990s, Tehama County was relying on groundwater for more than two-thirds of its irrigated land (Tehama County FCWCD, 1996). It is important to note, however, that local stream diversions are the second largest water source in the county, and the largest surface water supply (28 percent). Local stream diversions total 106,300 ac-ft in a normal year, and CVP surface water only accounts for 21,300 ac-ft (see Table 5-2 in the *Tehama County FCWCD Water Inventory and Analysis* [Department, 2003d]).

Nearly all of the municipal and industrial (M&I) suppliers depend solely on groundwater to deliver municipal water to their customers. There are approximately 10,000 groundwater wells in Tehama County, and groundwater pumping and recharge are very high-priority issues for the county (CDM et al., 2005). Concerns about potential development in recharge areas have been raised in recent years, and the further study of recharge areas is needed. A Proposition 50 grant funding proposal has been submitted for the Lower Tuscan Recharge Investigation Program. Preliminary mapping of recharge areas can be found in the *Northern Sacramento Valley (Four County) Drinking Water Quality Strategy Document* (Four-County Document; CDM, 2005).

Tehama County has an AB3030 groundwater management plan and is SB1938 compliant. The Tehama County Board of Supervisors passed a groundwater aquifer protection ordinance in 1994 (Ordinance 1617). The Tehama County FCWCD is working with the Department and local purveyors to implement an effective groundwater management plan. Figure 6.2-3 shows the distribution of groundwater wells in Tehama County.

The majority of Tehama County's groundwater resources come from the Sacramento Valley Region (Tehama County FCWCD, 2003); however, large-scale developments in the Bowman area will induce land use and water use changes in this formerly rural setting. Tehama County FCWCD is taking a proactive approach to monitoring groundwater impacts from large-scale development by requiring developers to install additional onsite monitoring wells.

The *Tehama County FCWCD Water Inventory and Analysis* indicates that overall total groundwater in storage in the county was in a declining trend from 1998 to 2002 during years of normal to above normal precipitation. The Department is presently analyzing the total water in storage for spring 2006.

#### **6.2.4 Existing and Ongoing Planning**

In the past decade, the Tehama County water purveyors have taken several steps toward preparing for future land use changes and their associated water demands. Table 6.2-1 summarizes recent planning documents. The Tehama County FCWCD has completed a

comprehensive study that examined water inventories and issues in the county. Included in the 2003 *Tehama County FCWCD Water Inventory and Analysis* are water management recommendations and water supply and demand scenarios for 75 and 100 percent dry-year cutbacks in CVP water in the county.

**TABLE 6.2-1**  
Existing and Relevant Tehama County Water Resource Planning Documents

<b>Planning Document</b>	<b>Description</b>	<b>Date Published</b>
Tehama County FCWCD Water Inventory and Analysis	Contains detailed water use analysis, groundwater analysis, and water management issue descriptions for Tehama County.	September 2003
Tehama County Small Water Systems Drought Vulnerability Study	Small water systems (small water users/groups not associated with larger municipal systems) inventory and drought analysis. GIS-based study provides tool for future management.	2005
Tehama, Butte, Glenn, and Colusa Four-Counties MOU	Agreement among common governing entities to participate in groundwater planning efforts.	March 2006
Tehama County Groundwater Management Plan	AB3030 Groundwater Management Plan.	1998
Sacramento River Basinwide Water Management Plan	Contains current and future water requirements for all Sacramento River diverters (includes portions of Tehama County).	October 2004
Northern Sacramento Valley (Four County) Drinking Water Quality Strategy Document	The Four-County effort is intended to develop and promote regional collaboration among Butte, Colusa, Glenn, and Tehama Counties to effectively coordinate drinking water resources and contribute to local, regional, and statewide water quality goals.	June 2005
Tehama County General Plan	General Plan.	Updating 2006
City of Corning Water Production Master Plan	Water plan to the year 2025.	
Ordinance 1617 "Aquifer Protection"	Prohibits the mining of groundwater, and requires a permit to move groundwater from one parcel to a noncontiguous parcel of ownership.	1994
Developing Groundwater Trigger Levels	Developing groundwater trigger levels to provide public awareness of groundwater levels in each of the 10 groundwater subbasins.	In progress
City of Red Bluff General Plan	Surface and groundwater resources section (2000-2020).	October 2000

Tehama County FCWCD is taking a proactive approach to groundwater monitoring in Tehama County. To date, the district has installed three 1,000-foot-deep multi-completion groundwater monitoring wells in three known areas of groundwater depression. The Service has donated several existing agricultural wells to be retrofitted into monitoring wells. The district has secured funding to instrument several existing Department multiple-completion

monitoring wells with pressure transducers and dataloggers to provide real-time water level data. Grant funds will be used to install additional monitoring wells in areas slated for large-scale residential developments. Hourly groundwater level data, including hydrographs, are available at the district's Web site (<http://www.tehamacountywater.ca.gov>). Furthermore, the Tehama County FCWCD is requiring these large-scale developers to include groundwater monitoring infrastructure in their construction plans. This includes installation of pressure transducers and dataloggers in the monitoring wells and collecting both baseline groundwater level data before construction begins and real-time groundwater level data after construction is completed to allow for evaluation of drawdown impacts due to groundwater production. Groundwater modeling is also required to help fulfill SB221 and SB210 and to track predicted effects compared to real-time demand of the project.

In 2005, the county completed a small water systems drought vulnerability study to determine which parts of the county are more susceptible to water shortage impacts. The study indicated that only six small water systems in the county are likely to be at risk in the event of drought. The Geographic Information System (GIS)-based study is now being used as a tool to help the county as it moves forward with water resources management planning.

In early 2006, the Counties of Tehama, Butte, Glenn, and Colusa signed an MOU that is commonly referred to as the "Four-County Agreement." This MOU is a voluntary agreement among these counties that share common groundwater resources to coordinate and cooperate with each other relating to water issues. The Four-County Document (2005) is an excellent example of water planning integration in the region. The Four-County Agreement highlights the primary water sources that link the four counties, including the Sacramento River that flows through each county, shallow alluvial aquifers, and the deeper Lower Tuscan Aquifer that underlies a portion of each county. Operational links include such common factors as groundwater quality and level monitoring programs, water resource studies, data and information management, county ordinance oversight, public education, and stakeholder interaction.

### **6.2.5 Plan Areas**

The *Tehama County FCWCD Water Inventory and Analysis* divided the county into 14 discrete inventory units for analysis (see Figure 6.2-4).

The Mountain Region West and Mountain Region East areas account for approximately two-thirds of the county acreage. The middle third of the county represents lands overlying groundwater basins and is divided into regions along groundwater basin boundaries. Many of the inventory units have been further divided into inventory subunits that are based primarily on political boundaries, of which many represent irrigation or water districts. A complete description of each inventory area and subarea can be found in the *Tehama County FCWCD Water Inventory and Analysis*.

### 6.2.5.1 Land Use Conditions

#### *Existing Land Use Condition (2006)*

Existing land use for each subunit was mapped and inventoried for the *Tehama County FCWCD Water Inventory and Analysis*. Detailed land use information for each subregion has been categorized and documented. Tehama County land use was mapped for the IRWMP using FMMP data. Land use categories were combined to reflect regional water use and urbanization patterns in the county. Tehama County land use is summarized in Table 6.2-2.

**TABLE 6.2-2**  
Existing Tehama County Land Use

Land Use Category	Acreage	% Change in 10 years <sup>a</sup>
Important Farmland <sup>b</sup>	245,445	3
Grazing Lands	705,674	-1
Urban	11,544	13
Other	870,610	0
Water	6,221	0

<sup>a</sup>Percent change over period 1992 to 2002

<sup>b</sup>Sum of Unique, Prime, Statewide, and Locally Important Farmland

Source: California Department of Conservation, 2002a

#### *Future Land Use Condition*

Future land use will occur in accordance with county and local plans. Interviews with local officials indicate that the majority of urban development will most likely occur in the far northern and southern portions of Tehama County along the Interstate 5 corridor. The areas that will see significant development will be the Bowman area in the far north near the community of Cottonwood, both east and west of Interstate 5, and the Corning area in the southern part of the county. The northern part of the county could see 9,000 additional homes or more in the next 10 years (Impact Sciences, Inc., 2006). The City of Corning expects to add approximately 1,700 new homes (about 60 percent population growth) by the year 2025 (Kimbrough, 2006). Corning City officials state that groundwater quality protection is the highest water management priority for the city. The City of Corning has an adequate supply according to the Corning Water Production Master Plan (Kimbrough, 2006). Corning does not allow new septic systems or private groundwater wells within the city, to protect groundwater quality.

### 6.2.5.2 Water Use Conditions

#### *Existing Water Use Condition (2006)*

In Tehama County, 98 percent of public drinking water comes from groundwater sources. (CDM, 2005). The *Tehama County FCWCD Water Inventory and Analysis* evaluated a dry-year scenario to see the affect on water supply sources and demands. Relative to an average

water year, water demand in a dry year from all sectors increases by 63,800 ac-ft (17 percent). Agricultural water demand and M&I demands typically increase during a dry year because of higher demand for irrigation of crops and landscape during summer months. Environmental water demand doubles in the areas near Mill and Deer Creeks, mainly because these areas participate in dry-year programs to benefit the environment. Conveyance losses decrease during a dry year because of the smaller surface water supply and less potential for percolation, evaporation, and spillage.

The composition of water supplies also changes during a dry year. Local surface water supplies decrease by 26 percent, and CVP supplies decrease by 47 percent, relative to an average year, because of lower precipitation and snowmelt in local rivers and creeks and related CVP contract curtailment provisions. Accordingly, groundwater use increases by approximately 32 percent to compensate for increased water needs and smaller surface water supplies. Supply shortages total approximately 31,000 ac-ft under the dry-year scenario.

Increased groundwater use mitigates a portion of the shortage; however, the county does not have adequate groundwater infrastructure to cover all water shortages. In general, areas with greater reliance on surface water supplies and relatively higher conveyance losses experience the larger shortages. Without the infrastructure, the cutbacks in CVP supply during a dry year create water shortages, generally in areas west of the Sacramento River. Drought along the east side of the river results in less stream diversion. Dry-year scenario supply and demands are summarized in Tables 6.2-3.

**TABLE 6.2-3**  
Summary of Water Supply Versus Demand in Dry-year Scenario

<b>Inventory Unit</b>	<b>Surface Water Supply (ac-ft)</b>	<b>Total Groundwater Supply (ac-ft)</b>	<b>Total Water Demand (ac-ft)</b>	<b>Total Water Shortage (ac-ft)</b>
Red Bluff East	5,000	91,200	98,500	2,300
Red Bluff West	100	3,900	4,100	100
Corning East	10,000	131,500	150,100	8,600
Corning West	1,300	1,100	4,300	1,900
Bend	2,200	400	2,600	0
Antelope	10,500	24,600	34,900	0
Dye Creek	25,000	9,500	44,400	9,900
Los Molinos	13,400	14,500	32,200	4,300
Vina	15,500	16,800	34,600	3,400
Bowman	13,600	3,900	17,900	400
Rosewood	1,300	1,400	2,600	0
South Battle Creek	6,300	2,400	8,700	0
West Mountain	0	300	300	0
East Mountain	6,900	200	7,100	0
<b>Total County</b>	<b>111,100</b>	<b>301,700</b>	<b>442,300</b>	<b>30,900</b>

Source: Tehama County FCWCD Water Inventory and Analysis

### ***Future Water Use Conditions***

Tehama County agencies and purveyors have been managing water and supplying high-quality water from surface water and groundwater sources for more than a century. Except in times of extreme drought, water supplies have been adequate to meet demand for the entire county. Current trends indicate that most future urban development will depend on a groundwater source to meet water demands. Agricultural demands that have historically used surface water might also trend toward groundwater in the future, depending on cropping trends and water efficiency system improvements.

## **6.2.6 Local Water Management Issues and Strategies**

### **6.2.6.1 Conjunctive Management and Groundwater Storage**

Groundwater management is a top priority for Tehama County. Significant groundwater resources lie beneath Tehama County. The Tuscan, Tehama, and Modesto Formations are high-profile geologic layers that lie beneath Tehama and surrounding counties. Tehama County has an AB3030 groundwater management plan and is SB1938 compliant. The Tehama County groundwater management ordinance was passed in 1994. The Tehama County FCWCD is working with the Department and local purveyors to implement an effective groundwater management plan. Tehama County FCWCD is taking a proactive approach to monitoring groundwater impacts from large-scale development by requiring developers to install additional onsite monitoring wells.

Conjunctive management is the coordinated operation of surface water storage and use, groundwater storage and use, and conveyance facilities to meet water management objectives. Conjunctive management strategies are used to improve water supply reliability, reduce groundwater overdraft, protect water quality, and improve environmental conditions. The county would like to obtain funding to explore possible recharge opportunities along the western slopes of the county in areas where significant outcrops can be found, and is participating in the Lower Tuscan Recharge Investigation in the eastern part of the county.

### **6.2.6.2 Floodplain Management**

Floodplain management in the county falls within the jurisdiction of the Tehama County Building and Safety Department. In January 1997, major storms throughout the state caused record flows in many Central Valley rivers, resulting in flooding and property damage. In Tehama County, the Sacramento River at Tehama Bridge reached 8 feet over flood stage. Over 1,000 feet of broken levee at Deer Creek resulted in \$2 million in damages and an additional \$1 million to repair private levees. Several areas are subject to flooding almost annually. The county is actively engaged with the U.S. Army Corps of Engineers regarding flooding and levee problems in the county. Tehama County FCWCD is responsible for maintaining the Deer Creek and Elder Creek levees. The Tehama County Flood Mitigation Plan is presently underway and is expected to be completed soon. System Reoperation – the Red Bluff Diversion Dam Problem.

The TCCA operates and maintains two canal systems owned by Reclamation: the Corning Canal and the Tehama-Colusa Canal. The Corning Canal is 15 miles long and serves three water districts in the county, and the Tehama-Colusa Canal is 110 miles long and serves 14 water districts, 6 of which are in Tehama County. The system was designed to divert water from the Sacramento River into the settling basin by virtue of a dam across the Sacramento River located in Red Bluff. Environmental concerns and regulatory requirements have altered the operational practices of the dam. Current regulations generally prevent the dam gates from being lowered until May 15. To overcome this limitation, current practice is to dam up Stony Creek in Orland and backflow water through canal gates that were actually intended to let water out of the canal into Stony Creek. Between the pumps on the Sacramento River at Red Bluff, and the reverse flow diversion at Stony Creek, the demands of irrigators have been met, but generally without any reserve. Diversions from Stony Creek are currently permitted between April 1 and May 15 and again between September 15 and October 29. The Stony Diversion depends on U.S. Army Corps of Engineers' operation of Black Butte Reservoir, which is primarily for flood control purposes and not irrigation. These two needs are not always compatible, and present operations do not provide TCCA with sufficient water diversion reliability or flexibility.

Since construction of RBDD, concern has been expressed regarding the dam's effect on both upstream and downstream fish migration. Over the years, the dam gates have been raised more frequently in an attempt to enhance fish passage, which has reduced the ability to divert irrigation water to the current 4-month (gates-in) operations from May 15 to September 14. During the remainder of the year, the dam gates are open. Studies show the current design of the fish ladders and the operations of the dam gates do not adequately allow passage of threatened and endangered fish species. At this time, National Marine Fisheries Service is finalizing the first stage of a listing of the green sturgeon as a threatened species. This listing will further emphasize the urgent need for an alternative method of diversion at Red Bluff because the green sturgeon is incapable of passing the RBDD.

Further complicating the reoperation of the RBDD is the impoundment of Lake Red Bluff that occurs when the dam gates are down. The potential loss of what is called Lake Red Bluff is a significant local concern. A draft EIS/EIR was prepared in 2002 to assess all options for reoperating the RBDD. To date, no additional operational changes have been made, and the RBDD continues to operate as described above.

Additionally, the TCCA is investigating the potential to extend the existing Tehama-Colusa Canal to provide high-quality water to urban uses in the Yolo and/or North Bay and Solano areas. This project could include a conjunctive water management/recharge component. The potential for this project, which would require extensive design, environmental, and right-of-way effort prior to construction, is being reviewed as to the potential benefits in relation to anticipated costs.

### 6.2.6.3 Water Conservation

The Tehama County Resource Conservation District operates a mobile irrigation lab that provides agricultural growers with important system information for management decisions. The mobile irrigation lab can identify problems with distribution uniformity and suggest solutions. An evaluation process is conducted with test protocols and evaluation software from the Irrigation Training and Research Center at Cal Poly. Through this service, growers learn to operate their systems more effectively and save water in the process. [Mobile lab evaluations are performed at no cost to growers.](#)

### 6.2.6.4 Ecosystem Restoration

The California Water Plan describes ecosystem (aquatic) restoration as “changing the flows in streams and rivers, restoring fish and wildlife habitat, controlling waste discharge into streams, rivers, lakes, and reservoirs, or removing barriers in streams or rivers so salmon and steelhead can spawn” (Department Bulletin 160-05). Ecosystem restoration improves the condition of the modified natural landscapes and biotic communities to provide for the sustainability and for the use and enjoyment of those ecosystems by current and future generations.

Tehama County is actively involved in many major ecosystem restoration programs, including the following:

- Battle Creek Salmon and Steelhead Restoration Program
- Cottonwood Creek Watershed Group Monitoring and Management Programs
- Deer Creek Spring-run Chinook Salmon Protection Program
- Deer Creek Water Exchange Pilot Program
- Numerous riparian rehabilitation projects along the Sacramento River

### 6.2.6.5 Recharge Area Protection

Butte County has proposed the Lower Tuscan Aquifer Monitoring, Recharge, and Data Management Program to be implemented in Butte and Tehama Counties. The following are goals of the project:

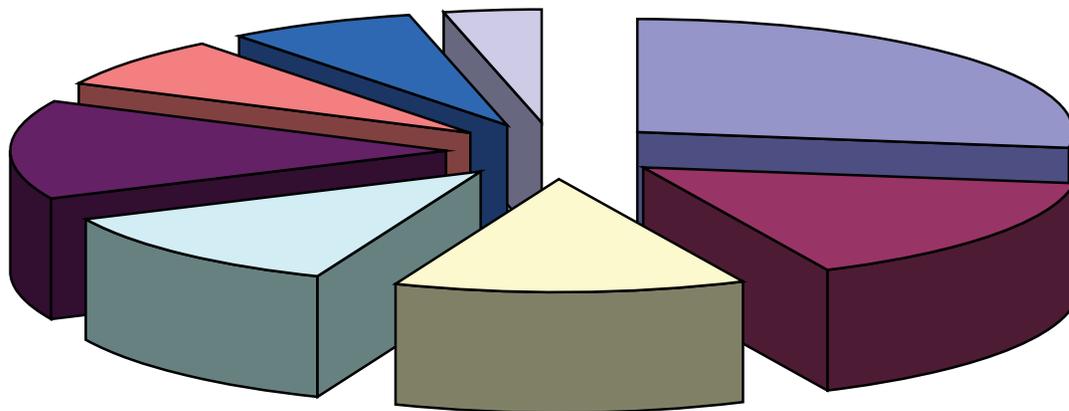
- Identify the geological makeup of the Lower Tuscan Aquifer
- Quantify the potential yield of the Lower Tuscan Aquifer
- Determine the aquifer system’s ability to meet the water needs of the local agricultural economy
- Examine the potential for conjunctive water management programs
- Educate the public to reduce potential local and regional conflict
- Foster regional coordination of water management

Element facilities will consist of several stream gauging stations and monitoring wells. The wells will be integrated into the Department-Butte County cooperative monitoring well network. In addition to installation of equipment and infrastructure, the Lower Tuscan Recharge Investigation project will entail the development of a comprehensive GIS database of water and resource management information for the four counties (Butte, Tehama, Colusa, and Glenn) that overlie the Lower Tuscan Aquifer. Further detail on the SVWMA and the project are provided in Section 1, Introduction, and Section 4, Assessment of Water Management Strategies, of this IRWMP.

### **6.2.7 Next Steps/Recommendations**

Next steps/recommendations are as follows:

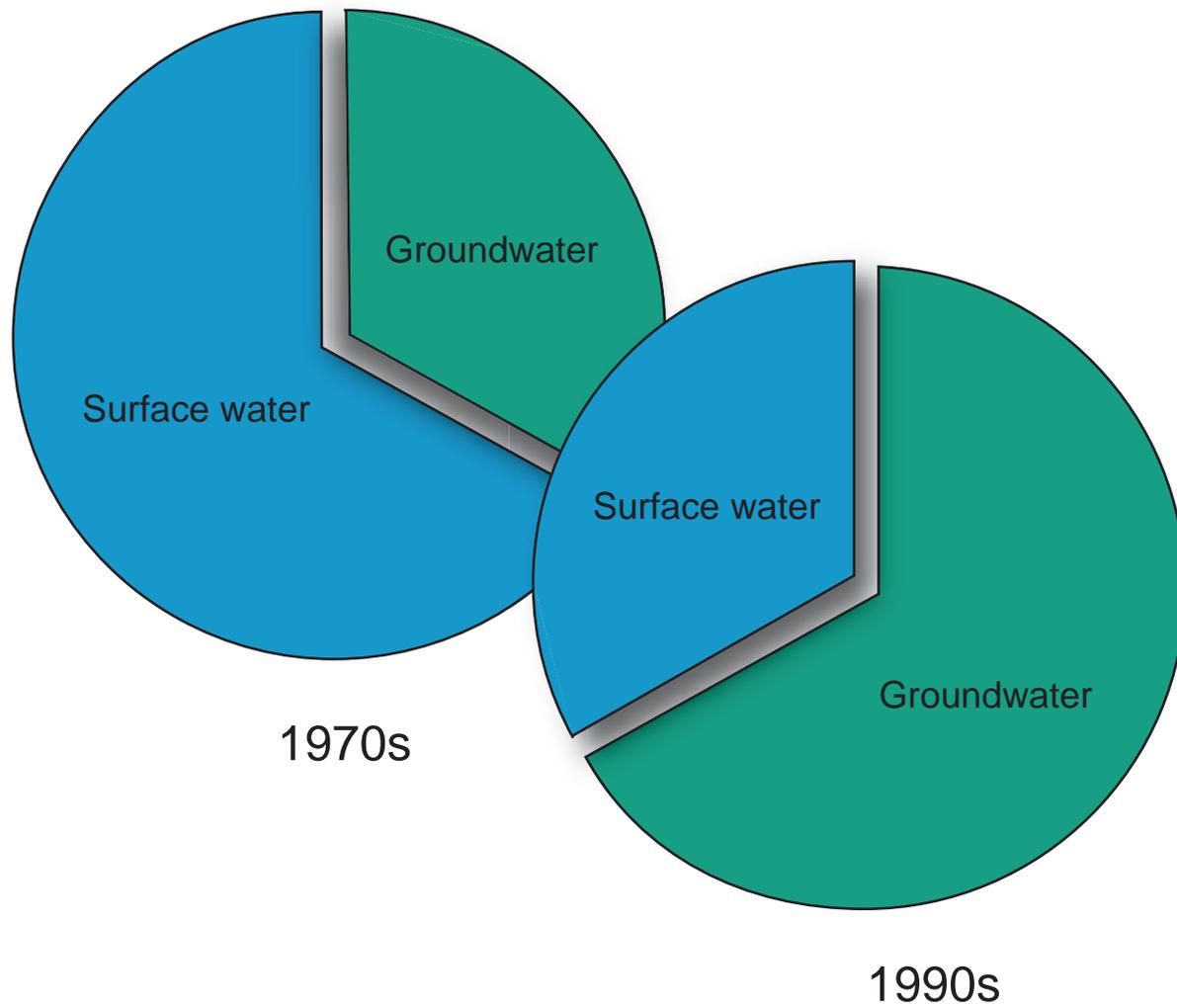
1. Implement the Lower Tuscan Recharge Investigation program.
2. Create a BMO database similar to Butte County.
3. Explore funding opportunities to develop a subsistence network.
4. Explore research opportunities and funding to expand knowledge base for the Tehama Formation.
5. Continue the cooperative effort with Glenn, Colusa, and Butte Counties to ensure reliable, high-quality drinking water, and work with the Coalition to promote management of agricultural runoff and discharge.
6. Continue to encourage agricultural uses and development through land use planning and policies.
7. Support existing efforts to evaluate flood potential and pursue funding to protect both urban and agricultural areas.
8. [Tehama County FCWCD] pursue a more coordinated effort with Tehama County Planning Department with respect to development and water supply.
9. Continue to support proposed projects within Tehama County as detailed in Appendix B to this IRWMP.



- Walnuts
- Almonds
- Plums
- Milk
- Cattle
- Pasture
- Olives
- Fruit and Nut crops

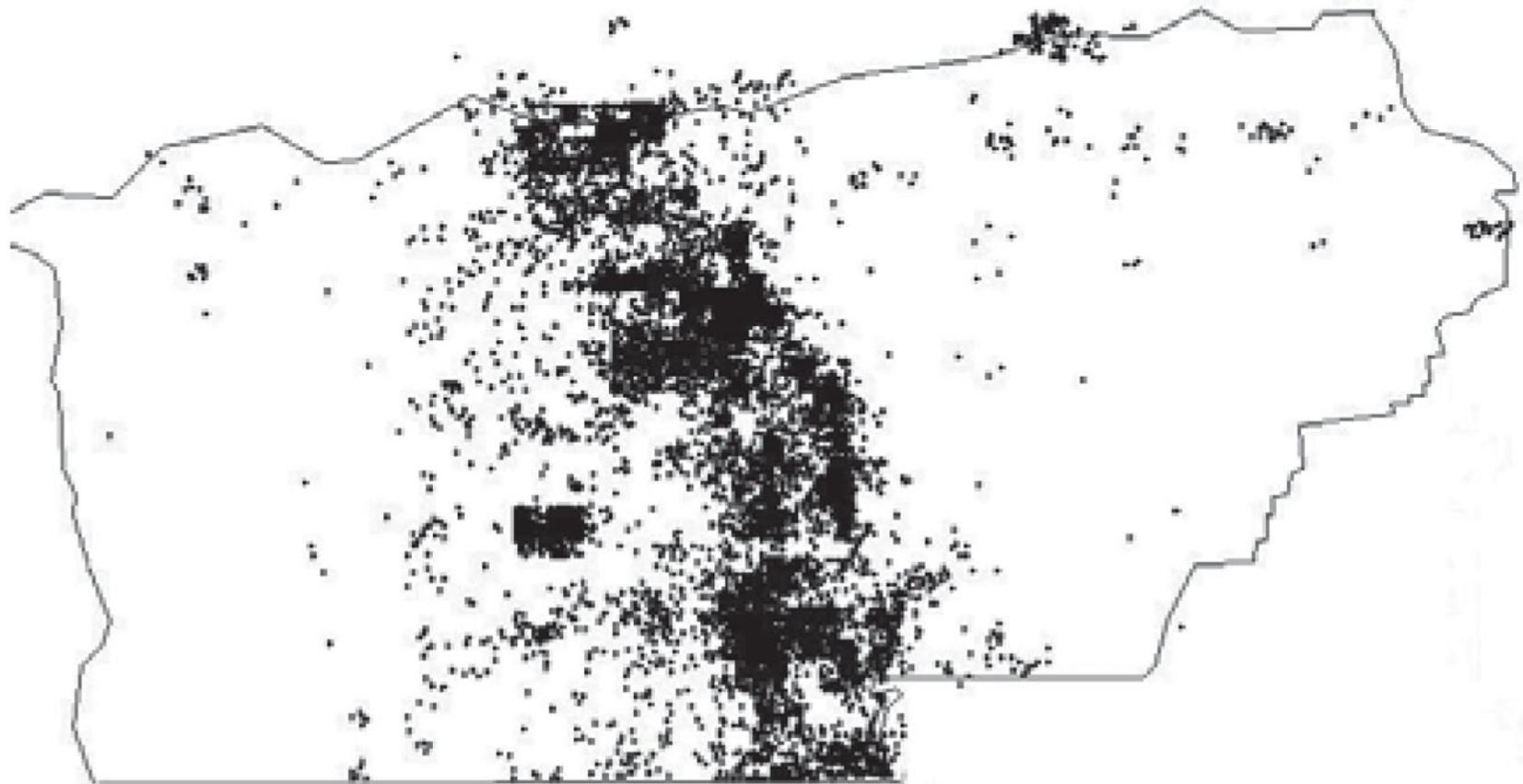
Source: United States Department of Agriculture National Agricultural Statistics Service, 2006a

**FIGURE 6.2-1**  
**TEHAMA COUNTY LEADING**  
**AGRICULTURAL COMMODITIES**  
 SACRAMENTO VALLEY IRWMP



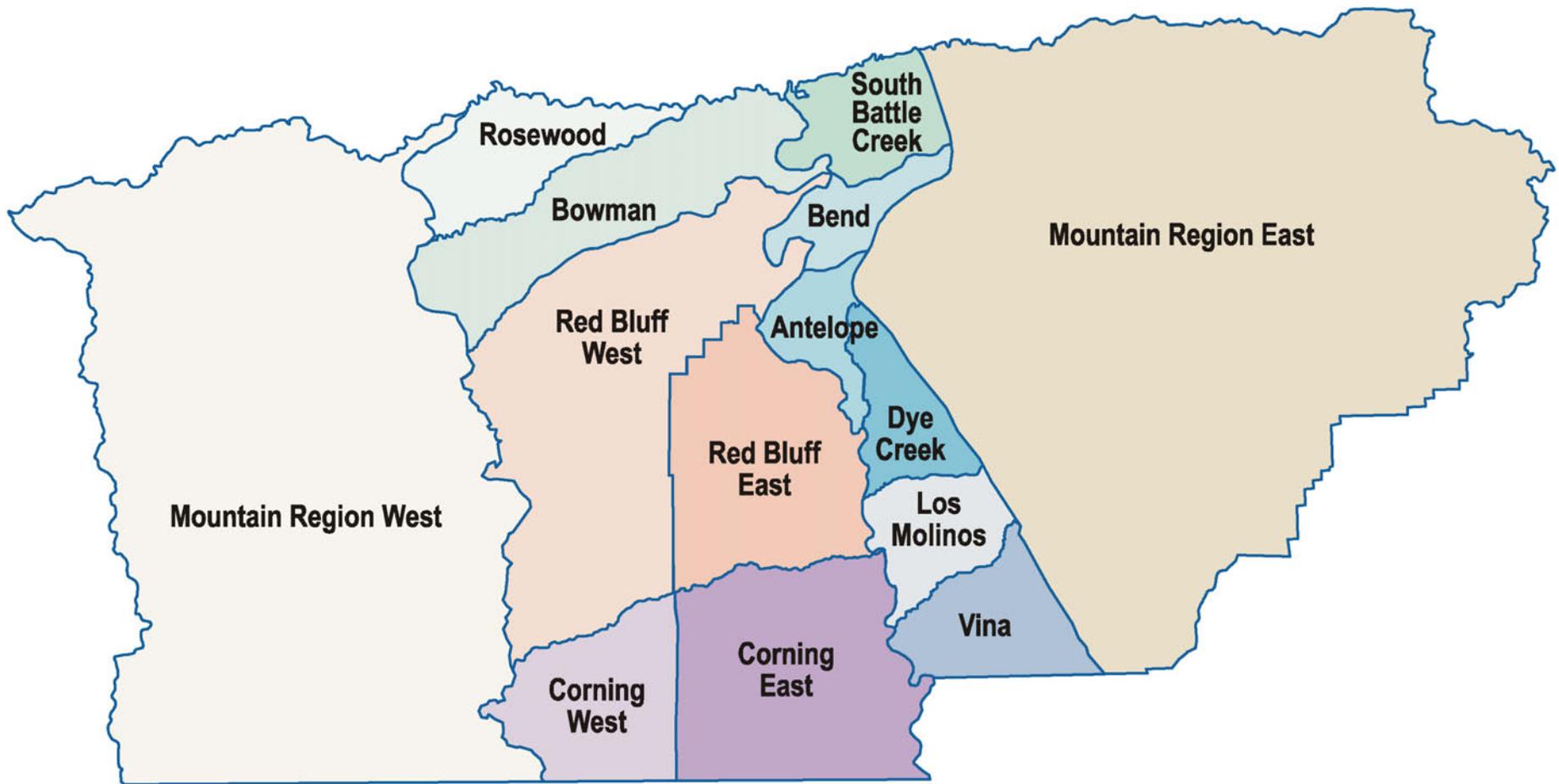
Source: Tehama County FCWCD Inventory and Analysis

**FIGURE 6.2-2**  
**CHANGE IN SURFACE WATER**  
**GROUNDWATER USE**  
 SACRAMENTO VALLEY IRWMP

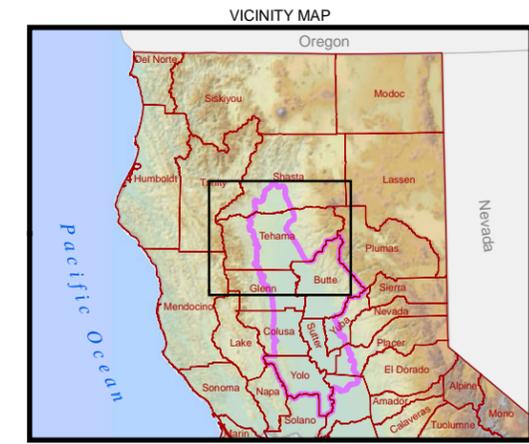
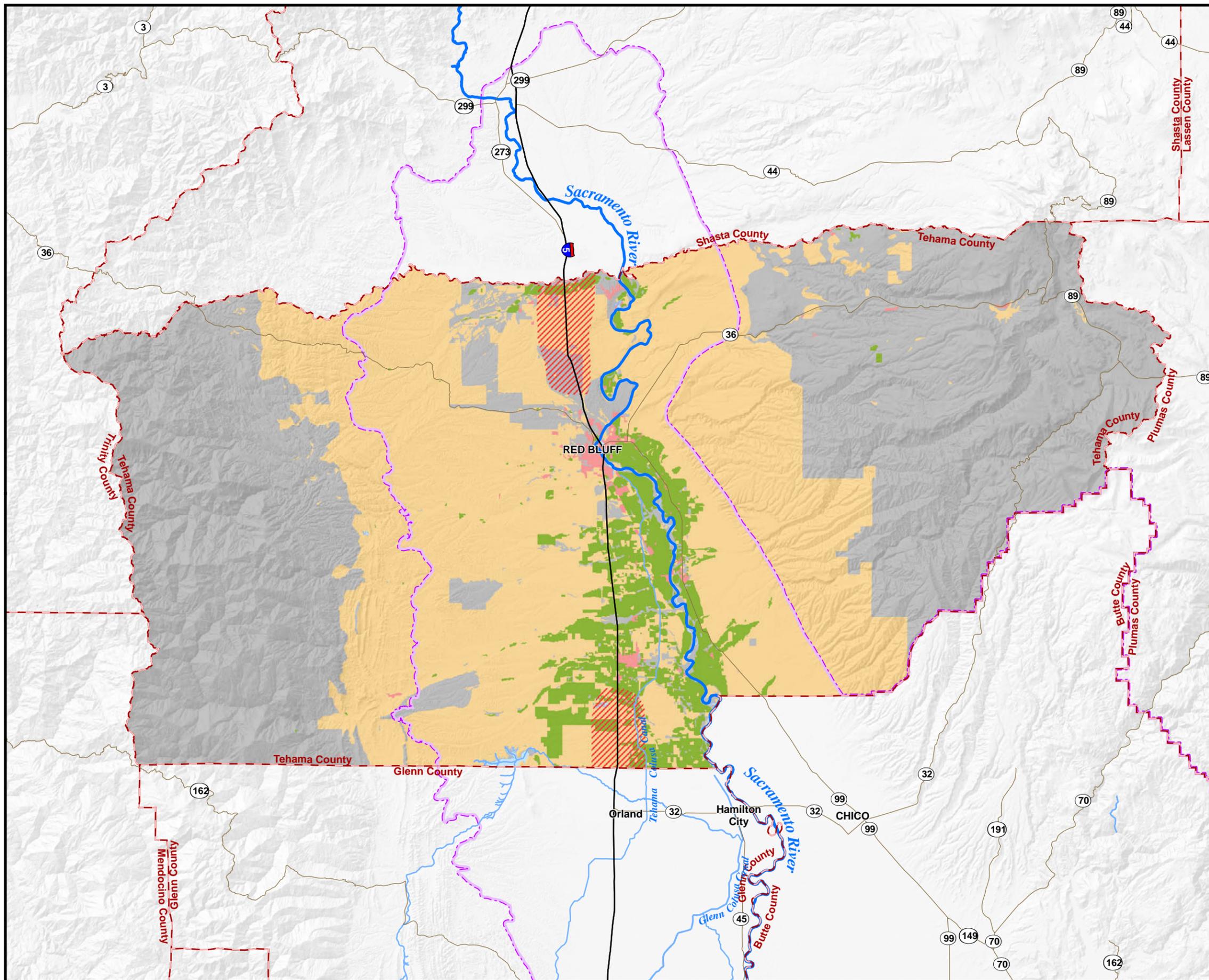


Source: Department of Water Resources

**FIGURE 6.2-3**  
**DISTRIBUTION OF GROUNDWATER**  
**WELLS IN TEHAMA COUNTY**  
SACRAMENTO VALLEY IRWMP



**FIGURE 6.2-4**  
**TEHAMA COUNTY INVENTORY UNITS**  
SACRAMENTO VALLEY IRWMP



- Legend**
- Interstate Highway
  - State / US Highway
  - River
  - Stream
  - ▨ Likely Future Development
  - - - County Boundary
  - ▭ Core IRWMP Region
- Current Land Use**
- Grazing Land
  - Irrigated Farmland
  - Other Land
  - Urban
  - Water

Source:  
 1. Land Use provided by Farmland Mapping and Monitoring Program - 2002, (Tehama County 2002).



**FIGURE 6.2-5**  
**TEHAMA COUNTY LAND USE AND**  
**LIKELY FUTURE DEVELOPMENT**  
 SACRAMENTO VALLEY IRWMP

## 6.3 Glenn County

The following summarizes the local setting, current and future land and water use, and primary recommendations in the Glenn County area. Glenn County officials were interviewed and consulted as a part of the development of this IRWMP and identified the following key and/or highest priority water- and land use related issues (Messina et al., 2006):

1. Increasing shift in agricultural water supply source from surface supply to groundwater
2. Development, use, reuse, and recharge of the Lower Tuscan Formation
3. Groundwater recharge
4. Increased residential development in Orland Unit Water User's Association (OUWUA) district area
5. Agricultural land conversion to smaller, rural residential parcels (1 to 10 acres)
6. Transfers in/out of the basin

### 6.3.1 Local Setting

Glenn County is located in the west-central portion of the Sacramento River Hydrologic Region. Primarily an agricultural area, Glenn County totals approximately 850,000 acres with 30 percent in agriculture and only 1 percent in urban uses (Wood Rodgers and Associates, 2003). A small portion of western Glenn County lies within the North Coast hydrologic region. In 2000, the population of Glenn County was approximately 26,500, with 50 percent in urban (small community) and 50 percent in rural/farm housing. By the year 2030, Glenn County is expected to see approximately 27 percent growth to about 34,300 (California Department of Finance, 2004).

The majority of irrigated agricultural land is in the eastern third of the county. Major crops include rice, deciduous orchard, and field crops. The largest urban areas are the cities of Willows and Orland, both of which are located along Interstate 5. Surface water provides the majority of supply, with groundwater being the primary source for users outside water districts as well as orchards. Conversely, 98 percent of Glenn County residents get their drinking water from a groundwater source, and the remaining 2 percent from a surface water source.

Numerous water agencies and districts oversee the provision and development of water supplies in Glenn County. These include the following agricultural water purveyors, urban water purveyors, agencies with flood management responsibilities, and agencies with land use management responsibilities:

- Agricultural Water Purveyors
  - Stony Creek Water District

- 4-E Water District
- Provident Irrigation District
- Princeton-Codora-Glenn Irrigation District
- Orland Unit Water User’s Association
- Orland-Artois Water District
- Kanawah Water District
- Glide Water District
- Glenn-Colusa Irrigation District
- Hunter Creek Water District
- Urban Water Purveyors
  - California Water Service Company (CWSC)
  - City of Orland
  - Black Butte Water Company
  - Elk Creek Community Services District
  - Butte City Community Services District
  - Artois Community Services District
- Flood Management Agencies
  - U.S. Army Corps of Engineers
  - Glenn County
  - California Department of Water Resources
  - Colusa Basin Drainage District
- Land Use and Resource Agencies
  - Glenn County
  - Glenn County Resource Conservation District
  - Public Trust Agencies

### **6.3.2 Land Use Patterns**

Urban and built-up land in Glenn County makes up only a small portion of overall land use. In 2002, urban and built-up lands accounted for less than 1 percent of total lands within the county (California Department of Conservation, 2002b; see Figure 6.3-1). Glenn County is presently experiencing a relative increase in housing development compared to historical trends.

County planners expect more new development and a number of new subdivisions in the future, including 1,500 residences in and around the City of Orland over the next 5 to 10 years, 60 residences in Hamilton City in the next 2 years, 1,100 residences and 40 acres of commercial development over 10 years in a new urban area between Orland and Artois, and 600 units adjacent to the City of Artois over 7 years (Four-County Document). The Glenn

County Planning Department has recently initiated an analysis of the number of parcels that might be available to develop under the current zoning structure (Walker, 2006). Future zoning regulations are always subject to change, but this analysis indicates that approximately 3,600 potential additional parcels could be created in the future within the present zoning restrictions. New Glenn County development will use groundwater as the primary drinking water source. The Glenn County General Plan is presently being updated and is expected to be completed in 2007.

Agricultural cropping trends are monitored by the county, and agriculture is by far the largest industry in the county. The 2005 gross production of agricultural commodities was valued at \$393.6 million. This represents an increase of 12 percent from the 2004 gross production value of \$347.9 million. For the first time since the 1930s, rice is currently not the number one leading commodity in Glenn County. Almonds have taken the lead with a production value of \$134.5 million. This is a 42 percent jump from 2004 because of a significant increase in value per ton and a slight increase in production. Walnuts and prunes also showed an increase, but olives and pistachios have declined (Black, 2006). Figure 6.3-2 shows the 10 leading agricultural commodities for the county in 2005.

Water from the Sacramento River is diverted into two major canals; the Glenn-Colusa Canal and the Tehama-Colusa Canal. Stony Creek is also an important source of surface water, supporting two reservoirs: Stony Gorge and Black Butte. The eastern portion of the county overlies the Sacramento Valley Groundwater Basin. Groundwater is the primary source of domestic water for the county and is also used for irrigation in some areas (QUAD Consultants, 1993)

Given virtually all land suitable for irrigated agriculture in Glenn County has already been developed, changes in agricultural water use are generally attributed to changes in crop mix and/or need for improved supply reliability. Agricultural water supply source (groundwater versus surface water) is one of the most significant considerations for water management in Glenn County (Messina, 2006). The current source of water for agricultural use is approximately 70 percent surface water and 30 percent groundwater. This ratio is anticipated to continue to move toward a greater proportionate use of groundwater, with county officials projecting an increase in groundwater use by agricultural users in the next 25 years. This increase is primarily because of the anticipated increase in orchards in the county and their typical associated reliance on groundwater, and anticipated in-/out-of-basin transfers by substitution.

Areas historically dependent on groundwater only experienced groundwater level declines during extended (multi-year) drought-year conditions, such as 1961 to 1963, 1976 to 1977, and 1987 to 1994. Following these extended drought periods, however, regional groundwater levels generally recovered. In fact, during and following the most recent drought period, GCID implemented conjunctive water management projects to meet local needs in 1992 and 1994 (up to 74,000 ac-ft of groundwater pumping in 1992, alone). Groundwater levels in

these pumping areas typically returned to pre-pumping conditions subsequent to winter recharge that replenished the groundwater basin.

Regional groundwater levels in the Stony Creek Project Area are currently relatively stable, and, from a regional perspective, the basin is presumed to be full (e.g., natural recharge is in balance or in excess of the basin's ability to accept it). Regardless of regional trends, however, some local areas where groundwater is relied on as a primary supply recover more slowly as a result of extended dry periods and increased pumping.

### **6.3.3 Water Use and Water Supply Patterns**

Orland along the foothills, west of the Orland Artois Water District (OAWD) service area boundary (Department, 2003c). This area has seen large increases in almond acreages in recent years, resulting in a gradual increase in demand for groundwater.

The greatest amount of natural recharge occurs in the Stony Creek area of Glenn County. The area has been a focal point of recent groundwater investigations and studied for possible groundwater recharge programs. Water balances completed for the *Stony Creek Fan Conjunctive Water Management Program Feasibility Investigation* estimate the project area contributes a net recharge to the area of approximately 1.1 ac-ft per acre per year. The Stony Creek partners, being primary surface water users, are largely responsible for this positive net recharge.

Water sources were mapped for the *Glenn County Groundwater Management Plan*.

Figure 6.3-3, from the Glenn County Groundwater Management Ordinance, represents 2001 surface water, groundwater, and mixed sources in the county (<http://www.glenncountywater.org/BMO.HTM>).

### **6.3.4 Existing and Ongoing Planning**

In the past decade, the Glenn County water resource planners have taken several steps toward preparing for future land use changes and their associated water demands. The Glenn County Water Resources Coordinator of the Department of Agriculture acts in a support role for the Board of Supervisors to identify exceedances in BMO water levels, quality, or land subsidence. A Water Advisory Committee and Technical Advisory Committee meet to help guide the decisionmaking process for the county. Members of the Water Advisory Committee and Technical Advisory Committee are appointed by and serve the Glenn County Board of Supervisors. The Glenn County Department of Agriculture is involved in the management of numerous water-related policies and programs, including Ordinance 1115, groundwater level monitoring, AB303-funded projects, and underground storage tank regulation. The Glenn County Department of Agriculture provides implementation support for Ordinance 1115, which adopted the *Glenn County Groundwater Management Plan*. *The goal of the Glenn County Groundwater Management Plan* is “to ensure the continued availability of groundwater and that extraction of groundwater does not exceed safe yield

based on the established BMOs” (Messina, 2005). The Glenn County Department of Agriculture administers the Water Advisory Committee, which developed the Glenn County Groundwater Management Plan and oversees implementation.

The Four-County Document details the results of an effort by Butte, Tehama, Glenn, and Colusa Counties to collaborate on a regional scale in areas where they currently share common operational practices and physical linkage. County water resource managers are currently facilitating activities in areas such as water resource studies, groundwater management, data and information management, county regulation and ordinance oversight, public education, and stakeholder interaction.

Table 6.3-1 summarizes existing planning documents for Glenn County.

**TABLE 6.3-1**  
Existing and Relevant Glenn County Water Resource Planning Documents

<b>Planning Document</b>	<b>Description</b>	<b>Date Published</b>
Ordinance 1115 BMO Groundwater Management Plan	A six-element BMO program with 17 subareas to monitor groundwater levels, subsidence, and solve disputes with groundwater management.	February 2000
Northern Sacramento Valley (Four County) Drinking Water Quality Strategy Document	A Butte, Tehama, Glenn, and Colusa County Document that provides an integrated approach to water quality management in the four-county region.	June 2005
Glenn County General Plan	General Plan (update in progress).	June 15, 1993
Impact of Urbanization in the Vicinity of Orland, California (LEGACI Grant)	A brief report concerning the Orland Unit and conversion in the area.	August 2005
Stony Creek Groundwater Recharge Study	A study along the Lower Stony Creek corridor to determine stream interaction and the effects it might have on recharge in aquifers underlying the county.	2003 and 2005
Lower Stony Creek Fish Monitoring Study	A Reclamation study to aid future water management and determine if entrainment occurs at the North Canal and CHO for the Tehama-Colusa Canal.	2004
Stony Creek Fan Conjunctive Water Management Program Feasibility Investigation	Includes description, supply, demand, and projections for the Stony Creek Fan Partners of GCID, OAWD, and OUWUA.	January 2006
Estimating the Potential for in Lieu Conjunctive Use Water Management in the Central Valley of California	A conjunctive use water management study by the Natural Heritage Institute involving Glenn County.	February 2002

### **6.3.5 Plan Area**

The January 2006 *Stony Creek Conjunctive Water Management Feasibility Investigation* includes a plan (project) area that encompasses most of the Glenn County portion of this IRWMP (see Figure 1-1; Grant David Associates, 2006). The range of the project Area is defined by the boundaries of the three partners – GCID, OAWD, and OUWUA – and extends from southern Tehama County, across Glenn County, to central Colusa County. The plan includes existing conditions and projections to the year 2025 for each of the partners. Table 6.3-2 summarizes the land and water use information and projections in the document for each area.

### **6.3.6 Local Water Management Issues and Strategies**

#### **6.3.6.1 Groundwater Management**

Groundwater management in Glenn County is conducted in accordance with the BMOs in the Glenn County Groundwater Management Plan. The county is highly engaged in protecting and monitoring groundwater resources. County officials are coordinating with surrounding counties in an effort to monitor any potential development of the Lower Tuscan Formation, and to ensure protection of recharge areas and groundwater quality.

#### **6.3.6.2 Conjunctive Management and Groundwater Storage**

The Stony Creek project area is defined by the boundaries of the three partners – GCID, OAWD, and OUWUA – and extends from southern Tehama County, across Glenn County, to central Colusa County. The Stony Creek Fan Conjunctive Water Management Program was initiated to evaluate the potential for conjunctive water management in the Stony Creek Fan area of Glenn County. To date, the project sponsors have developed a Phase I agreement to support this effort; an FI work plan was developed and is currently being implemented; development of an Integrated Groundwater and Surface Water Model was started; groundwater monitoring wells for a recharge test were installed; and a recharge test program was conducted. These activities are funded by a mixture of local funding and in-kind services, Conjunctive Water Management Branch service contracts (technical, modeling, and drilling), and by Department contracts with OAWD and GCID.

GCID is continuing to develop a conjunctive water management and monitoring program to supplement current surface supplies and reduce Sacramento River diversions. Water produced as part of this project is proposed to be dedicated to meeting water quality standards in the Bay-Delta and improve local, regional, and statewide water supply reliability depending on year type in accordance with SVWMA. Further detail on the SVWMA and the project is provided in Section 1, Introduction, and Section 4, Assessment of Water Management Strategies, of this IRWMP.

**TABLE 6.3-2**  
Summary of Plan Areas

Plan Area	Land Use	Water Use
GCID	Largest irrigation district in Sacramento Valley Approximately 55,000 acres of irrigated land Rice is dominant crop (85%) By 2025, net irrigated area expected to be about 57,500 acres	Surface water delivered to 141,000 acres of land (and 20,000 acres of wildlife habitat) Primarily Sacramento River diversion, also 17,000 ac-ft of groundwater use 2025 change in groundwater pumping to meet SVWMP commitment
Orland-Artois Water District	29,988 assessed acres (approximately 24,000 irrigated) 2025 net irrigated acreage will be approximately 25,300 acres; major cropping difference expected to be expansion in permanent crops (almonds)	Closed pipeline system with virtually no spill 53,000 af/yr CVP surface supply OAWD is generally water-short, each year OAWD seeks to augment its CVP contract supplies with short-term water transfers OAWD's CVP contract would yield an average of 27,000 ac-ft annually, satisfying less than one-third of the long-term average applied water demand Additional demand met by groundwater pumping from 35,000 to 95,000 ac-ft annually
Orland Unit Water User's Association	1,099 shareholders within the OUWUA Average size farm is small; less than 25% of farms are greater than 20 acres 21,000 total acres (15,000 to 17,000 irrigated) Pasture is dominant (60 to 70%)	Primarily surface water from East Park and Stony Gorge (see Table 4 in Stony Creek Conjunctive Water Management Feasibility Investigation for details) Average annual diversion of 95,372 af/yr Surface water typically sufficient to meet demand; small amount of groundwater use (approximately 3,000 ac-ft)
Groundwater-only Areas	Approximately 75,000 acres of groundwater-only use area (49,000 acres irrigated average) 2025 projections indicate about 55,000 acres or irrigated land in this area Cropping shift to permanent crops expected	Only water supply is private pumping of groundwater

Note:

The Stony Creek Conjunctive Water Management Feasibility Investigation contains significantly more detailed descriptions of the supply, demand, cropping trends, and operational considerations for each of these planning areas as well as the assumptions used to make the 2025 projections.

### 6.3.6.3 Impact of Urbanization in the Vicinity of Orland

The primary source of water for the City of Orland is groundwater. As land is annexed into the city, it is removed from the OUWUA. Over time, land within the city increases, and the OUWUA service area declines. At the same time, the application of surface water for

irrigation will decline, and the extraction of groundwater grows to serve municipal needs (Wood Rodgers Consultants, 2005). Compounding the problem is the fact that over 80 percent of the parcels in the OUWAU are 20 acres or less. Smaller parcels such as this that fall outside the area of annexation are susceptible to development as “ranchettes” that will no longer be eligible for water from the OUWAU.

The *LEGACI Grant Report* found that the long-term impacts to groundwater levels from development in the vicinity of Orland are not significant. The full development of the city would, however, significantly interrupt OUWUA’s water distribution system and the operations and maintenance. The OUWAU has done preliminary planning to install a new regional pipeline in lieu of canals passing through the north part of the city and terminating at the Tehama-Colusa Canal. This type of system modification would be beneficial for servicing the eastern portion of the district service area and minimizing the liability risk of having an open channel in an urbanized area.

#### **6.3.6.4 Flood Management in the Colusa Basin Drainage District**

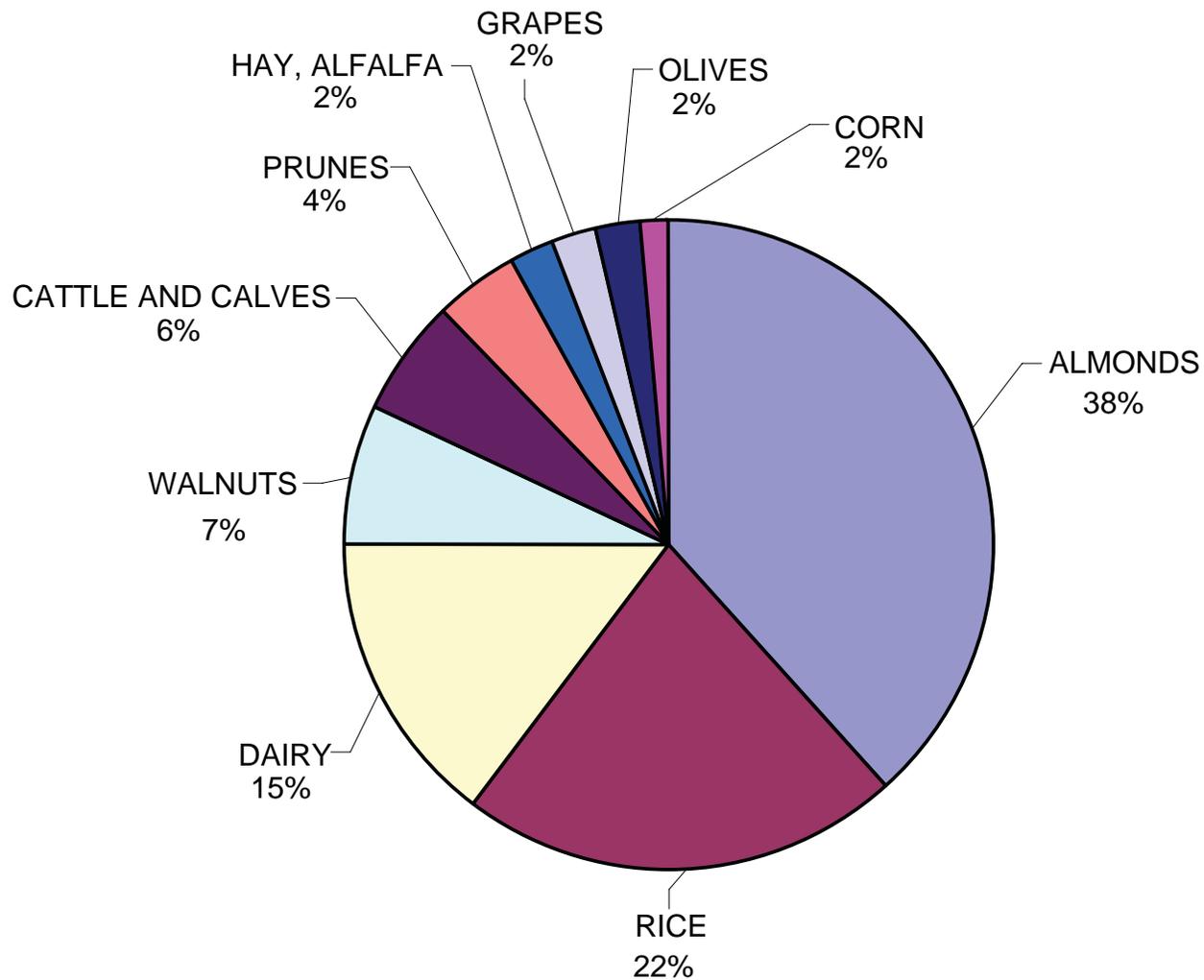
State Legislature formed the CBDD in 1987, to address flooding, drainage, and subsidence problems in the Colusa Basin. The Colusa Basin extends into Colusa, Glenn, and Yolo Counties and is primarily used for agricultural production. CBDD commissioned the *Integrated Watershed Management Plan* to reduce flood damage in the City of Willows and surrounding agricultural lands and improve the environment in Willow and Wilson Creek Subbasins in Glenn County (CH2M HILL, 2004). The first flood control detention basin project, located on South Fork Willow Creek, is presently in the design phase.

#### **6.3.7 Next Steps/Recommendations**

Next steps/recommendations are as follows:

1. Continue the cooperative effort with Tehama, Colusa, and Butte Counties to ensure reliable, high-quality drinking water, and actively participate in ongoing efforts that support prudent management of the underlying aquifer systems. Continue to work with the Coalition to promote management of agricultural runoff and discharge.
2. Continue to support proposed projects in Glenn County as detailed in Appendix B to this IRWMP.
3. Continue formulating the Water Needs Analysis that will be completed by December 2006. Depending on the findings, further recommendations will be made in the future.
4. Support growth within the county, keeping in mind that agricultural water needs to be available to maintain the county’s economic base.





Source: Glenn County 2005 Crop Report

**FIGURE 6.3-2**  
**GLENN COUNTY'S 10 LEADING**  
**COMMODITIES IN 2005**  
 SACRAMENTO VALLEY IRWMP

## LEGEND

- ◆ EXISTING DWR SPRING 2001 GROUNDWATER LEVEL MONITORING WELL
- ◆ PROPOSED GROUNDWATER MONITORING WELL
- ⓔ PROPOSED SUBSIDENCE MONITORING WELL (EXTENSOMETER)
- ◆ PROPOSED DWR GROUNDWATER MONITORING WELL
- ⓔ PROPOSED DWR SUBSIDENCE MONITORING WELL
- ⓔ EXISTING BUTTE COUNTY SUBSIDENCE MONITORING WELL

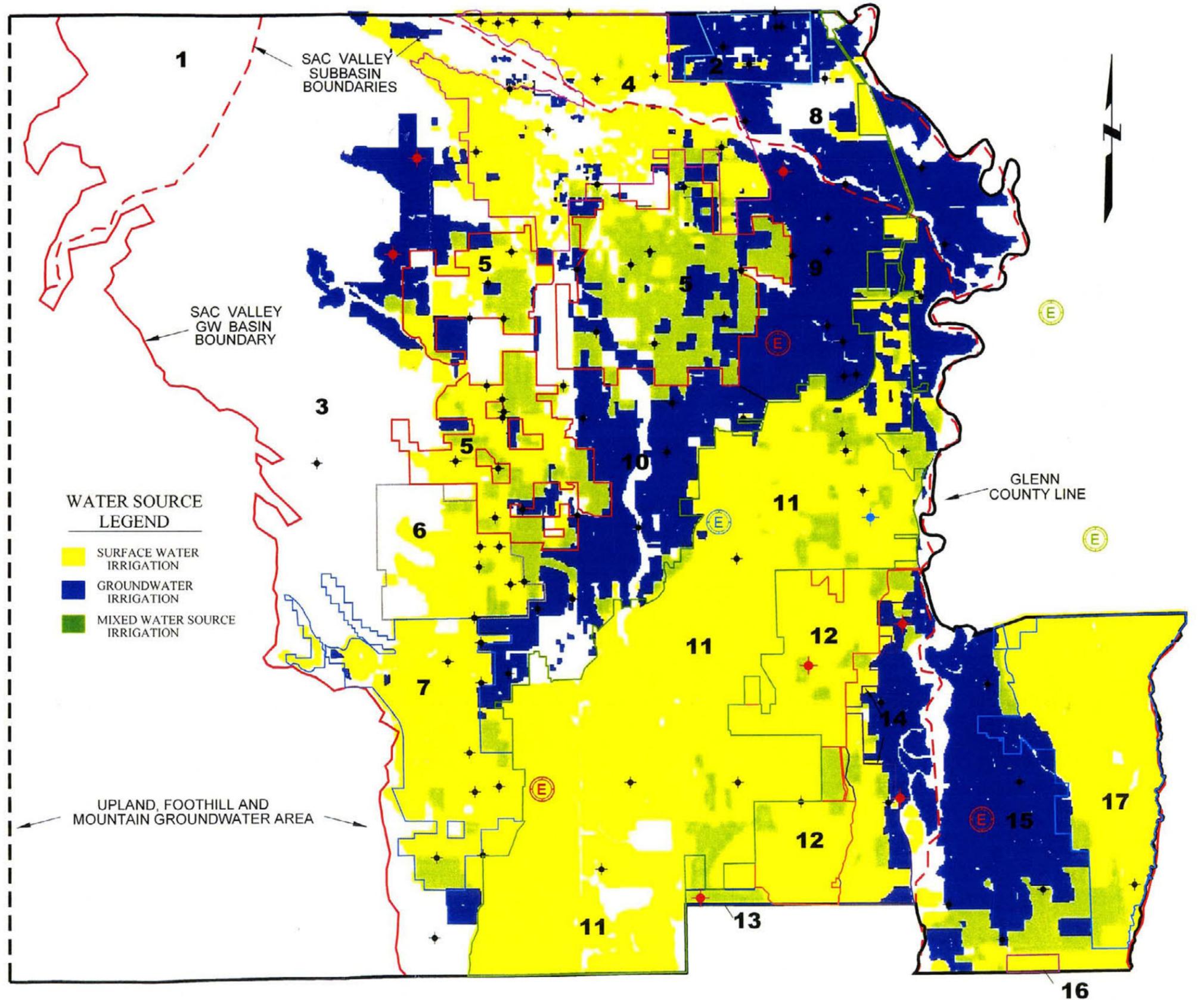


## BMO AREA LEGEND

1. WEST CORNING BASIN PRIVATE PUMPERS
2. STONEY CREEK WATER DISTRICT
3. WEST COLUSA BASIN PRIVATE PUMPERS
4. ORLAND UNIT WATER USERS ASSOCIATION
5. ORLAND-ARTOIS WATER DISTRICT
6. GLIDE WATER DISTRICT
7. KANAWHA WATER DISTRICT
8. EAST CORNING BASIN PRIVATE PUMPERS
9. BOS DISTRICT FIVE PUMPERS
10. BOS DISTRICT THREE PUMPERS
11. GLENN COLUSA IRRIGATION DISTRICT
12. PROVIDENT IRRIGATION DISTRICT
13. WILLOW CREEK MUTUAL WATER COMPANY
14. PRINCETON-CODORA-GLENN IRR. DISTRICT
15. RECLAMATION DISTRICT 2106
16. RECLAMATION DISTRICT 1004
17. WESTERN CANAL WATER DISTRICT

## WATER SOURCE LEGEND

- SURFACE WATER IRRIGATION
- GROUNDWATER IRRIGATION
- MIXED WATER SOURCE IRRIGATION



**FIGURE 6.3-3  
EXISTING AND PROPOSED  
MONITORING WELLS  
SACRAMENTO VALLEY IRWMP**

## 6.4 Colusa County

The following summarizes the local setting, current and future land and water use, and primary recommendations in the Colusa County area. Colusa County officials were interviewed and consulted as a part of the development of this IRWMP and identified the following key and/or highest priority water- and land use related issues (Hackney, 2006):

- Agriculture-urban interface conflicts
- Urban water quality
- Loss of agricultural quality of life
- Flood management
- Water transfers

### 6.4.1 Local Setting

Colusa County is located in the western portion of the Sacramento Valley approximately 60 miles northwest of Sacramento. The county's 1,156 square miles encompass a variety of topography ranging from the Coastal Mountain Range and foothills to the west and relatively flat agricultural land in the east. Elevation ranges from 40 to 7,040 feet above sea level. Although sparsely populated, the county contains two incorporated cities: Colusa (5,000) and Williams (3,000). The population of Colusa County was 21,000 in 2005 (California Department of Finance) with approximately 7,000 homes (California Department of Finance, 2004). Fifty-five percent of the population lives in small urban communities, and forty-five percent lives in rural homes. The population of Colusa County is projected to be 29,300 by the year 2030 (U.S. Census Bureau, 2000).

The climate in Colusa County is typical of the Sacramento Valley with hot, dry summers and cool, wet winters, with most of the annual precipitation falling between November and March. The City of Colusa has an annual rainfall of approximately 16 inches per year and an average summer (July) daytime high temperature of 96 degrees Fahrenheit.

Agriculture is the major industry in the county. Within the boundaries of Colusa County are some of the richest rice-producing lands in the country and quality waterfowl habitat associated with the Pacific Flyway. Colusa was identified as having the highest percentage increase in agricultural growth, nearly 115 percent, in California during the period 1985 to 1995 (University of California Cooperative Extension, 1999). The total onfarm agricultural value in the county in 1997 was \$333 million. The major crops produced include rice, processed tomatoes, almonds, wheat, vegetable seeds, walnuts, and prunes. Rice remains the number one crop, with acreage remaining fairly stable. There is currently a transition from row crops to perennial crops (almonds, grapes, and walnuts) and from low-value agronomic crops to higher value vegetables or other row crops. Environmental issues (air quality, water quality, and soil degradation), commodity marketing, and economic sustainability are the major challenges facing local producers.

Colusa County is home to many large canals and infrastructure necessary to meet the agricultural demand for the 358,000 acres of cropland in the county. Most of the irrigation water used in the county originates from the GCID Canal, which takes its principal supply from the Sacramento River at Hamilton City and a limited supply from Stony Creek in Glenn County. Some runoff from the foothills and water from the Sacramento River is channeled into the GCID Canal, Tehama-Colusa Canal, and the Colusa Drainage Trough. These canals serve as irrigation sources and flood control channels.

Water agencies and private parties have been effective over the years in obtaining and developing water supplies to meet the needs of Colusa County. In the past, most efforts were conducted by individual agencies. There are over 25 agencies with land and water management responsibilities. These include the following agricultural water purveyors, urban water purveyors, agencies with flood management responsibilities, and agencies with land use management responsibilities:

- **Agricultural Water Purveyors**
  - Glenn-Colusa Irrigation District
  - Willow Creek Mutual Water Company
  - Sartain Mutual Water Company
  - Colusa Irrigation Company
  - Maxwell Irrigation District
  - Colusa Drain Users Association
  - Cortina Water District
  - Glenn Valley Water District
  - Reclamation District 2047
  - Westside Water District
  - Reclamation District 479
  - Myers Marsh Mutual Water Company
  - 4-M Water District
  - Roberts Ditch Irrigation Co. Inc.
  - Reclamation District 108
  - Reclamation District 1004
  - Davis Water District
  - Holthouse Water District
  - Provident Irrigation District
  - Colusa County Water District
  - LaGrande Water District

- **Urban Water Purveyors**
  - City of Williams
  - City of Colusa
  - Arbuckle Public Utility District
- **Flood Management Agencies**
  - Colusa Basin Drainage District
  - County of Colusa
- **Land Use and Resource Agencies**
  - County of Colusa
  - Colusa County Resource Conservation District

### 6.4.2 Land Use Patterns

Land use in Colusa County is dominated by agriculture (see Figure 6.4-1). Uses consist primarily of irrigated and nonirrigated farmland; small, urban community developments; and significant wildlife refuge and recreational areas. County land use has been recently mapped for as a part of the Four-County Document and by the FMMP (California Department of Conservation, 2002a).

Table 6.4-1 shows the trends in agricultural land use changes for the period of 1986 to 1998. The only significant changes include a 33 percent increase in nonirrigated farmland and an 11 percent increase in urban development.

**TABLE 6.4-1**  
Colusa County Land Use Changes

Land Use Category	Acreage by Category							Percentage Change
	1986	1988	1990	1992	1994	1996	1998	
Irrigated Farmland	334,354	335,587	330,383	330,046	327,879	329,348	329,049	-2
Nonirrigated Farmland	8,608	9,266	10,917	10,579	10,924	10,754	11,496	33
Grazing Land	237,818	238,350	238,255	237,129	238,981	237,759	234,874	-1
<b>Agricultural Lands Total</b>	<b>582,766</b>	<b>585,191</b>	<b>581,545</b>	<b>579,746</b>	<b>579,778</b>	<b>579,857</b>	<b>577,417</b>	<b>&lt;1</b>
Urban	3,851	3,864	3,914	4,158	4,159	4,176	4,293	11
Other	82,055	79,615	83,213	84,771	84,740	84,630	87,002	6
Water Areas	1,931	1,935	1,935	1,935	1,935	1,951	1,904	<1
<b>Total Inventoried</b>	<b>668,617</b>							

Source: FMMP (California Department of Conservation, 2000)

Like most areas in California, Colusa County is experiencing an increase in housing development. From January 2000 to December 2003, Colusa County issued 97 building permits for residences. In 2004, a subdivision of 74 residences was permitted. Colusa County planners expect additional subdivision growth of more than 4,000 residences in the future (Hackney, 2006).

About 45 percent of the county consists of forested rangeland. The Colusa and Delevan NWRs cover about 10,300 acres of low-lying Colusa Basin and provide a haven for waterfowl in the Sacramento Valley Flyway. The Colusa County portion of the Mendocino National Forest covers over 70,000 acres, or about 10 percent of the county's total land area (Sedway Cook & Associates, 1989). Table 6.4-2 lists the existing land use categories and areas as inventoried for the Colusa County General Plan.

**TABLE 6.4-2**  
Existing Colusa County Land Use

<b>Land Use Category</b>	<b>Total Acres</b>
Communities	2,500
Rural Subdivisions	1,200
Orchards and Vineyards	38,200
Cropland	358,000
Undeveloped Bottomland	9,300
Undeveloped Rangeland	244,800
National Wildlife Refuge	12,000
National Forest	72,000
<b>Total Area</b>	<b>738,000</b>

Source: Colusa County General Plan

### **6.4.3 Water Use and Water Supply Patterns**

Surface water is the primary source of supply for agricultural uses in the county. The county uses a total of 968,000 ac-ft of water per year for irrigation purposes, of which 815,000 ac-ft are provided by irrigation canals (Sedway Cook & Associates, 1989). The majority of supply is provided by GCID, Colusa County Water District, RD 108, and TCCA and associated water districts, each of which holds a long-term contract with Reclamation. Groundwater is a source of supply for agricultural water users outside these districts. Reuse of water both within districts and use of drainwater from upstream water districts is also an important source of supply for many areas in the county.

Local governments play a vital role in water and resource management through their land use authority. Groundwater is the primary source for drinking water in Colusa County

(U.S. Environmental Protection Agency, 2005). Drinking water purveyors that deliver water to over 500 connections include the City of Williams and Arbuckle Public Utility District. An additional 61 small water systems deliver water to smaller groups of users in Colusa County. The Colusa County Department of Planning and Building, the Colusa County Resource Conservation District, and the Colusa County Department of Environmental Health are the primary agencies that have responsibilities for drinking water quality or are involved in activities related to drinking water quality (Glenn County Department of Agriculture, 2005).

M&I water use totaled just 3,400 ac-ft in 1980. The Conservation Section of the Colusa County General Plan (1989) contains M&I water use projections to the year 2010. However, the 2010 population estimate for those projections was 17,000. The county plans to update the general plan and complete a comprehensive water inventory in the near future.

The majority of existing wells in the county pump groundwater from the Tehama or Upper Tuscan Formation, with the potential for using the Lower Tuscan Formation currently under study. Colusa County is currently initiating a groundwater management and water resources planning investigation.

#### **6.4.4 Existing and Ongoing Planning**

Because of staff and fiscal limitations, limited planning has occurred to date with respect to current water resources and future water needs in Colusa County. As discussed above, the county recently began working on a groundwater management plan that will include a detailed water supply inventory and analysis. Table 6.4-3 summarizes the primary investigations and/or processes conducted to date.

**TABLE 6.4-3**  
Existing and Relevant Colusa County Water Resource Planning Documents

<b>Planning Document</b>	<b>Description</b>	<b>Date Published</b>
Northern Sacramento Valley (Four County) Drinking Water Quality Strategy Document	A Butte, Tehama, Glenn, and Colusa County document that provides an integrated approach to water quality management in the four-county region.	June 2005
Sacramento River Basinwide Water Management Plan	Contains current and future water supply and use projections for many Colusa County water districts	2004
Colusa County General Plan	General Plan providing basis for decisions regarding growth and land development.	Approved January 1989 Housing Element updated 2004

County water resource managers in Butte, Colusa, Glenn, and Tehama Counties (Four-County Document) are currently facilitating activities in areas such as water resource studies,

groundwater management, data and information management, county regulation and ordinance oversight, public education, and stakeholder interaction. The Four-County Team is continuing to evaluate drinking water resources and management through continued coordination.

#### **6.4.5 Plan Areas**

Planning subareas have not yet been identified by the county. It is anticipated that the upcoming groundwater management plan will likely identify such areas. Existing land use was mapped for the IRWMP using Department and FMMP land use data. Interviews with local planning officials were conducted to determine areas within the county where future development is likely. Lack of sufficient GIS data and water supply inventories for Colusa County made projections for the year 2030 water demand impossible at this time given the scope and size of the Sacramento Valley IRWMP Region. Current land use and likely areas of future development according to interviews with county staff are shown on Figure 6.4-2.

#### **6.4.6 Local Water Management Issues and Strategies**

The following summarizes key water management issues in Colusa County in terms of the Department's water resource management strategies as applicable.

##### ***Conjunctive Management and Groundwater Storage***

Groundwater management is a high-priority issue for the county, as evidenced by the initiation of a groundwater management plan and comprehensive water supply inventory. The county's current groundwater ordinance was passed in 1998. Some water districts and companies in the county have proposed conjunctive management projects identified in Appendix B to this IRWMP to decrease Sacramento River diversions as part of the SVWMA. These projects include a monitoring component that should be coordinated with ongoing monitoring efforts throughout the county.

##### ***Agricultural Water Use Efficiency***

Efficient use of water remains a priority for water districts and companies throughout the county. Several districts have and continue to identify projects to improve system operations and facility improvements. Currently proposed projects are identified in Appendix B to this IRWMP. Two of the larger districts in the county (GCID and RD 108) are completing a Regional Water Management Plan in cooperation with Reclamation to assist in improved water management.

##### ***Water Quality/Drinking Water***

Colusa County has partnered with Glenn, Tehama, and Butte Counties for the Four-County Document. The Colusa County Planning Department is committed to protecting water quality

throughout the county. Although water quality is generally considered good, local officials expressed concern over the number of natural gas wells that are being drilled in the county and their possible impacts on groundwater quality. With respect to agricultural discharge and associated water quality effects, many of the growers in the county are participating in the Coalition. Additional information on the Coalition and the current monitoring program is found in Section 8, Performance and Monitoring, of this IRWMP.

Local planning officials indicate that the communities of Arbuckle and Maxwell are in need of system upgrades and waste facility expansion. The City of Williams is also undergoing relatively significant housing development and is anticipated to require upgrades in the near future to accommodate continued urban growth.

### ***Surface Storage***

Investigation of the proposed Sites off-stream storage project continues. Located approximately 10 miles west of Maxwell in the Antelope Valley, the proposed reservoir would have a capacity of approximately 1.9 million ac-ft and would greatly increase water supply management throughout the region and state. A number of local districts and federal and state agencies signed an MOU in 2000 to mutually explore the potential for the project and work toward its timely implementation.

### ***Floodplain Management***

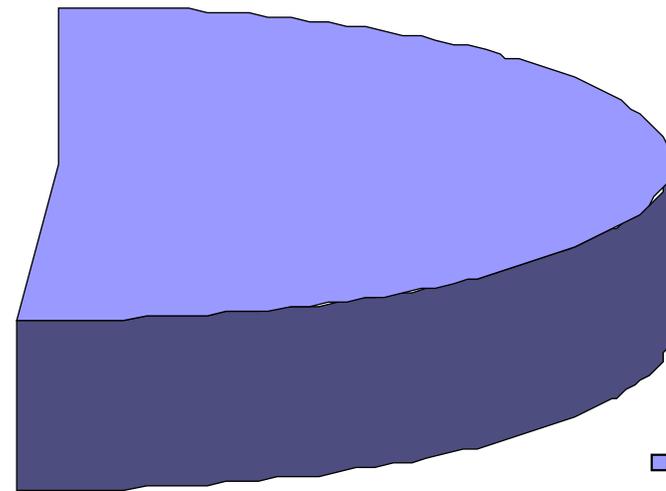
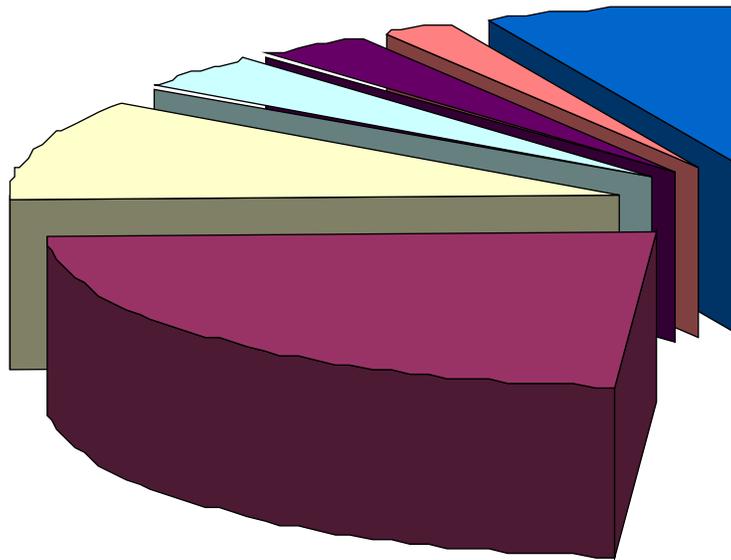
State Legislature formed the CBDD in 1987, to address flooding, drainage, and subsidence problems in the Colusa Basin. The Colusa Basin extends into Colusa, Glenn, and Yolo Counties and is primarily used for agricultural production. CBDD developed a programmatic EIR/EIS to evaluate the broad impacts of alternatives that reduce potential flood damages and improve the environment within the Colusa Basin. CBDD has since commissioned several site- and project-specific studies, in various phases of completion, to further address flooding and environmental issues. CBDD efforts to restore the environment primarily relate to soil erosion, sedimentation, habitat, and water supply. Increased sediment production rates associated with the basin's annual flooding can affect regional water quality. Sediment is deposited into the Sacramento River, which degrades the water quality for downstream water users. CBDD commissioned the *Integrated Watershed Management Plan* to reduce flood damage in the City of Willows and surrounding agricultural lands and improve the environment in Willow and Wilson Creek Subbasins in Glenn County. CBDD identified several water quality-related methods to enhance the environment including (1) improve water quality through improved erosion control measures and practices, and (2) improve water quality through filtering and trapping nutrients/sediments in spreading basins (CH2M HILL, 2004).

### **6.4.7 Next Steps/Recommendations**

Next steps/recommendations are as follows:

1. Complete the groundwater management plan
  - Develop planning subareas or regions according to water sources, land use, hydrology, and political and physical boundaries to be used as the basis for water resource planning
  - Establish BMOs or similar approach to assist in evaluating groundwater levels and avoiding potential impacts
  - Establish a monitoring network and process with stakeholders to initiate groundwater protection actions as determined necessary
2. Require large-scale developers to install monitoring equipment to collect both baseline groundwater level data before construction begins and real-time groundwater level data after construction is completed to allow for evaluation of drawdown impacts due to groundwater production
3. Implement the Lewis Ranch and RD108 water management projects
4. Continue the cooperative effort with Glenn, Tehama, and Butte Counties to ensure reliable, high-quality drinking water, and work with the Coalition to promote management of agricultural runoff and discharge
5. Continue to support the investigation and eventual implementation of the Sites off-stream water storage project
6. Continue to encourage agricultural uses and development through land use planning and policies
7. Encourage managed urban growth adjacent to existing urban centers
8. Support existing efforts to evaluate and manage flood potential and pursue funding to protect both urban and agricultural areas





- Rice
- Almond
- Tomatoes
- Cattle
- Rice Seed
- Walnuts
- Other

Source: California Agricultural Statistics Service (2002-03). Chart indicates leading commodities in gross value

**FIGURE 6.4-2**  
**COLUSA COUNTY**  
**AGRICULTURAL PRODUCTION**  
 SACRAMENTO VALLEY IRWMP

## 6.5 Butte County

### 6.5.1 Introduction and Summary

The following summarizes the local setting, current and future land and water use, and primary recommendations in the Butte County area. Butte County officials were interviewed and consulted as part of the development of this IRWMP and identified the following key and/or highest priority water- and land use related issues:

- Development of agricultural lands in the rural areas of the county, and the need for water and sewer services to these areas
- Potential groundwater impacts from urban development and protection of county groundwater resources
- Potential development of the Lower Tuscan Formation and protection of recharge areas
- Groundwater quality protection in the City of Chico
- Continued protection of water quality
- Continued monitoring of the groundwater BMOs

#### 6.5.1.1 Local Setting

Butte County is located on the eastern side of the Sacramento Valley and western Sierra Nevada. The Sacramento River flows along a portion of the western boundary of the county. The Feather River is the largest river within the county. Lake Oroville is located behind Oroville Dam on the Feather River in the foothills above the Town of Oroville (Figure 6.5-1). Oroville Dam is owned by the Department, which operates it, along with Thermalito Forebay and Afterbay, as part of the SWP.

The valley floor portion of Butte County consists of irrigated agriculture with primary crops being rice and orchards. The City of Chico is the largest urban area in this otherwise agricultural county. Other smaller urban areas include Biggs and Gridley on the valley floor, and Oroville and Paradise in the foothills. The current population of Butte County is estimated at 217,200. The population is expected to grow primarily in these urban areas between now and 2030 to about 320,000. Additional growth is also occurring in unincorporated parts of the county, which are more rural agricultural areas. Providing services such as water and sewer is one of the challenges facing the county for these lands resulting from the conversion of agricultural lands to urban uses.

The water needs of Butte County are met with a combination of surface water and groundwater from the alluvial groundwater subbasins of the Sacramento Valley Groundwater Basin. The Lower Tuscan Formation is the primary groundwater-producing aquifer in the county.

The larger public water supply wells extract water from the Lower Tuscan Formation and many smaller private domestic and agricultural wells rely on the overlying alluvial deposits.

Most of the recharge areas of the Tuscan Formation are located along the base of the Sierra Nevada foothills in Butte County. Groundwater quality is generally good, but there are some areas of concern. The City of Chico has some groundwater quality issues including high nitrates (from septic systems), tetrachloroethylene/trichloroethylene plume (from dry-cleaner releases), and petroleum plume. Portions of the south part of Butte County have elevated arsenic levels.

Some local water purveyors contract for SWP water through their settlement agreements with the Department. Much of the surface water use in the county is for agriculture. Groundwater is also used to supplement surface water supplies for agricultural uses in the areas not supplied with district water. Currently, most of the urban and domestic water needs are met with groundwater, although some surface water supplies are in the foothill areas. Paradise Irrigation District, Thermalito Irrigation District, South Feather Water and Power, Del Oro Water Company, and California Water Service in Oroville all use surface water supplies to help meet their needs.

#### **6.5.1.2 Local Water Resources Management**

In July 1999, the Butte County Board of Supervisors approved the formation of the DW&RC. The mission of the DW&RC is "...to manage and conserve water and other resources for the citizens of Butte County," thereby defining Butte County as its "Planning Region" for the evaluation of water resources management issues. Since its inception, the DW&RC has focused on coordinating local water resource management. To gather the information necessary to set a course for protection and management of resources, the DW&RC initiated an Integrated Water Resources Program. Part of this program is the *Integrated Water Resources Plan* (Butte County IWRP), which presents policy recommendations developed through close collaboration with a diverse stakeholder group. The IWRP is intended to provide direction for resource management and protection into the future.

In June 2004, Butte County adopted the IWRP that was prepared for the DW&RC to develop water resources policy recommendations for consideration by the Butte County Board of Supervisors (CDM, 2004). This plan is part of Butte County's proactive Integrated Water Resources Program. Some of the results of the Butte County IWRP are summarized in this analysis. Additional details and supporting information are available from the Butte County IWRP and the supporting documents.

In addition to the DW&RC, over 15 agencies have water resources management responsibilities and land use planning responsibilities in Butte County. They are listed below

and shown on Figure 6.5-2. The following agencies, along with other stakeholders and interested parties, participated in the preparation of the Butte County IWRP:

- **Water and Irrigation Districts**
  - Biggs-West Gridley Water District
  - Butte Water District
  - California Water Service Company (Oroville Area)
  - Del Oro Water Company
  - Durham Mutual Water District
  - Oroville-Wyandotte Irrigation District
  - Lake Madrone Water District
  - Magalia County Water District
  - Paradise Irrigation District
  - Ramirez Water District
  - Durham Irrigation District
  - Richvale Irrigation District
  - Thermalito Irrigation District
  - Western Canal Water District
  
- **Flood Management Agencies (not shown on Figure 6.5-2)**
  - Maintenance Area No. 5
  - Maintenance Area No. 7
  - Maintenance Area No. 13
  
- **Land Use Planning Agencies**
  - Butte County
  - City of Chico
  - Biggs
  - Gridley
  - Paradise

### 6.5.1.3 Existing and Future Land and Water Use Conditions

The IWRP relied upon the *Butte County Water Inventory and Analysis* (Water Inventory) (CDM, 2001) to estimate water supply and water demands analysis for agricultural, urban, and environmental demands in average and dry water years. As part of the Water Inventory, the county developed agricultural and urban water demand forecasts and an initial environmental demand assessment. Different methodologies were used for each sector to address specialized needs to account for various water factors that affect each sector. The findings show that future agricultural water demand will decline slightly, urban demand will

increase, and additional monitoring and research is needed to project future environmental demand.

This section presents the results and conclusions of land and water use analysis completed in the Water Inventory and summarized in the Butte County IWRP.

Recent preliminary updates on development and regional growth projections for the 2006 to 2030 period prepared by the Butte County Association of Governments describe the overall growth within Butte County. The population of the City of Chico is expected to increase by about 48,000 to about 127,000 by 2030. This represents an annual growth rate of about 2.5 percent. The Cities of Biggs, Gridley, and Oroville are expected to have an annual growth rate of around 5 percent each, representing an increase in population of about 2,200, 7,200, and 15,000 respectively. These growth rates do not include annexations. The unincorporated parts of the county area are expected to grow at about 1 percent per year, adding about 24,300 people by 2030.

## ***Agricultural Demand***

### **Existing Agricultural Demand**

The Butte County IWRP identified about 230,500 acres of irrigated cropland in a fully cropped normal year, with rice accounting for about 110,000 acres or 48 percent of the irrigated acreage. Other major crops in the county include orchards, grains, and pasture. The 2005 Butte County Agricultural Crop Report shows that harvested rice acreage has reduced to 96,400 acres. In addition, the Crop Report also showed almonds as the highest valued crop in the county due to increased yield and unit value.

For water planning purposes, the Water Inventory characterized the agricultural demands in the county in average and dry years. The report estimates the water demand using the Department's 1997 land use data, Agricultural Commissioner Reports, and discussions with landowners and water purveyors regarding irrigated crop acreage and irrigation requirements.

The total agricultural water demand in the county is estimated at about 1 million ac-ft in a normal year and about 1.1 million ac-ft in a drought year (about 70 and 73 percent of the county demand, respectively).

The Butte County IWRP states that the county has an adequate supply of surface water and groundwater to meet current agricultural demands.

### **Future Agricultural Demand**

Future agricultural water demands will vary from current demands because of changes in economic, land use, and hydrologic conditions. In the Butte County IWRP, future agricultural water demands were evaluated using potential reasonable scenarios for future

agricultural water use. The scenarios are summarized in Table 6.5-1 and described as follows:

- **Agricultural Land Conversion** – This scenario reflects the recent trends that show agricultural land conversion for urban and environmental uses.
- **Increased Crop Prices** – This scenario reflects the changing market demands, competition from other production regions, and government programs.

**TABLE 6.5-1**  
Summary of Agricultural Demand Forecast Scenarios

Scenario	Implementation Method	Analytical Representation
Land Conversion	Decrease total land in production	Decrease irrigated land – 3% in Vina and West Butte Decrease irrigated land – 1% in East Butte
Crop Idling	Decrease surface water used for crop production	Decrease surface water delivery – 10%
Crop Prices	Increase relative crop prices	Increase rice and orchards price – 10%
Water Conservation	Increase crops irrigation efficiency	Set target irrigation efficiencies for each crop
Combination Scenario – Average and Dry Years	Combines land conversion, crop idling, and conservation scenarios	Decrease irrigated land – 3% in Vina and West Butte Decrease irrigated land – 1% in East Butte Decrease surface water delivery – 10% Set target irrigation efficiencies for each crop

- **Increased Crop Idling** – This scenario reflects the opportunity to idle land to develop a water source to meet new and increased water demand for environmental resource protection and water supply reliability.
- **Conservation** – This scenario reflects water conservation as an important component of managing water demands and supplies in the future. Increased irrigation efficiency would provide additional water supplies from savings associated with onfarm irrigation systems and management.
- **Combination Scenario** – This scenario forecasts likely changes in agricultural water demand, taking into account a combination of the most probable land and water use changes.

The agricultural demand forecast analysis indicates that most of the reasonably foreseeable changes would not result in significant long-term changes in agricultural water demand in Butte County. In the combination scenario, individual regions would see a reduction in agricultural water demand ranging from a minimum of 0.6 percent to a maximum of 8.75 percent. The total water demand in the county decreases by 60,500 ac-ft (6.0 percent) in an average year and 71,300 ac-ft (6.3 percent) in a dry year under the combination scenario.

### *Urban Water Demand*

The urban water demand in Butte County was evaluated for the six study areas listed in Table 6.5-2 for the years 2000, 2010, 2020, and 2030. Urban water use includes household uses, commercial and industrial uses, and landscape irrigation.

**TABLE 6.5-2**  
Forecast Model Study Area

<b>Study Area</b>	<b>Water Purveyor(s)</b>
Biggs	City of Biggs
Chico	California Water Service Company, Chico
Gridley	City of Gridley
Oroville	California Water Service Company, Oroville Oroville-Wyandotte Irrigation District Thermalito Irrigation District
Paradise	Paradise Irrigation District
Unincorporated Areas	Several small water purveyors (not listed) Private wells

### *Existing Urban Demand*

The 2000 annual urban and domestic water demand totaled about 67,400 ac-ft for the county. Chico and the unincorporated areas of the county have the largest demands. The existing urban demands are summarized in Table 6.5-3.

**TABLE 6.5-3**  
Annual Urban Water Demands

<b>City</b>	<b>2000 Urban Demand (ac-ft)</b>	<b>Percent Increase in Urban Demand<sup>a</sup></b>	<b>2030 Estimated Urban Demand (ac-ft)</b>
Biggs	600	44	800
Chico	25,800	96	46,000
Gridley	1,600	33	2,000
Oroville	5,500	77	9,000
Paradise	7,600	11	8,300
Unincorporated Areas	26,300	Slight decline	25,000
<b>Total</b>	<b>67,400</b>		<b>91,100</b>

<sup>a</sup>Percent increase in single housing family units from 2000 to 2030.

**Future Urban Demand**

Future urban water demands vary from current demands because of changes in development, population, economic, and hydrologic conditions. The complete analysis is available in the *Butte County Urban Water Demand Forecast Report*. The urban water demand forecast analysis used IWR-MAIN Water Demand Management Suite<sup>®</sup> to perform the urban water demand forecast with the adjusted rate of water use forecasting method.

As shown in Table 6.5-3, the urban demand of the entire county is estimated to increase by about 50 percent between 2000 and 2030. The county's urban growth is primarily due to increases in residential and commercial uses in Chico. The unincorporated areas would decline somewhat because of the urban annexation of existing housing developments that are currently in unincorporated areas.

**Environmental Demand**

During the preparation of the Butte County IWRP, the DW&RC performed preliminary environmental demand calculations as a frame of reference for water resource planning, recognizing that additional data were needed to provide a more detailed estimate of actual environmental water demand.

The Water Inventory calculated environmental water demand for managed wetlands and rice decomposition in Butte County. Total environmental water demand is approximately 139,000 ac-ft in a normal year and 161,000 ac-ft in a dry year. The report also calculates conveyance losses, which can be considered an environmental water use. Conveyance losses were 230,100 ac-ft during a normal year and 185,100 ac-ft during a dry year. The Water Inventory did not calculate environmental demands associated with riparian and terrestrial vegetation or instream demand.

**6.5.1.4 Existing and Ongoing Planning**

Butte County has been working for many years to more effectively manage and protect its water resources. Some of the existing and ongoing planning efforts are as follows:

- Groundwater Conservation Ordinance (Chapter 33)
- Well Spacing Ordinance (Chapter 23B)
- Update of Butte County Water Inventory and Analysis
- Groundwater Management Plan (AB3030 Plan)
- Groundwater Monitoring Program
- Update of Butte Basin Groundwater Model
- Urban Stormwater Management Plan

In addition, the IWRP has initiated the following efforts:

- Drought Management Plan
- Water Resources update of the Conservation Element in the General Plan
- Preliminary design for an Environmental Monitoring Program
- Basin Management Objectives

Some of the relevant Butte County water resources planning documents are identified in Table 6.5-4.

**TABLE 6.5-4**  
Existing and Relevant Butte County Water Resource Planning Documents

<b>Planning Document</b>	<b>Description</b>	<b>Lead Agency and Date Published</b>
Butte County Water Inventory and Analysis	Contains water supply and demand data.	Butte County DW&RC (2001)
Butte County Groundwater Inventory	Contains groundwater data and groundwater setting.	Butte County DW&RC (2001)
Integrated Water Resources Program	Provides outline to establishing water management policy for county.	Butte County DW&RC (2004)
Butte County Groundwater Management Plan	AB3030 Groundwater Management Plan.	Butte County DW&RC (2001)
Drought Management Plan	Contains plan to reduce short- and long-term impacts of drought to Butte County.	Butte County DW&RC (Ongoing)
Groundwater Management Ordinance 3869	Documents county's approach to managing groundwater resources.	Butte County Board of Supervisors (2004)
Groundwater Status Report	Summarizes groundwater level and land subsidence data collected through October 2004.	Butte County Water Commission by the Butte Basin Water Users Association (2005)
Northern Sacramento Valley (Four County) Drinking Water Quality Strategy Document	Contains water quality information from the Counties of Butte, Glenn, Colusa and Tehama.	Glenn County Department of Agriculture (2005)
BMOs Groundwater Management In Butte County, California	Describes BMOs within Butte County.	Butte County (2006)

#### **6.5.1.5 Plan Areas**

The Water Inventory organized the county into planning subareas to evaluate land and water use conditions based on the following considerations:

- Water use
- Topography
- Land use

- Geological setting
- Proximity to water source
- Water district boundaries

As a result of these considerations, the county was organized into the following five subareas shown on Figure 6.5-3:

- Vina Subarea (Chico)
- West Butte Subarea
- East Butte Subarea (highly agricultural)
- North Yuba Subarea
- Mountain/Foothill Subarea

Much of the analysis included in the Butte County IWRP is based on these subareas and includes evaluation of agricultural land use and water demands. Additional information regarding the land and water use analysis is available in the Water Inventory.

#### 6.5.1.6 Local Water Management Issues and Strategies

##### *Water Management Objectives*

The Butte County IWRP identified planning objectives that describe what the county should achieve with regard to water management. These objectives serve as expressions of the variety of ideas and concerns held by the stakeholders and provide a reference for the evaluation and comparison of the water management strategies. The primary objectives identified by the stakeholders and the steering committee during the development of the Butte County IWRP follow, along with the relative rankings of each objective:

- **Local Control**
  - Barriers to local control (11)
  - Seek consistency and applicability at the regional level (2)
- **Water Supply**
  - Protect water rights (8)
  - Improve water management (13)
  - Meet future in-county water demands (23)
  - Meet county urban, agricultural, and environmental needs first (11)
  - Protect public health and safety (7)
- **Economy**
  - Maintain and enhance economic health of the county (14)
  - Minimize cost effects (5)

- Minimize third-party impacts (8)
- Protect rural way of life (6)

- **Natural Resources**

- Protect and enhance biological resources (17)
- Improve water quality (18)
- Increase understanding of existing environmental conditions (9)
- Integrate watershed management programs (8)

The Butte County IWRP weighted and ranked the planning objectives to show their relative importance.

### ***Water Management Options***

The Butte County IWRP identified 30 options that might help to meet Butte County objectives (listed above). An “option” is a project, program, or policy that could be implemented to help meet the county’s future water management needs. The options were grouped into six categories based on their function. These categories are as follows:

1. Environmental
2. Water Use Efficiency
3. Ridge Supplies
4. Coordinated Management
5. Policies
6. SWP Allocation Management

#### **Environmental**

This category includes options that address environmental concerns in Butte County relating to special-status species habitat, water quality, and environmental water demand. Water resources-related actions that benefit environmental resources generally fall into three categories: (1) increasing flows to improve habitat, (2) restoring more natural flow patterns in rivers and creeks, and (3) increasing understanding of water quality and environmental resources.

Other options in this category propose to improve the understanding of the county’s water quality and environmental resources. Increased monitoring would help the county understand surface water and groundwater quality and how the quality affects both environmental resources and water supplies.

#### **Water Use Efficiency**

Increasing water use efficiency can provide additional available water for future drought protection or other in-county beneficial uses. Public education programs would help people understand the effects of their actions on water quality and quantity, and understanding these

effects could lead to more efficient practices. The county or local water districts could work with the California Urban Water Conservation Council, the Agricultural Water Management Council, or CALFED to implement efficient water management practices.

### **Ridge Supplies**

This option category proposes projects to address potential future water shortages in the Ridge communities, including the Town of Paradise and surrounding developments. The Ridge area has a growing population, and the water supply must be increased to meet future needs, particularly during dry years. The Ridge area water purveyors are investigating options to increase supplies, and the options within this plan are derived from those local investigations.

### **Coordinated Management (Conjunctive Use)**

Coordinated management of groundwater and surface water enables better management of both resources. This category would help manage groundwater fluctuations to ensure future county water supplies. Coordinated management includes several components: (1) recharge, or placing water into the aquifer; (2) monitoring groundwater levels, groundwater quality, and subsidence; and (3) recovery of water from the aquifer.

### **Policies**

The policy options propose to improve water management within the county, address regional water issues, and improve the county's water quality. These options do not identify on-the-ground projects, but rather identify policies that the DW&RC could adopt to help meet the planning objectives.

### **State Water Plan Allocation Management**

This category includes one general option to develop a mechanism for managing the unused portion of its SWP allocation. The county could use the allocation as part of other options, many of which rely on a portion of the SWP allocation for implementation.

Options represent potential means of accomplishing the planning objectives. The options were screened for their general feasibility, which included an assessment of the technical, legal, political, financial, and environmental feasibility. Only the feasible options were carried forward for evaluation. Figure 6.5-4 reflects the results of the screening process. An "X" indicates that a criterion was not met and the option was screened out of the process. The options were combined into reasonable packages that have an ability to achieve multiple complementary objectives.

### ***Water Management Packages***

A total of 30 options passed the screening criteria, but no single option was capable of addressing all of the county’s water management issues on its own. As a result of this, “packages” of options were developed that would meet multiple objectives. The packages were created by organizing the options according to their combined ability to address specific problems (called Problem Statements), which described potential issues the county could face in the future. The six Problem Statements are as follows:

- The Ridge area is projected to have water supply shortages during dry years.
- The county faces a potential reduction in its 27,500-ac-ft SWP allocation if it is not put to beneficial use, but using the entire allocation in the county could be problematic because it is very expensive.
- Water quality degradation could affect future supplies and biological resources.
- Outside interests might attempt to use county water resources that are not used beneficially within the county.
- The county must cope with fiscal challenges.
- The county faces historical and ongoing threats to its terrestrial and aquatic habitats.

The option packages were formed to focus on a single Problem Statement. Additional options were then added to an option package to address multiple Problem Statements, while maintaining the primary focus on the original, single Problem Statement. Two of the guidelines when grouping options into packages included the following:

- The package must pay for itself.
- The SWP allocation quantity must not be exceeded.

During the development of the option packages, it was found that several options were included in each package. These were eventually identified as base options and included as part of each package. The following four-option packages were identified through this process are described in detail in the Butte County IWRP:

- Economic Health Package
- Threat of Outside Interest Package
- Environmental Package – Focus on Butte Creek
- Environmental Package – Focus on Feather River

After reviewing the option packages, it was determined that none of them fully met the plan objectives. As a result, a “hybrid” package was developed that could achieve a more favorable overall rating than the initial packages. The hybrid package was then used to develop the policy recommendations as described in the following section.

### ***Policy Recommendations***

The policy recommendations of the Board of Supervisors, presented in the Butte County IWRP, were developed using the evaluation results of the hybrid package and other option packages. The hybrid package evaluation results were used to develop the First Tier Policies characterizing the policy directives necessary to implement the option combinations. Policies generated from the remaining options fell into the Second Tier of recommendations. The First Tier and Second Tier Policies are briefly described below. A more complete description is included in the Butte County IWRP.

#### **First-tier Policies**

The First Tier Policies identified in the Butte County IWRP are listed and summarized as follows:

- **Continue Ongoing Water Resources Efforts** – Butte County has been working for many years to more effectively manage and protect its water resources. Some of these efforts are listed in Section 1.4 of this analysis.
- **Improve Water Management of the SWP Allocation** – The county must develop a mechanism for managing the unused portion of its SWP allocation and other water that might be available.
- **Increase Agricultural and Urban Water Use Efficiency** – The county recognizes that improved water use efficiency can provide additional supply for future drought protection or other in-county beneficial uses.
- **Recommend that BMOs Support Native Vegetation** – Sustaining natural vegetation above recharge zones is important for managing groundwater levels, because natural vegetation enhances riparian areas and wetlands that recharge the aquifer.
- **Protect Recharge Areas through Zoning** – Land use practices on recharge areas can affect the quality and quantity of recharge into the aquifer. Protecting habitat areas and limiting activities that could degrade water quality would reduce the potential for these effects.
- **Inform and Educate the Public about Water** – Fostering public knowledge and understanding regarding water resources can help to create a culture of resource stewardship. The county will increase public education to inform residents about local water resources and issues.
- **Increase Support for Butte County Resource Conservation District (RCD)** – The Butte County RCD can play an important role in managing water resources by fulfilling its mission to “...conserve the resources of Butte County for the benefit of its citizens, its environment, and its economy.” The county will maintain administrative support for the RCD and help to coordinate activities with local watershed groups through the RCD.

- **Support Solutions to Potential Future Water Shortages in the Ridge Community** – The county will provide institutional support to help the Ridge community implement a solution to potential future water shortages.
- **Implement a Coordinated Management Program** – A coordinated management program could improve the flexibility and reliability of county water resources. A coordinated management program would include a recharge component to place water into the aquifer, a recovery component to extract water from the aquifer, a monitoring program to assess the aquifer behavior, and an institutional framework within which the program would function. The county will study the feasibility of a coordinated groundwater-surface water management program and will seek to implement programs that are feasible and environmentally beneficial.
- **Take Steps to Understand and Improve Butte County Water Quality** – Understanding threats to water quality and improving water quality in Butte County are important aspects of resource stewardship. Known constituents affecting the county’s water quality include nitrates, organic chemicals, sediment, and heavy metals. The county will support investigations to improve understanding of Butte County’s surface water and groundwater quality.
- **Serve as an Advocate to Improve Understanding of and Conditions for Special-status Species in Creeks and Rivers** – Many creeks and rivers in Butte County provide valuable habitat for special-status species (i.e., state- and federal-listed species). The presence of these species, their requirements, and the threats to their health are not fully understood. A need exists for a better understanding of these species’ location-specific requirements and for identification and implementation of actions to improve conditions for these species. The county will use Service and DFG documents to identify the type and location of special-status species and the habitat needs of these species. The county will initiate actions and participate in ongoing efforts to protect special-status species in creeks and rivers.
- **Coordinate Regional Watershed Management** – The county recognizes the efforts and progress made by the Butte County RCD and local watershed groups to meet distinct organizational and resource challenges. These local efforts could, in some cases, be enhanced through coordination and exchange of information and through sharing of staff and funding resources. Likewise, at the regional level, coordination of watershed management planning among Butte, Plumas, Yuba, and Lassen Counties could achieve mutual benefits. The county will support watershed planning and management through the RCD.
- **Implement an Environmental Monitoring Program** – Although the county has developed demand projections for municipal and agricultural water use, the county’s environmental water needs are less well quantified. Better quantifying current and projected environmental water needs will allow the county to plan for its future water

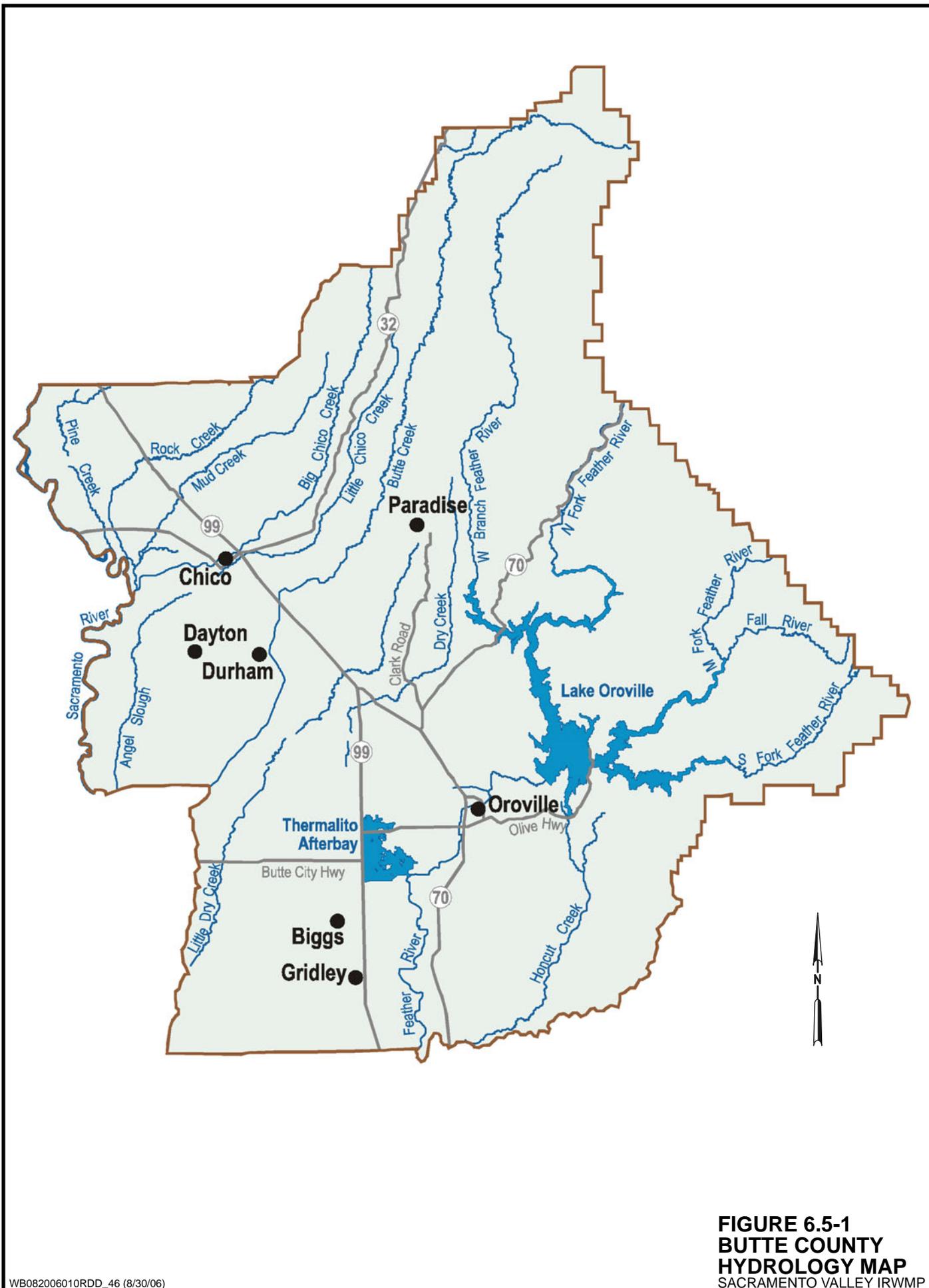
needs and to protect the potential for beneficial, in-county use of its water resources. The county will implement an environmental monitoring program to increase knowledge regarding environmental resources and water demands.

- **Enhance a Multi-county Cooperative Outreach Effort** – Because management of the county’s water resources affects – and is affected by – resource management in adjacent counties, opportunities might exist for the county to improve local, statewide, and federal understanding of regional water management issues and needs through a multi-county, coordinated outreach effort. The county will initiate a multi-county effort to cooperate with neighboring entities that share water resources.

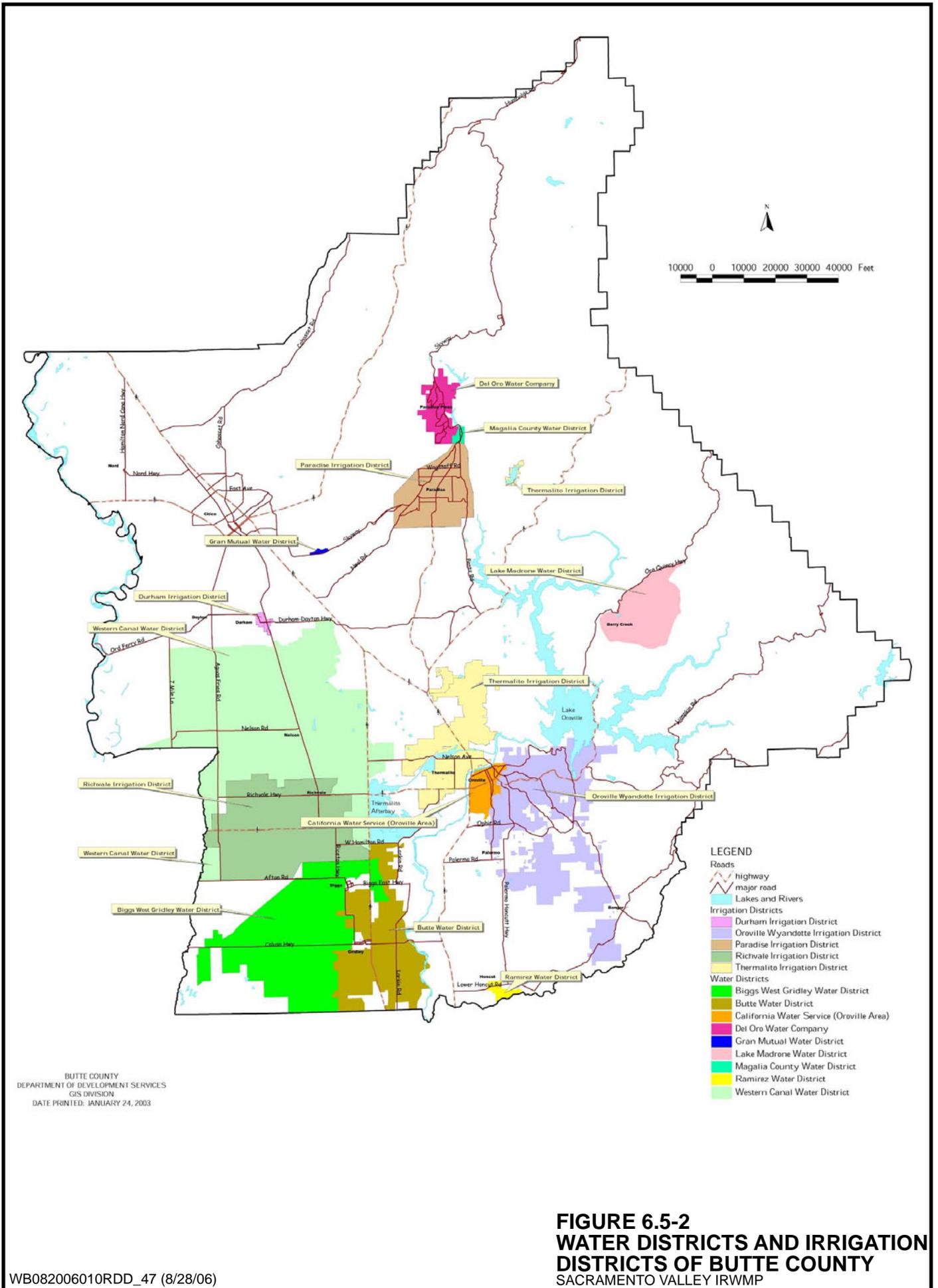
### *Second-tier Policies*

The Second Tier Policies identified in the Butte County IWRP are listed and summarized as follows:

- **Investigate the Potential for Water Storage in Former Mines** – Mining activities leave a pit that might have potential for use as a water storage reservoir. The county will investigate the potential for future water storage projects in former mines.
- **Expand Groundwater Level and Extraction Monitoring** – Increased monitoring of the groundwater aquifer will help the county protect the resource for the future. Butte County DW&RC and the Department, Northern District, have focused on characterizing the groundwater aquifer under Butte County, but additional information is needed in areas where significant volumes of groundwater are extracted each year. Increased groundwater level and extraction monitoring in these areas would provide information that could help the county and Department better understand the aquifer. The county would increase monitoring efforts to further this goal.
- **Commit to a Periodic and Coordinated Update of Water Management Plans, Ordinances, Resolutions, and Policies** – Water use and available supplies change regularly, especially with increasing development or changes in land use. Water management tools lose effectiveness if they are not updated as these changes take place. The county will commit to regularly updating water management plans, ordinances, resolutions, and policies, including management objectives.
- **Support Restoration of a More Natural Flow Regime on the Sacramento River** – The flow patterns and geomorphology of the Sacramento River vary from historical patterns of high flows during rainfall and snowmelt. Fish and riparian vegetation use flows to cue various behaviors, such as spawning and migration. Channel geomorphology also plays an important role in the river’s suitability for riparian species. Butte County will provide institutional and political support to restore a more natural flow regime and geomorphology on the Sacramento River.



**FIGURE 6.5-1  
BUTTE COUNTY  
HYDROLOGY MAP  
SACRAMENTO VALLEY IRWMP**



BUTTE COUNTY  
 DEPARTMENT OF DEVELOPMENT SERVICES  
 GIS DIVISION  
 DATE PRINTED: JANUARY 24, 2003

**FIGURE 6.5-2**  
**WATER DISTRICTS AND IRRIGATION**  
**DISTRICTS OF BUTTE COUNTY**  
 SACRAMENTO VALLEY IRWMP



**FIGURE 6.5-3**  
**SUBAREAS FOR BUTTE COUNTY**  
**USED IN WATER PLANNING**  
SACRAMENTO VALLEY IRWMP

Option Number/Name		Screening Criteria						Notes	
		Technical	Legal	Political	Financial	Environmental	Benefits		
Environmental	1. Increase fish flows in Upper Butte Creek								
	2. Increase fish flows in Lower Butte Creek								
	3. Restore a more natural flow regime on the Feather River								
	4. Develop a coordinated water quality database								
	5. Develop a coordinated and expanded water quality monitoring program								
	6. Implement an environmental monitoring program								
	7. Provide guidance in development of basin management objectives that support vegetation								
	• Increase flow on Big Chico Creek	X						Big Chico Creek does not have upstream storage facilities or diversions that could be reoperated to increase flows	
Water Use Efficiency	8. Expand urban water efficiency measures								
	9. Expand agricultural water efficiency measures								
	10. Inform and educate the public about water								
	• Meter water use in Chico					X		Redundant to expand urban water use efficiency measures option	
Ridge Supplies	11. Divert water from Miocene and Hendricks Canals to supply the Ridge								
	12. Build the Lime Saddle Pipeline to deliver water to the Ridge								
	13. Strengthen Magalia Dam to increase storage capacity								
	14. Raise Paradise dam to increase storage capacity								
Coordinated Management	15. Implement a coordinated management program								
	16. Identify and deepen shallow groundwater wells								
	17. Build a canal to deliver surface water to Cherokee and Esquon								
	18. Build the Oro-Chico conduit for in-lieu and direct recharge in Cherokee and Esquon								
	19. Construct groundwater recharge basins								
	20. Investigate a storage reservoir in Table Mountain's former basalt mine								
	21. Enhance natural recharge from local waterways through environmental restoration activities								
	22. Expand groundwater level and extraction monitoring								
		• Divert water from Miocene Canal to Dry Creek for groundwater recharge					X		Redundant to Option 21 (enhance natural recharge)
		• Construct tanks to store extracted groundwater				X	X		Above-ground storage is expensive and not necessary; the groundwater aquifer can function as a storage facility
	• Refire land in recharge areas			X				County residents would likely not accept retiring land over recharge areas	
	• Adjudicate groundwater basin			X		X		Adjudicating the groundwater basin would be unpopular and would not benefit County residents	
Policies	23. Create a groundwater replenishment district								
	24. Protect recharge area water quality through zoning								
	25. Commit to a periodic and coordinated update of water management plans, ordinances, resolutions and policies								
	26. Initiate a multi-county cooperative outreach effort								
	27. Increase support for the Butte County Resource Conservation District								
	28. Coordinate regional watershed management								
	29. Support restoration of a more natural flow regime on the Sacramento River								
		• Establish a no-growth policy for cities			X				Cities would not be likely to accept no-growth policies
		30. Improve management of unused SWP allocation							

X Option is unacceptable in this category

Source: Butte County Integrated Water Resources Plan, Table 4-1 (June 2004)

**FIGURE 6.5-4**  
**OPTION SCREENING**  
SACRAMENTO VALLEY IRWMP

# *The* Sacramento Valley

Water Management Agreement



September 2001

*The Sacramento Valley Water Management Agreement  
is a grassroots, collaborative effort to increase water supplies  
for farms, cities, and the environment*

# Sacramento Valley Water Resources



## Sacramento Valley at a Glance

- The Sacramento River supplies 80 percent of the water flowing into the Delta.
- The Sacramento River and its tributaries are major habitat and spawning grounds for threatened and endangered fish species.
- The Sacramento Valley has more than 20 percent of California's total irrigated acreage.
- Sacramento Valley water shortages are predicted to continue for both average and drought years.
- The Sacramento Valley is a major resting point for millions of migratory waterfowl on the Pacific Coast Flyway.
- The Sacramento Valley is home to 2 million people.



# *The Sacramento Valley*

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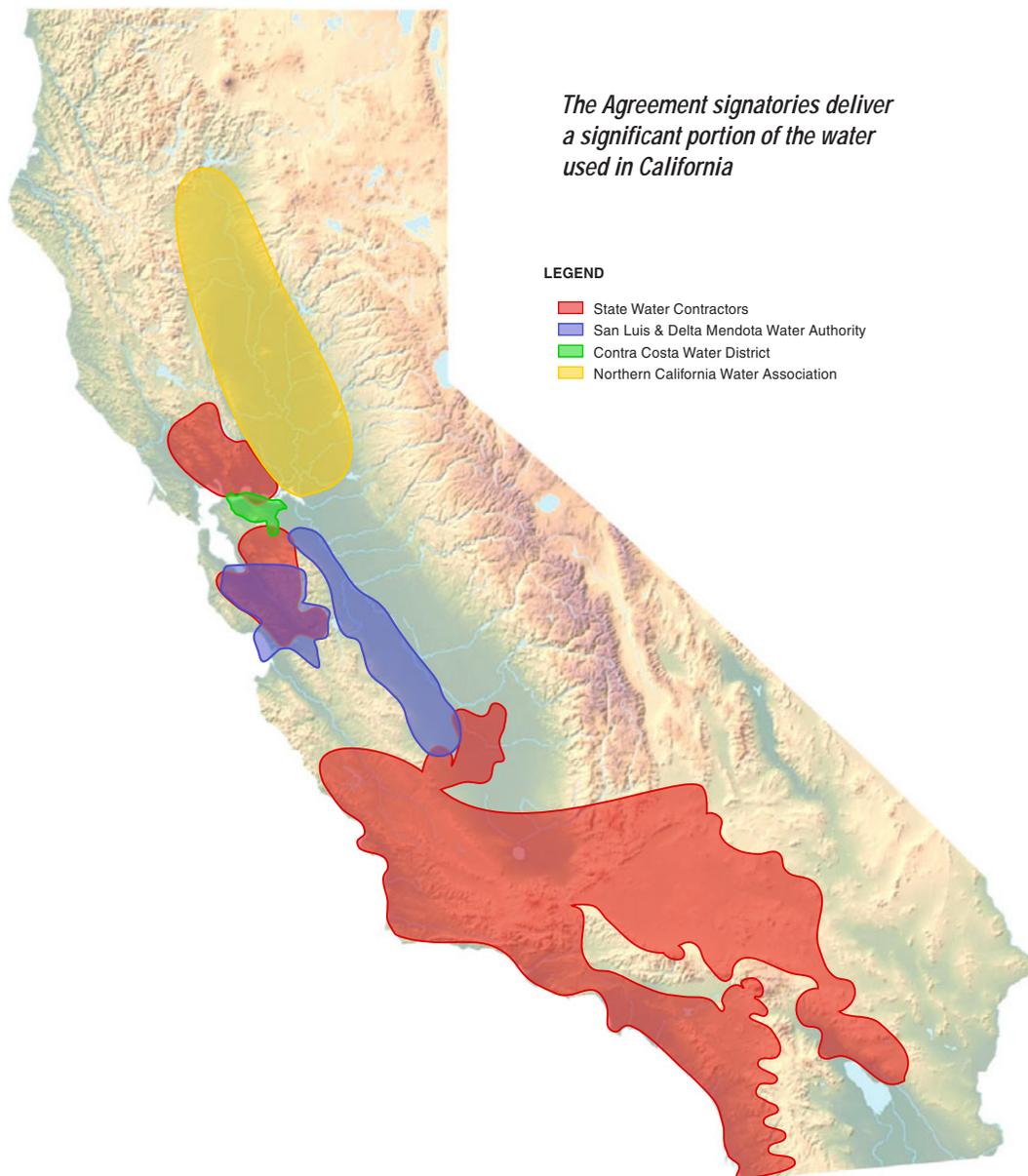
## Water Management Agreement

### Contents

- Pg. 3 Agreement Benefits
- Pg. 4 Bay-Delta Water Quality
- Pg. 7 Unprecedented Cooperation
- Pg. 8 Workplans for Implementation
- Pg.11 Appendix A - The Sacramento Valley Water Management Agreement
- Pg.17 Appendix B - U.S. Bureau of Reclamation and California Department of Water Resources Letter
- Pg.19 Appendix C - State Water Resources Control Board Decision

## The Sacramento Valley Water Management Agreement

*In April 2001, more than 100 organizations reached an unprecedented agreement to manage water in a way that meets water supply, water quality, and environmental needs in the Sacramento Valley and throughout California.*



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# Agreement Benefits



## *Increased supplies for all uses*

Through integrated water management strategies, upstream and export water users will be able to optimize existing water supplies, enhance water quality, and develop additional supplies. This will enable them to meet existing and future water needs and enhance their water management flexibility.



## *Sustainable solution*

The Sacramento Valley Water Management Agreement (Agreement) calls for solutions to complex problems, rather than stopgap measures. Solutions will be implemented in two tiers, based on how quickly the project can be implemented and begin providing benefits.



## *Timely resolution*

The Agreement provides firm milestones to complete a joint workplan for short-term projects within the first 180 days. These projects will provide benefits for the 2002 and 2003 water years; a long-term workplan will be completed within 1 year.



## *Environmental restoration*

The programs and projects provided for in the Agreement will avoid unmitigated impacts to Delta water quality and the environment and will be developed and implemented to provide environmental benefits, including benefits to fish and wildlife, in the Sacramento River watershed.



## *Water quality standards will be met*

The California Department of Water Resources and the U.S. Bureau of Reclamation will continue to voluntarily meet the requirements in the State Water Resources Control Board 1995 Water Quality Control Plan to protect the Bay-Delta until a long-term solution is negotiated as a part of the Agreement.



## *Consistent with other water management activities*

The projects implemented under this Agreement are consistent with the August 2000 CALFED Bay-Delta Program Record of Decision and with the CALFED Integrated Storage Investigation.

# A 40-Year Struggle for Bay-Delta Water Quality

**1959**  
Delta Protection Act passed.

**1973**  
California Department of Fish and Game (DFG) conclude Peripheral Canal best Delta water facility.

**1977**  
California experiences driest year on record.

**1978**  
SWRCB issues Water Right Decision 1485 (D-1485) requiring Central Valley Project (CVP) and State Water Project (SWP) operations to meet Delta water quality standards.

**1982**  
Voters defeat Proposition 9 – the Peripheral Canal Measure.

**1971**  
State Water Resources Control Board (SWRCB) issues Delta Water Right Decision 1379.

**1974**  
Department of Water Resources (DWR), DFG, U.S. Bureau of Reclamation (USBR) and U.S. Fish and Wildlife Service (USFWS) sign statement of intent that agencies will provide protection of Delta fish and

**1979**  
USBR announces CVP will voluntarily comply with D-1485 until mandatory compliance is resolved.

**1986**  
Racanelli Appellate Court Decision requires SWRCB to revise water rights and water quality process.

Historic USBR-DWR Coordinated Operation Agreement authorized by Congress.

*California's Sacramento Valley is rich in agricultural and environmental resources and serves as a major resting point for millions of migratory waterfowl on the Pacific Coast Flyway. The Sacramento River is the lifeblood of this Valley. The Sacramento River and its tributaries are major habitat and spawning grounds for threatened and endangered fish species and supply more than 80 percent of the inflows to the Sacramento-San Joaquin Delta. The Delta is the largest estuary on the west coast and serves as the hub for California's water system.*

Competing agricultural, environmental, and urban uses create serious water management challenges within the Sacramento Valley. Current forecasts predict continuing statewide water shortages in both average and drought years. Water managers are striving to ensure that the water supply is of both adequate quantity and quality for the many uses.

For nearly 40 years, the State of California has struggled to develop the appropriate water quality standards for the Bay-Delta and to determine which water sources are required to meet those standards. This struggle has involved years of contention and litigation and has been elevated to the United States Supreme Court.



A major breakthrough occurred in late 1994 with the so-called Bay-Delta Accord (Accord). The Accord set water quality standards and required the State Water Resources Control Board (Board) to determine which water users would be responsible to meet these standards. In 1995 the Board adopted the Water Quality Control Plan (Plan) as a tool to implement the Accord. The California Department of Water Resources (Department) and the U.S. Bureau of Reclamation (Bureau) have been voluntarily meeting the Plan's water quality standards on an interim basis. Meanwhile, the Board held water rights proceedings to determine final responsibility for meeting the standards.



**1987**  
SWRCB begins proceedings to revise D-1485 upon U.S. Environmental Protection Agency (USEPA) declaration that it is inadequate to protect Bay-Delta water quality.

**1992**  
President George Bush signs CVP Improvement Act, requiring among other things, 800,000 a.f. of water annually for the environment.

**1994**  
Bay-Delta Accord signed. CALFED formed.  
  
Sacramento River winter-run chinook salmon listed as federal endangered species.

**1995**  
SWRCB adopts new water quality standards and begins water rights proceedings.

**1998**  
CALFED released programmatic draft EIS/EIR offering three alternatives for Delta restoration.

**2001**  
Sacramento Valley Water Management Agreement.

**1988**  
Senate Bill 34 passes, providing \$120 million over 10 years for Delta levee maintenance.

**1991**  
SWRCB releases new salinity control plan for Bay-Delta.  
  
USEPA calls for more stringent standards.

**1993**  
Delta smelt declared federal threatened species. SWRCB resumes work on permanent Delta Water Quality Standards.  
  
USEPA proceeds with setting federal Bay-Delta standards.

**1997**  
Steelhead listed as federal threatened species.

**1999**  
Splittail minnow and spring-run chinook salmon listed as federal threatened species.

**2000**  
CALFED Record of Decision.  
  
San Joaquin River Agreement.



### *Bay-Delta Water at a Glance*

- More than 22 million people depend on the Delta for drinking water.
- More than 750 species of plants and animals call the Bay-Delta home, making it the richest ecosystem on the west coast.
- Seven million acres of the nation's most productive agricultural lands depend on Bay-Delta water to irrigate crops and water livestock.
- The Delta is a critical source of freshwater to blend with high salinity waters in other areas of the state to provide safe water for agricultural, environmental, and urban uses.

Phases 1 through 7 of the water rights proceedings involved the San Joaquin Valley and other Delta issues. After completion of these phases, the contentious Sacramento Valley issues (Phase 8) loomed over the State's water users.

In Phase 8, the Department and the Bureau claim that certain water rights holders in the Valley must cease diversions or release water from storage to help meet Delta water quality standards. Sacramento Valley water users believe

their use has not contributed to water quality problems in the Delta; and as senior water right holders and water users within the watershed and counties of origin, they contend they are not responsible for meeting these standards. The Phase 8 process would ultimately determine which entities and individuals (if any) would be responsible for meeting water quality standards.

# Agreement Partners

California Department of Water Resources  
 U.S. Bureau of Reclamation  
 State Water Contractors

San Luis & Delta-Mendota Water Authority  
 Contra Costa Water District  
 Northern California Water Association

**San Luis & Delta-Mendota Water Authority includes the following:**

- Banta-Carbona Irrigation District
- Broadview Water District
- Central California Irrigation District
- Centinella Water District
- City of Tracy
- Columbia Canal Company
- Del Puerto Water District
- Eagle Field Water District
- Firebaugh Canal Water District
- Fresno Slough Water District
- Grassland Water District
- James Irrigation District
- Laguna Water District
- Mercey Springs Water District
- Oro Loma Water District
- Pacheco Water District
- Pajaro Valley Water Management Agency
- Panoche Water District
- Patterson Irrigation District
- Plain View Water District
- Pleasant Valley Water District
- Reclamation District 1606
- San Benito County Water District
- San Luis Canal Company
- San Luis Water District
- Santa Clara Valley Water District
- Tranquility Irrigation District
- Tummer Island Water District
- West Side Irrigation District
- West Stanislas Irrigation District
- Westlands Water District
- Widren Water District

**Northern California Water Association includes the following:**

- Brophy Water District
- Browns Valley Irrigation District
- Cordua Irrigation District
- Feather Water District
- Garden Highway Mutual Water Company
- Glenn-Colusa Irrigation District
- Joint Water Districts Board
  - Biggs-West Gridley Water District
  - Butte Water District
  - Richvale Irrigation District
  - Sutter Extension Water District
- Maxwell Irrigation District
- Natomas Mutual Water Company
- Pelger Mutual Water Company
- Plumas Mutual Water Company
- Princeton-Codora-Glenn Irrigation District
- Provident Irrigation District
- Ramirez Water District
- Reclamation District 108
- Reclamation District 1004
- South Sutter Water District
- South Yuba Water District
- Sutter Bypass-Butte Slough Water UA
- Sutter Mutual Water Company
- Tehama-Colusa Canal Authority
  - Colusa County Water District
  - Corning Water District
  - Cortina Water District
  - Davis Water District
  - Dunnigan Water District
  - 4-M Water District
  - Glenn Valley Water District
  - Glide Water District
  - Holthouse Water District
  - Kanawha Water District
  - Kirkwood Water District
  - LaGrande Water District
  - Myers-Marsh Mutual Water Co.
  - Orland-Artois Water District
  - Proberta Water District
  - Thomes Creek Water District
  - Westside Water District
- Thermalito Irrigation District
- Tudor Mutual Water Company
- Western Canal Water District
- Yuba County Water Agency

**State Water Contractors includes the following:**

- Alameda County Flood Control and Water Conservation District Zone 7
- Alameda County Water District
- Antelope Valley-East Kern Water Agency
- Casitas Municipal Water District
- Castaic Lake Water Agency
- Central Coast Water Authority
- City of Yuba City
- Coachella Valley Water District
- County of Kings
- Crestline-Lake Arrowhead Water Agency
- Desert Water Agency
- Dudley Ridge Water District
- Empire-West Side Irrigation District
- Kern County Water Agency
- Littlelock Creek Irrigation District
- Metropolitan Water District of Southern California
- Mojave Water Agency
- Napa County Flood Control and Water Conservation District
- Oak Flat Water District
- Palmdale Water District
- San Bernardino Valley Municipal Water District
- San Gabriel Valley Municipal Water District
- San Geronio Pass Water Agency
- San Luis Obispo County Flood Control and Water Conservation District
- Santa Clara Valley Water District
- Solano County Water Agency
- Tulare Lake Basin Water Storage District

DEPARTMENT OF WATER RESOURCES  
 DATED: 3/23/01 By:   
 Approved as to legal form and authority.  
  
 ASST. DIR. OF LEGAL COUNSEL  
 DIVISION OF LEGAL COUNSEL  
 U.S. BUREAU OF RECLAMATION  
 MID-PACIFIC REGION  
 DATED: 3/14/01 By:   
 Lester A. Shaw  
 Regional Director

STATE WATER CONTRACTORS  
 DATED: 4/3/01 By:   
 John C. Coburn  
 General Manager

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY  
 DATED: 3/30/01 By:   
 David G. Nelson  
 Executive Director

CONTRA COSTA WATER DISTRICT  
 DATED: 4/3/01 By:   
 Walter J. Binkley  
 General Manager

NORTHERN CALIFORNIA WATER ASSOCIATION  
 DATED: 4/4/01 By:   
 David J. Gray  
 Executive Director

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# Unprecedented Cooperation

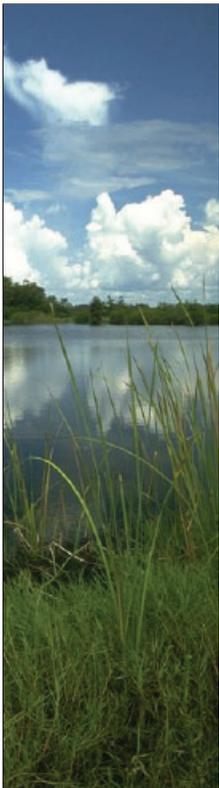
*The Sacramento Valley Water Management Agreement is a grassroots, collaborative effort to increase water supplies to farms, cities, and the environment.*

Proceeding with Phase 8 could involve litigation and judicial review for nearly 10 years. This extended process could result in adverse impacts to the environment and undermine progress on other statewide water management initiatives. To avoid the consequences of delay, the Sacramento Valley water users, the Department, the Bureau, and export water users developed the Sacramento Valley Water Management Agreement (Agreement). This Agreement establishes a framework to meet water supply, water quality, and

environmental needs in the areas of origin and throughout California in an unprecedented cooperative spirit. The Board on April 26, 2001, issued an order to postpone and possibly dismiss Phase 8 of its Bay-Delta water rights proceedings and allow implementation of the Agreement, thus providing an amicable way to resolve these contentious issues.

## ***Regional Strategy Based on Collaboration***

The cornerstone of the Agreement is that it was achieved and will be implemented through a collaborative process including Sacramento Valley water users, the Department, the Bureau, and export water users. This will include active participation by water district managers, technical consultants, and local political leaders. The Agreement provides the foundation for a regional strategy to ensure that local water needs are fully met while helping improve water supplies throughout the state.



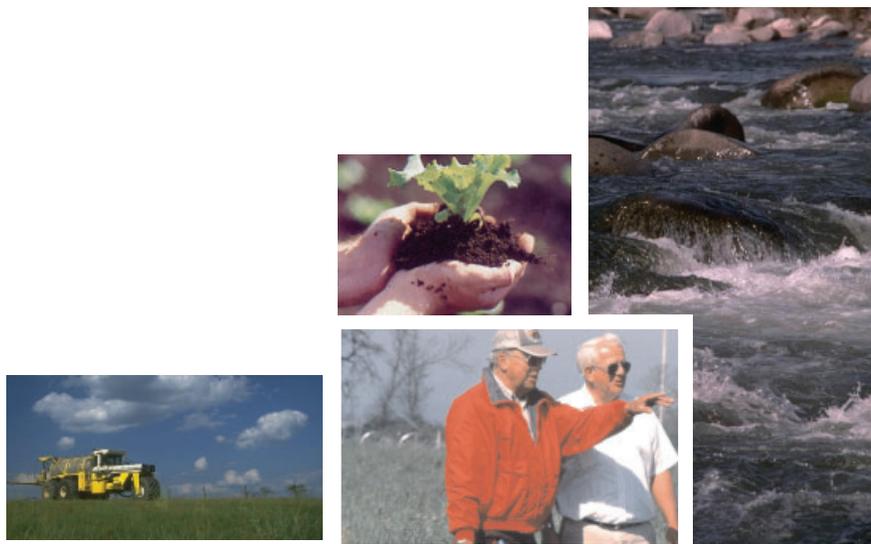
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## ***Agreement Principles***

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- The state and federal export projects will continue to meet water quality standards in the Delta until a long-term solution is negotiated as a part of the Agreement.
- The parties fully commit to an integrated water management and water supply development program for the Sacramento Valley that will meet 100% of the water needs in the Sacramento Valley, improve the water supplies and quality for other areas of the state, and provide water for environmental purposes.
- The parties will work together to secure public funding for water management and supply projects in the Sacramento Valley that will help assure environmental restoration, optimize the use of existing water supplies and enable local interests to develop additional water supplies in areas of origin.
- By the end of 2001, the parties will prepare a joint workplan for short-term Sacramento Valley water management projects to implement the Agreement. Workplans on longer-term projects will follow in 2002.
- The parties will evaluate the projects and workplans against the Agreement's goals and principles on an ongoing basis to ensure that water needs are being met.

## Next Steps: Workplans for Implementation



To implement the Agreement, the parties are preparing joint workplans. The workplans will describe certain Sacramento Valley projects and provide an estimate of the quantity of water or other water management benefits that can be realized by implementing these projects. The short-term workplan will provide benefits for 2002 and 2003 and will be completed by the end of 2001. The long-term workplan will be completed by May 2002.

The workplans will identify a palette of voluntary water management measures that will lead to an integrated water management program. The program will include the

coordinated use of storage facilities, management and recovery of tailwater through major drains, water conservation, conjunctive management of surface water and groundwater, and transfers and exchanges among Sacramento Valley water users and other water users in the state. Furthermore, the Agreement contains a commitment to implement Sites Reservoir as an integral component of the water management and water supply development program for the Sacramento Valley.

The workplans are being developed through the process illustrated in Figure 1. It is a locally driven process, with

Figure 1 **Project Development Process**





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### *Management Tools*

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Implementation of voluntary water management measures are key to accomplishing the goals of this Agreement. These include:

- Coordinated use of storage facilities
- Conjunctive management of surface water and groundwater
- Management and recovery of tailwater through major drains
- Water conservation
- Transfers and exchanges among Sacramento Valley water users and other water users in the state
- Increased surface storage

extensive involvement by all stakeholders. More than 50 stakeholders completed detailed questionnaires to propose projects for the short-term workplan. The proposed projects will be screened on the basis of a broad range of potential benefits and broad geographic coverage in the Valley.

Those projects will then be reviewed and evaluated on the basis of more detailed project summaries. From that review, projects will be selected for inclusion in the short-term workplan and implementation plans will be developed.

The next steps will be:

- Conduct environmental review and obtain necessary permits
- Secure appropriate funding
- Provide for public participation

Environmental review is a part of all projects, even those that will generate positive net effects on the environment. Envi-

ronmental documentation will be prepared for all projects, and cumulative impacts will be addressed.

Funding will be pursued from a number of sources. As most of the projects will provide multiple benefits to various participants, cost-sharing arrangements will be negotiated to reflect those benefits. Many of the projects will also provide public benefits, primarily environmental, and efforts will be made to obtain state and federal funds to support those benefits. Potential funding sources include Proposition 13, Proposition 204, and state and federal funding through the CALFED program.

Public support will be crucial to successful development of the projects. Public meetings will be held to provide opportunities for full input into the planning process.



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# Appendix A

## **AGREEMENT REGARDING RESOLUTION OF PHASE 8 ISSUES, DEVELOPMENT AND MANAGEMENT OF WATER SUPPLIES, AND A BINDING COMMITMENT TO PROCEED PURSUANT TO SPECIFIED TERMS**

This Agreement is in furtherance of a resolution of Phase 8 of the State Water Resources Control Board's (hereinafter "SWRCB") current Bay-Delta Water Rights Hearings. The Parties will work together to settle issues related to obligations or potential obligations to meet existing Bay-Delta water quality and flow objectives by developing a cooperative water management partnership among (a) those south of the Sacramento-San Joaquin Delta who possess water rights or are State Water Project ("SWP") or Central Valley Project ("CVP") water users; (b) the Contra Costa Water District and those who derive SWP water from the North Bay Aqueduct (hereinafter (a) and (b) for the purposes of this Agreement referred to collectively as "Export Water Users"); (c) those who possess water rights or are water users within the watershed of the Sacramento River and its tributaries (hereinafter "Upstream Water Users"); (d) the California Department of Water Resources (hereinafter "DWR"); and (e) the United States Bureau of Reclamation on behalf of the CVP (hereinafter "Reclamation"), all of which are hereafter referred to as the Parties.

Now therefore, it is mutually agreed as follows:

### **1. Goals and Principles**

The Parties hereto agree to the following statement of goals and principles that shall guide the implementation of all aspects of this Agreement, including development of a cooperative water management partnership. This Agreement, during its term, is intended to:

- (a) Provide the mechanism for satisfying the flow-related objectives of the SWRCB's 1995 Bay-Delta Water Quality Control Plan (hereinafter the "1995 WQCP");
- (b) Be implemented in lieu of proceeding with Phase 8 of the SWRCB's Bay-Delta process;
- (c) Facilitate the development of integrated water management strategies that will enhance the Upstream and Export Water Users' abilities to optimize use of their existing supplies, enable them to develop additional supplies to meet their existing and future water needs, and enhance their water management flexibility;
- (d) Facilitate the development of protections to ensure that water stored and released by the SWP and the CVP is available for meeting downstream flow-related objectives and for SWP and CVP purposes, including exports from the Delta;
- (e) Be implemented in a manner compatible with CALFED's goals;
- (f) Facilitate the development of new near- and long-term water supplies through agreements among the Parties, and through the Governor's drought contingency plan, in ways that do not detract from the ability to meet the existing and future needs of Upstream Water Users;
- (g) Avoid unmitigated impacts to Delta water quality or the environment;
- (h) Provide net water quality benefits for Upstream Water Users, Export Water Users, and the Delta;
- (i) Be implemented in a manner that provides that the comprehensive program will, among other factors, be cost effective, financially feasible, and affordable; and
- (j) Result in state-wide water resource and environmental benefits and, therefore, receive funding from state and federal sources where appropriate.

### **2. Initial Elements of the Cooperative Management Partnership.**

It is intended that the Goals and Principles adopted with this Agreement be implemented through the development of specific programs and projects. The development of these programs and projects will be an ongoing process and may, over time, involve numerous entities not signatories to this Agreement. These may include agencies of the state or federal government including, but not limited to, the United States Fish & Wildlife Service ("USFWS"), the National Marine Fisheries Service ("NMFS"), and the California Department of Fish and Game ("CDFG"), and may also include in-Delta water users. Moreover, over time, the Parties may decide to employ a facilitator or mediator to assist them in moving forward with project development and implementation. In this light, the following specific matters are intended only as the initial scope of work under this Agreement, with future work to be developed and implemented as appropriate. Future work plans, if appropriate, can become amendments to this Agreement or can be the subject of subsequent related agreements.

- (a) *Quantifying Water Demands and Supplies.* The Parties recognize a need to develop reliable estimates of the quantities of water that are currently being used, present unmet demands and projected future demands within the watershed of the Sacramento River and its tributaries. The Parties also need to develop estimates of the quantities of new water supplies that could be made available to Upstream areas, Export areas, and to meet the 1995 WQCP standards based on the measures included in the programs and projects described below. The Parties agree to establish a technical committee to begin immediately to develop, collect and analyze this information.
- (b) *Unmet and Future Demands in the Upstream Areas.* The Parties recognize that Upstream Water User demands may vary and that the following approximates the categories of upstream demands that will be provided for:
  - (i) Urban needs and uses within the watershed of the Sacramento River and its tributaries.

- (ii) Needs and uses within the Tehama-Colusa and Corning Canal service areas.
- (iii) Needs and uses within the Sacramento River Water Rights Settlement Contractors' collective service area.
- (iv) Needs and uses within areas that obtain supply from the drains and bypasses within the Sacramento Valley.
- (v) Needs and uses within the areas tributary to the Sacramento, American, and Feather Rivers.
- (c) *Export Water Supplies.* The Parties recognize that Export Water Users have experienced water supply reductions as a result of regulatory and other actions. The programs and projects provided for in this Agreement will improve the water supplies on both a short- and long-term basis, and improve the water quality.
- (d) *Environmental Benefits.* The Parties recognize that programs and projects provided for in this Agreement will be developed and implemented not only to meet the needs of Upstream and Export Water Users and the flow-related objectives of the 1995 WQCP, but also to provide environmental benefits, including benefits to fish and wildlife, in the watershed of the Sacramento River.
- (e) *Role of Sites Reservoir.* The Parties recognize that new off-stream surface storage is an essential part of the long-term water management program, and agree that Sites Reservoir is a potentially significant off-stream surface-water storage project that could help meet the goals and objectives of this Agreement, including providing capacity to increase the reliability of water supplies for Upstream and Export Water Users, flexibility during critical fish migration periods on the Sacramento River, and storage benefits for other CALFED programs. Work being undertaken pursuant to CALFED's Sites MOU will be integrated into this Agreement and the Parties will work with CALFED to accelerate feasibility studies and completion of appropriate environmental and permitting processes for the reservoir.
- (f) *Enlarged Shasta.* The Parties agree that other significant surface water storage opportunities may exist, including the enlargement of Shasta Reservoir. The Parties shall take all appropriate efforts to advance these other opportunities and shall integrate the benefits associated with these projects into the programs provided for in this Agreement.
- (g) *Role of the Basin-Wide Management Plan.* Reclamation and certain Upstream Water Users are currently developing a Basin-Wide Management Plan for the purpose of improving water management within portions of the Sacramento Valley. The Basin-Wide Management Plan that Reclamation and certain Upstream Water Users are developing shall serve as a model for implementation of this Agreement and could be expanded to incorporate other areas of the watershed of the Sacramento River and its tributaries, as appropriate.
- (h) *Management Tools for this Agreement.* A key to accomplishing the goals of this Agreement will be the identification and implementation of a "palette" of voluntary water management measures (including cost and yield data) that could be implemented to develop increased water supply, reliability, and operational flexibility. Some of the measures that may be included in the palette are:
  - (i) Basin-Wide Water Management Plan identified above;
  - (ii) Conjunctive uses of surface water and groundwater;
  - (iii) Coordinated use of storage facilities;
  - (iv) Management and recovery of tailwater through major drains;
  - (v) Transfers and exchanges among Upstream Water Users and with the CVP and SWP water contractors, either for water from specific reservoirs, or by substituting groundwater for surface water;
  - (vi) Substitution of water from potential north of Delta reservoirs, such as Sites Reservoir, for groundwater, or river diversions, or maintaining water quality in the Delta; and
  - (vii) Water conservation.

### 3. Resolution of Phase 8 Issues

- (a) The Parties agree that while this Agreement remains in effect, DWR and Reclamation shall assume responsibility for meeting the Sacramento River and its tributaries' portions of flow-related objectives established in the 1995 WQCP. Upstream Water Users shall have no obligation to release stored water, extract groundwater or forego diversions in order to help implement the flow-related objectives included in the 1995 WQCP.
- (b) In conjunction with the SWRCB, the Parties shall jointly develop a program to prevent unauthorized diversions, provided that the program is consistent with this Agreement.
- (c) The Export Water Users, DWR, and Reclamation agree that while this Agreement is in effect they shall take no action before the SWRCB or elsewhere, nor shall they support any such action to insert Term 91, or its regulatory equivalent, into existing water rights permits or licenses, or modify riparian or pre-1914 water rights through the application of the regulatory equivalent of Term 91. The Parties recognize that the SWRCB will continue to implement Term 91 according to its existing terms.
- (d) Notwithstanding the foregoing, nothing herein shall be interpreted as waiving the Parties' legal positions or rights in the event that the SWRCB proceeds with the Phase 8 hearings or otherwise attempts to determine the legal obligations of water users to meet adopted water quality or flow standards in the Bay-Delta or in streams tributary to the Bay-Delta. In addition, the Parties acknowledge and agree that nothing herein shall limit their ability to initiate a new or additional water right or water supply, transfer an existing water right, or change or modify an existing water right or a contract relating to a water supply; nor shall a Party be precluded from arguing that Term 91 should be applied or not applied by the SWRCB in any of these proceedings or that a new water right, transfer, or change or modification of an existing water right will or will not cause injury to a lawful water user.

- (e) This Agreement shall become effective on the day the SWRCB enters an order that:
  - (i) Provides for a Stay of Phase 8 of the current Bay-Delta water rights proceeding pending development and approval of the Workplans described in Paragraphs 5(a) and 5(b) of this agreement;
  - (ii) Provides that, should either of the Workplans not be completed or approved, and this Agreement is therefore terminated, the Parties shall immediately notify the SWRCB and the SWRCB will lift the stay and proceed with Phase 8;
  - (iii) Under the circumstances provided for in sub-paragraph 3(e)(ii), extends the expiration of the SWP's and CVP's obligations under Conditions 1 and 2 of the Order in Revised Decision 1641 to the earlier of the completion of a resumed Phase 8 or one year from the date of a notice to the SWRCB of termination of this Agreement; and
  - (iv) Provides that, should the Workplans described in Paragraphs 5(a) and (b) both be completed and approved, Notice of the approval provided to the SWRCB (a) automatically dismisses the Phase 8 proceedings and (b) further extends the expiration of the SWP's and CVP's obligations under Conditions 1 and 2 of the Order in Revised Decision 1641 to one year after the Notice of the termination of this Agreement to the SWRCB or such sooner time as a water rights proceeding allocating the responsibilities to meet Bay-Delta standards is completed; and
  - (v) Provides that the dates set forth in sub-paragraphs 3(e)(iii) and (iv) above may be extended for up to one year if after notice and hearing the SWRCB determines that the additional time is necessary for it to fully consider and decide the matter.

#### 4. Resolution of Related Issues

The Parties acknowledge that there are a number of administrative, regulatory, legislative and judicial actions currently ongoing or reasonably to be anticipated that could have major effects on the Parties' ability to implement the terms of this Agreement.

In this regard, the Parties acknowledge and agree that developments in any of these or other matters may have a material effect on any Party's ability to implement this Agreement and meet the Milestones set forth in Paragraph 5 below. The Parties agree that they will work together to attempt to deal with the factual/legal situation that then exists in order to allow the Parties to proceed with the programs identified in this Agreement. Nonetheless, failure to meet Milestones, for whatever reason, shall remain a cause for the termination of this Agreement.

#### 5. Milestones

- (a) *Short-Term Projects.* Within one hundred eighty days of the Effective Date of this Agreement, the Parties shall, working together, prepare a joint work plan listing short-term projects that can be used to implement this Agreement. Such projects are defined as those which can provide benefits for the 2002 and 2003 water years.
- (b) *Medium and Long-Term Projects.* Within one year of the Effective Date of this Agreement, the Parties shall, working together, prepare a joint work plan listing medium- and long-term projects that can be used to implement this Agreement. Medium-term projects are defined as those which will be operational by December 31, 2005. Long-term projects are defined as those which are operational by December 31, 2010.
- (c) *Workplan Standards.* For each project identified in the respective Workplan, the appropriate Workplan shall:
  - (i) Briefly describe the project, including expected 10 net benefits and their proposed allocations;
  - (ii) Provide a preliminary estimate of the quantity of water or the nature of other water management benefits that can be realized by implementing the project;
  - (iii) Provide a preliminary estimate of the cost of the project;
  - (iv) Identify any major environmental issues associated with the project; and
  - (v) Describe how the project could best be implemented (including a plan for financing for the project).

Each Workplan shall also provide a timetable for implementation of identified projects, which shall then constitute additional Milestones for this Agreement.

- (d) *Funding.* The Parties shall immediately jointly seek funding for the development of the two Workplans identified above from general state and/or federal sources. In addition, the Parties shall also seek funding, pursuant to Proposition 204 and other possible funding sources, to cover the cost of implementing programs identified within the respective Workplans. Milestones identified within this Agreement may need to be adjusted in order to provide ample time for the Parties to secure adequate state and federal funding to allow work to proceed. Such adjustments must be accomplished pursuant to mutual agreement of all Parties. The Parties shall not seek to acquire funds that are obligated to other programs within CALFED, and shall not seek funding that may otherwise conflict with funding commitments under the Central Valley Project Improvement Act Restoration Fund.
- (e) *Workplan Updates.* The Parties shall review and update the medium/long-term Workplan annually to incorporate information learned as a result of the cooperative process contemplated by this Agreement or as a result of other efforts. The Parties may also revise the list of projects contained in the medium/long-term Workplan, the estimates of the water supply or other benefits associated with such projects, the cost estimates for such projects, the environmental issues associated with such projects, and the implementation plan for each project. The Parties may review and update the medium/long-term Workplan as necessary in the event that circumstances identified in Paragraph 4 above occur.
- (f) *Sites Reservoir Milestones.* Because of the potential significance of Sites Reservoir or other north of Delta offstream storage to achieving the

goals of this Agreement, the following additional specific Milestones shall be adhered to:

- (i) finalize a Purpose and Needs Statement for the project satisfactory to the Parties no later than March 9, 2001;
- (ii) initiate initial scoping sessions associated with appropriate environmental review by April 9, 2001;
- (iii) initiate negotiations on all relevant Planning Agreements called for within the Sites MOU, including addressing issues dealt with in Paragraphs 7.4, 7.5 and 7.6 of the Sites MOU, by January 31, 2001;
- (iv) complete all environmental and planning documentation for the project not later than August 2004;
- (v) make a final decision with respect to the implementation and construction of the project, including obtaining all relevant permits/ biological opinions, including compliance with Clean Water Act section 404(b)(1) or 404(r) by August 2005; and
- (vi) assuming a decision to proceed, initiate project construction not later than August 2006.

## **6. Term and Termination**

- (a) *Term.* Except as may be otherwise expressly provided, the term of this Agreement shall be until December 31, 2010.
- (b) *Annual Reviews.* The Parties shall agree upon the Workplan identified in Paragraph 5(a) of this Agreement within 60 days of its completion. A failure to do so shall cause the immediate termination of this Agreement. The Parties shall agree upon the Workplans identified in Paragraph 5(b) of this Agreement within 60 days of their completion. A failure to do so shall cause the immediate termination of this Agreement. Assuming approvals of the Workplans identified in Paragraphs 5(a) and 5(b), the Parties shall thereafter, on an annual basis as scheduled by the Parties, jointly review the status of development and implementation of all Workplans, as well as the meeting of Milestones provided for herein and in the Workplans. Each annual review shall include a detailed examination of the status of Workplan and Milestone implementation including, without limitation, project feasibility and design, environmental review, permitting and funding. Except as provided for above, this Agreement may only be terminated following an annual review performed in accordance with this Paragraph 6.
- (c) *Termination for Failure to Meet Milestones.* Any Party may terminate this Agreement if, following an annual review and after the mediation provided for in Paragraph 7 of this Agreement, it determines:
  - (i) that either reasonable progress in achieving the Milestones established under this Agreement or in the Workplans cannot be made through the exercise of reasonable diligence by the Parties; or the Milestones established under this Agreement or in the Workplans have not been substantially achieved; and
  - (ii) that the Milestones established under this Agreement or in the Workplans cannot be revised to result in the reasonable achievement of the Milestones of this Agreement.
- (d) *Termination on Modification in 1995 WQCP.* In the event the flow-related objectives contained in the 1995 WQCP are increased or decreased, the Parties shall meet and, if necessary, employ the process outlined in Paragraph 7 of this Agreement, in an attempt to address the changed circumstances associated with modified flow-related objectives. A failure to reach agreement shall cause the termination of this Agreement.
- (e) *Petition on Termination.* In the event the Workplans are not completed or approved or this Agreement is terminated, the Parties shall immediately petition the SWRCB to conduct a water rights hearing to consider the issues described in the SWRCB's Revised Notice of Phase 8 Hearing dated May 6, 1998.

## **7. Resolution of Disputes**

Resolution of disputes, and issues which a Party believes may subject this Agreement to termination shall first be submitted to a mediator, mutually selected by the Parties, with experience in water-related disputes. The Parties will use their best efforts to resolve the issues within 30 days. The costs of any such mediation will be borne equally among the Parties.

## **8. Effect of this Agreement on Other Matters**

Nothing in this Agreement, and nothing incorporated by reference into the terms of this Agreement, is intended or shall be construed as a precedent or other basis for any argument that the Parties to this Agreement have waived or compromised their rights which may be available under State or Federal law except as to the matters addressed in this Agreement, nor shall it be construed as an admission or determination of any Party's responsibility for meeting the requirements of the 1995 WQCP.

## **9. Contingent Upon Appropriations**

The expenditure or advance of any money or the performance of any obligation of the United States under this Agreement shall be contingent upon appropriation or allotment of funds. No liability shall accrue to the United States in case funds are not appropriated or allotted.

## **10. Technical and Management Committees**

The Parties shall form two committees. The first shall be a technical committee which shall have the initial responsibility to develop the Workplans and related Milestones. The second shall be a management committee which shall provide policy direction to the technical committee and review and approve Workplans and Milestones. The committees shall together, in a manner that they determine, be responsible for the implementation of the Workplans. Each Party to this Agreement shall appoint one or more representatives to each of these committees.

### 11. Public Participation

The Parties shall hold periodic public meetings to provide an opportunity for nonparticipating individuals and entities to have input into the planning process.

### 12. Other Agreements

The Parties recognize that as program development progresses there will be a need to either amend this Agreement or to enter into additional agreements. In this regard, the Parties acknowledge that this Agreement will complement other relevant local partnerships and/or CALFED agreements and shall, as a consequence, be flexible enough to accommodate those other partnerships and agreements.

### 13. Environmental Compliance

In carrying out actions which may ultimately result from this Agreement, its amendments or subsequent agreements, the Parties hereto are committed to completing all required environmental review including all procedures and documents required by the National Environmental Policy Act and the California Environmental Quality Act, and to complying with all applicable statutes, including the federal and state Endangered Species Act. The costs of funding this environmental work and compliance shall be among the funding issues dealt with herein. Nothing contained herein is intended to affect DWR's and USBR's compliance with regulatory constraints that are imposed under the Federal Endangered Species Act, the Central Valley Project Improvement Act, the Federal Clean Water Act, or any other applicable state or federal law or regulation, including those incorporated into Tier 1 in the CALFED Record of Decision dated August 28, 2000.

### 14. Counterparts

This Agreement may be executed simultaneously or in one or more counterparts, each of which shall be an original but all of which together shall constitute one and the same document.

### 15. Notices

All notices shall be sent to the following: DWR: Thomas R. Hannigan Director Department of Water Resources P.O. Box 942836 Sacramento, CA 94236-0001 Reclamation; Lester Snow Regional Director United States Department of the Interior Bureau of Reclamation, MP-100 2800 Cottage Way Sacramento, CA 95825; Export Water Users: John Coburn, General Manager, State Water Contractors, 455 Capitol Mall, Sacramento, CA 95814; Daniel Nelson, General Manager, San Luis & Delta-Mendota Water Authority, 842 – 6th Street, Suite 7, P.O. Box 2135, Los Banos, CA 93635, Walter J. Bishop, General Manager, Contra Costa Water District, 1331 Concord Avenue, P.O. Box H2O, Concord, CA 94524; Upstream Water Users: David J. Guy Executive Director Northern California Water Association, 455 Capitol Mall, Suite 335, Sacramento, CA 95814.

### 16. Cooperation

The Parties shall cooperate in carrying out the Mutual Goals and Principles contained herein and the provisions and intent of this Agreement.

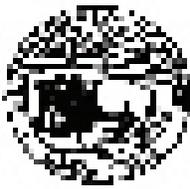
### 17. Effective Date

This Agreement shall become effective upon its full execution by all of the Parties hereto and the satisfaction of the conditions set forth in Paragraph 3(e) of this Agreement.

<p>DEPARTMENT OF WATER RESOURCES</p> <p>DATED: <u>3/23/01</u> By: <u></u>  <small>Approved as the State Water Contractors' representative</small>  <small>Approved as the USBR representative</small>  <small>Approved as the Contra Costa Water District representative</small>  <small>Approved as the San Luis &amp; Delta-Mendota Water Authority representative</small>  <small>Approved as the Northern California Water Association representative</small>          Thomas M. Hannigan          Director</p>	<p>STATE WATER CONTRACTORS</p> <p>DATED: <u>4/3/01</u> By: <u></u>          John L. Coburn          General Manager</p>	<p>CONTRA COSTA WATER DISTRICT</p> <p>DATED: <u>4/3/01</u> By: <u></u>          Walter J. Bishop          General Manager</p>
<p>UNITED STATES BUREAU OF RECLAMATION MID-PACIFIC REGION</p> <p>DATED: <u>3/16/01</u> By: <u></u>          Lester A. Snow          Regional Director</p>	<p>SAN LUIS &amp; DELTA-MENDOTA WATER AUTHORITY</p> <p>DATED: <u>3/30/01</u> By: <u></u>          Daniel G. Nelson          Executive Director</p>	<p>NORTHERN CALIFORNIA WATER ASSOCIATION</p> <p>DATED: <u>4/4/01</u> By: <u></u>          David J. Guy          Executive Director</p>



# Appendix B



UNITED STATES  
DEPARTMENT OF THE  
INTERIOR

## United States Department of the Interior

BUREAU OF RECLAMATION  
1616 North Foothill Parkway  
P.O. Box 25000  
Denver, Colorado 80225-0000

Apr. 25, 2001

Mr. Terry M. Schneider  
Chief, Division of Water Rights  
State Water Resources Control Board  
P.O. Box 2040  
Sacramento, CA 95818-2000

Dear Mr. Schneider:

In a separate letter dated April 25, 2001, the United States Bureau of Reclamation (USBR) and the California Department of Water Resources (CDWR) advised you pursuant to the Treaty of the City and San Francisco Bay-Sacramento-San Joaquin Valley, dated April 11, 2000, by the State Water Resources Control Board (SWRCB). On March 16, 2000, and March 19, 2000, respectively, the USBR and the CDWR entered the Agreement Regarding Regulation of Water Leases, Development and Management of Water Supplies, and a Binding Commitment to Mutual Payments Associated Terms. The Agreement was last amended by the remaining amendments.

The USBR and CDWR hereby agree to an extension of Conditions 1 and 2 of the Water Right Decision 1991, provided that the SWRCB adopts a final order in accordance with a final Order of April 11, 2000, including the proposed modifications to the Draft Order contained in the April 20, 2001, agreement of USBR and CDWR. A copy of the April 20, 2001, agreement is attached hereto and is incorporated herein by reference.

CURTIS

  
For: Lisa M. Padgett  
Assistant Chief, Division  
Mid-Pacific Region  
Law Bureau of Sacramento

  
Thomas H. Fairbank  
Chief  
California Department of Water Resources

ATTACHED:



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# Appendix C

## STATE OF CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

### ORDER WR 2001 - 05

In the Matter of  
Implementation of Water Quality Objectives  
for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary,  
Amending License 1986 (Application 23) and Permits 11315, 11316, 11885, 11886, 11887, 11967, 11968, 11969, 11970, 11971, 11972, 11973, 12364, 12721, 12722, 12723, 12725, 12726, 12727, 12860, 15735, 16597, 16600, and 20245 (Applications 13370, 13371, 234, 1465, 5638, 5628, 15374, 15375, 15376, 16767, 16768, 17374, 17376, 5626, 9363, 9364, 9366, 9367, 9368, 15764, 22316, 14858A, 19304, and 14858B, respectively) of the United States Bureau of Reclamation and Permits 16478, 16479, 16481, 16482, and 16483 (Applications 5630, 14443, 14445A, 17512, and 17514A, respectively) of the Department of Water Resources.

**Sources:** Sacramento and San Joaquin Rivers and their tributaries, and the Sacramento-San Joaquin Delta Estuary  
ORDER STAYING AND DISMISSING PHASE 8 OF THE BAY-DELTA WATER RIGHTS HEARING AND AMENDING REVISED DECISION 1641

By The Board:

#### 1.0 Introduction

By this order, the State Water Resources Control Board (SWRCB) takes actions to facilitate negotiations that may lead to a settlement of the potential responsibilities of numerous water users to implement the objectives in the *Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary*, adopted May 22, 1995 (1995 BayDelta Plan).[1]

In the absence of this order, the SWRCB would promptly convene the remainder of Phase 8 of the Bay-Delta Water Rights Hearing to consider the water users' potential responsibilities that have not yet been determined.

This order stays the resumption of Phase 8 for eighteen months from the date of this order. This order automatically dismisses Phase 8 at the end of eighteen months, unless the SWRCB receives notice from the Department of Water Resources (DWR) or the United States Bureau of Reclamation (USBR), within eighteen months, requesting resumption of Phase 8. This order extends the responsibilities of the DWR and the USBR under Conditions 1 and 2 to meet the water quality objectives in the 1995 Bay-Delta Plan. Unless the SWRCB issues a further order after notice and an opportunity for a hearing, the extension of their responsibilities will expire no later than one year after the DWR or the USBR requests a hearing. Upon request of the DWR or USBR, the SWRCB will resume Phase 8, or, after dismissal, will commence a new hearing. The SWRCB will expedite any hearing conducted pursuant to this order, to issue a decision within two years after receiving a request from the DWR or the USBR.

The SWRCB will, at least every six months, commencing not later than October 1, 2001, conduct a public informational workshop. The purpose of these workshops will be to provide the public and the SWRCB with information regarding the then-current status of negotiations and plans to implement the flow-dependent objectives, including information about the opportunities for non-parties to the negotiations to provide input.

#### 2.0 Background

##### 2.1 Procedural History

This order is part of a series of actions by the SWRCB to protect the beneficial uses of water in the Bay-Delta Estuary against the adverse effects of water diversions. In the BayDelta proceedings, the SWRCB adopts water quality objectives that, when implemented, will protect the beneficial uses. The SWRCB implements the objectives through water right orders and by requesting or directing that other agencies take appropriate actions including water quality control measures to be implemented by the Regional Water Quality Control Boards.

The 1995 Bay-Delta Plan contains the current water quality objectives. D-1641 and Order WR 2000-10 contain the current water right requirements to implement the BayDelta flowdependent objectives. D-1641 includes both long-term and temporary implementation requirements. Order WR 2000-10 requires partial implementation that will remain in effect up to thirtyfive years. In D-1641 and in Order WR 2000-10, the SWRCB assigned responsibilities, for specified periods, to water users (including the USBR and the DWR in D-1641, and the DWR in Order

WR 2000-10) in the watersheds of the San Joaquin River upstream of Vernalis, the Mokelumne River, Putah Creek, Cache Creek, within the boundaries of the North Delta Water Agency, and within the Bear River watershed. These responsibilities need not be revisited in the near future. These responsibilities require that the water users in these watersheds will contribute specified amounts of water, and that the DWR and/or the USBR will ensure that the objectives are met in the Delta.

To meet the potential responsibilities that are not yet assigned, but may be assigned to water users in areas not yet addressed, D-1641, in Conditions 1 and 2 on page 146 thereof, requires that the DWR and the USBR temporarily implement the objectives. Conditions 1 and 2 also require that the DWR and USBR meet certain objectives that the SWRCB does not contemplate assigning to other parties, such as export limits and gate closure requirements. D1641 provides that Conditions 1 and 2 will remain in effect only until the SWRCB makes further decisions establishing the responsibilities of water right holders in the areas where the potential responsibilities have not yet been determined. D-1641 sets these conditions to expire no later than November 30, 2001.

The SWRCB considered and heard comments on earlier drafts of this order at a Board meeting on March 7, 2001 and at a Board meeting on April 4, 2001.

## **2.2 Physical Setting**

The Bay-Delta Estuary includes the Sacramento-San Joaquin Delta, Suisun Marsh, and the embayments upstream of the Golden Gate. The Delta and Suisun Marsh are located at the confluence of the Sacramento and San Joaquin rivers, which converge to flow westward through San Francisco Bay. The watershed of the Bay-Delta Estuary produces water that is used in much of the state for municipal, industrial, agricultural, and environmental purposes. The watershed is a source of drinking water for two-thirds of the state's population. The State Water Project, operated by the DWR, and the Central Valley Project, operated by the USBR, store water upstream of the Delta, release the stored water into the Delta, and export both the stored water and uncontrolled flows[2] from the Delta. The two projects export water from the Delta to areas south and west of the Delta through a system of water conveyance facilities.

Fish, wildlife, and other public trust resources also use the waterways of the Bay-Delta Estuary and its tributaries. Some of the fish that reside in the estuary or migrate through it are protected under the state or federal Endangered Species Act. Additionally, migratory birds and other animals use the marshlands of the estuary for food and habitat.

## **3.0 Discussion**

It is the policy of the SWRCB in the Bay-Delta proceedings to encourage the parties to resolve among themselves the responsibilities for meeting the objectives in the 1995 Bay-Delta Plan, and to bring their joint proposals for establishing responsibilities to the SWRCB for approval.

The DWR, the USBR, some of their water supply contractors, and the members of the Northern California Water Association approached the SWRCB at a workshop on January 11, 2001, with a draft of an agreement among these parties. The parties proposed that the SWRCB adopt an order staying Phase 8 of the Bay-Delta Water Rights Hearing and automatically dismissing Phase 8 after the parties to the agreement complete and approve work plans for developing water supply projects. The parties presented an executed agreement to the SWRCB on April 4, 2001. The agreement includes a commitment by the DWR and the USBR to meet the objectives implemented under Conditions 1 and 2 in D-1641 so long as the agreement remains in effect, and for a period thereafter. This order is not based on the commitment in the agreement.

At the April 4, 2001, meeting, the SWRCB informed the parties to the agreement that, to be able to dismiss Phase 8 as requested, the SWRCB would need an independent commitment from the DWR and the USBR to meet the flow-dependent objectives for an interim period, and that the commitment could not be dependent on the agreement or on progress in implementing water supply projects pursuant to the agreement. The SWRCB further informed the parties that if it received the two projects' independent commitment to meet the objectives for an indefinite interim period and accept an indefinite extension of Conditions 1 and 2, it would (1) stay Phase 8 of the Bay-Delta Water Rights Hearing for up to eighteen months, (2) automatically dismiss Phase 8 after eighteen months had passed, (3) upon request of the DWR or the USBR at any time during the stay or after dismissal of Phase 8, convene a hearing to consider allocating responsibilities to meet the flow-dependent objectives to other parties, (4) set Conditions 1 and 2 to expire no later than two years after the request for hearing unless the SWRCB issues a further order after notice and opportunity for hearing, and (5) expedite the hearing to issue a decision within two years after the request for hearing.

The SWRCB has received the necessary commitment from the DWR and the USBR, by letter dated April 25, 2001. This order is based on that commitment. During the interim period, the SWRCB assumes that the DWR, the USBR, and other parties will conduct further negotiations. The SWRCB will take no part in the negotiations, and takes no position with respect to the direction of such negotiations.

After the DWR or the USBR requests a hearing to determine the responsibilities of the parties to meet the flow-dependent objectives, a hearing is likely to require two years or more. Therefore, an extension of Conditions 1 and 2 after the request for a hearing will help ensure that any necessary additional environmental documentation can be prepared and will ensure that the implementation of the objectives does not lapse. During any further hearing, the objectives in the 1995 Bay-Delta Plan must be met. A lapse in implementation could have serious consequences for the beneficial uses the objectives are intended to protect.[3] In the absence of a hearing, the SWRCB could not place responsibility for meeting

the objectives on a party or parties other than the DWR and the USBR.[4] Accordingly, the most reasonable approach is to retain the existing responsibilities to meet the objectives until the SWRCB is able to complete a hearing and make a decision after the hearing.[5]

A stay is appropriate for eighteen months, with the DWR and the USBR meeting the objectives. A dismissal after the stay is appropriate only if the objectives will be met for a reasonable, albeit interim, period. The DWR and the USBR will meet the objectives for an adequate period. Therefore, this order stays and dismisses Phase 8, effective eighteen months after the date of this order, unless either the DWR or the USBR requests, within eighteen months, that the SWRCB resume Phase 8. The stay and subsequent dismissal apply to proceedings to determine the responsibilities of the water right holders and water users within the watersheds of the Sacramento, Calaveras and Cosumnes Rivers to meet the flow-dependent objectives in the 1995 Bay-Delta Plan.

The administrative record of this order includes the entire evidentiary hearing record of the BayDelta Water Rights Hearing, from July 1, 1998, through April 12, 2000, and the notices and correspondence sent or received by the SWRCB regarding Phase 8 through the date of this order.

#### **4.0 Environmental Considerations**

Under the California Environmental Quality Act (CEQA) (Pub. Resources Code §§ 21000, et seq.), the SWRCB is the lead agency for preparation of environmental documentation for this order. The SWRCB has prepared and certified a final *Environmental Impact Report for the Implementation of the 1995 Bay-Delta Water Quality Control Plan* (BayDelta EIR). The BayDelta EIR fully analyzes the effects of several alternatives for assigning responsibility to water right holders in the watershed of the Bay-Delta Estuary, including Flow Alternative 2, under which the DWR and the USBR are jointly responsible for meeting all of the flowdependent objectives in the 1995 Bay-Delta Plan. D-1641 adopts Flow Alternative 2 as an interim measure, by including Conditions 1 and 2 in the water rights of the DWR and the USBR. This order amends Conditions 1 and 2 of D-1641 by extending the periods for which the requirements set forth in those conditions are effective.

CEQA contemplates that agencies may make serial decisions relying on a single EIR. (Cal. Code Regs., tit. 14, §§ 15165, 15168.) This order is one in a series of orders relying on the Bay-Delta EIR.

Except as applied to the Joint Point of Diversion and the San Joaquin River Agreement, the findings set forth in D-1641 in sections 14.3.1, 14.3.4, 14.3.5, 14.3.6, 14.3.7, 14.3.8, and 14.4 are applicable to the inclusion of Conditions 1 and 2 in the permits of the DWR and the USBR for an extended period. Those findings are incorporated herein by reference to the extent that they are applicable to this order. The SWRCB will file a Notice of Determination under CEQA after it adopts this order, and the Notice of Determination will state that this order relies on the BayDelta EIR.

#### **ORDER**

- A. IT IS HEREBY ORDERED that Phase 8 of the Bay-Delta Water Rights Hearing is stayed for a period of eighteen months from the date of this order. Phase 8 will be automatically dismissed at the end of eighteen months from the date of this order unless the DWR or the USBR notifies the SWRCB in writing, before the end of the eighteen month period, that it is requesting the SWRCB to resume Phase 8.[6] The purpose of the stay and dismissal is to allow water right holders whose rights might be amended after Phase 8 to negotiate toward a mutual settlement of their responsibilities to meet the flow-dependent objectives in the 1995 Bay-Delta Plan. If the DWR or the USBR requests in writing a hearing to allocate responsibilities to meet the flow-dependent objectives to other parties, the SWRCB expeditiously will convene a water right hearing, will determine whether the water right holders in the watersheds of the Sacramento, Cosumnes, and Calaveras Rivers have responsibility to meet the flow-dependent objectives in the 1995 Bay-Delta Plan, and will determine the amount of such responsibility in a decision or order.
- B. IT IS HEREBY ORDERED that License 1986 (Application 23) and Permits 11315, 11316, 11885, 11886, 11887, 11967, 11968, 11969, 11970, 11971, 11972, 11973, 12364, 12721, 12722, 12723, 12725, 12726, 12727, 12860, 15735, 16597, 16600, and 20245 (Applications 13370, 13371, 234, 1465, 5638, 5628, 15374, 15375, 15376, 16767, 16768, 17374, 17376, 5626, 9363, 9364, 9366, 9367, 9368, 15764, 22316, 14858A, 19304, and 14858B, respectively) of the United States Bureau of Reclamation and Permits 16478, 16479, 16481, 16482, and 16483 (Applications 5630, 14443, 14445A, 17512, and 17514A, respectively) of the Department of Water Resources shall be amended by revising Conditions 1 and 2 in SWRCB Decision 1641 as follows.
  1. Licensee/Permittee shall ensure that the water quality objectives for municipal and industrial beneficial uses and agricultural beneficial uses for the western Delta, interior Delta, and export area as set forth in Tables 1 and 2, attached, are met on an interim basis until the Board adopts a further decision assigning responsibility for meeting these objectives. Unless it is renewed pursuant to a further order after notice and an opportunity for hearing, this condition shall expire no later than one year after the DWR or the USBR requests in writing that the SWRCB convene a water right proceeding to determine whether to replace this condition with another condition that meets the objectives in Tables 1 and 2. Any extension hearing shall be for the limited purpose of determining whether additional time is necessary, and shall not include consideration of changes in allocation of responsibility. The SWRCB shall expedite any proceeding it conducts to assign long term responsibility to meet the objectives in Tables 1 and 2, in an effort to keep the proceeding under two years. This condition does not mandate that the Licensee/Permittee use water under this license/permit if it uses other sources of water or other means to meet this condition.

2. Licensee/Permittee shall ensure that the water quality objectives for Delta outflow and for Sacramento River flow at Rio Vista for fish and wildlife beneficial uses as set forth in Table 3, attached, are met on an interim basis until the Board adopts a further decision in the BayDelta Water Rights Hearing assigning responsibility for meeting these objectives. Any extension hearing shall be for the limited purpose of determining whether additional time is necessary, and shall not include consideration of changes in allocation of responsibility. Unless it is renewed pursuant to a further order after notice and an opportunity for hearing, this condition shall expire no later than one year after the DWR or the USBR requests in writing that the SWRCB convene a water right proceeding to determine whether to replace this condition with another condition that meets the objectives in Table 3. The SWRCB shall expedite any proceeding it conducts to assign long term responsibility to meet the objectives in Table 3, in an effort to keep the proceeding under two years. This condition does not mandate that the Licensee/Permittee use water under this license/permit if it uses other sources of water or other means to meet this condition.

### CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Resources Control Board held on April 26, 2001.

AYES: Art G. Baggett  
Pete S. Silva  
Richard Katz

NOS: None

ABSTAIN: None

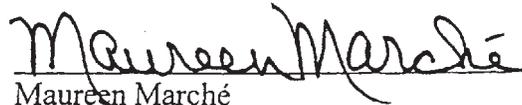
ORIGINAL SIGNED BY Maureen Marché  
Clerk to the Board

Footnotes:

- [1] From July 1, 1998 through December 21, 1999, the SWRCB conducted Phases 1 through 7 of the BayDelta Water Rights Hearing. On December 29, 1999, the SWRCB adopted Decision 1641, determining some of the responsibilities for meeting the objectives in the 1995 Bay-Delta Plan and resolving other related issues. On April 11 and 12, 2000, the SWRCB conducted a session of Phase 8 of the Bay-Delta Water Rights Hearing to consider a petition for change filed by South Sutter Water District in connection with a settlement agreement to resolve the responsibilities of water right holders on the Bear River. The SWRCB approved the petition on July 20, 2000, in Order WR 2000-10.
- [2] Uncontrolled flows include both natural flow and abandoned flow.
- [3] Conditions 1 and 2 require full implementation of the objectives for municipal, industrial, and agricultural beneficial uses, and require full implementation of the flow-dependent objectives for fish and wildlife beneficial uses for an interim period. The objectives protect the public interest.
- [4] The hearing record for D-1641 supports continuing the implementation by the DWR and the USBR of the objectives in the 1995 BayDelta Plan as provided by this order. See, for example, the Bay-Delta EIR, which analyzes the effects of imposing Conditions 1 and 2 on the DWR and the USBR.
- [5] This conclusion addresses the need to extend the responsibilities of the DWR and the USBR for an adequate interim period. This conclusion does not predetermine the allocation of responsibility after completion of any further proceedings before the SWRCB, should further proceedings become necessary. The DWR and the USBR historically have been responsible for meeting Bay-Delta objectives. SWRCB Decision 1641 continues the responsibility of the DWR and the USBR to meet the municipal, industrial, and agricultural objectives, and the flowdependent fish and wildlife objectives on an interim basis. To stay or dismiss of Phase 8, it is necessary to continue the interim requirements imposed on the DWR and the USBR. If it did not extend the responsibility of the DWR and the USBR for at least two years beyond the date when the DWR or the USBR requests resumption or initiation of a hearing, the SWRCB would have to conduct a hearing to determine whether to require a party or parties to meet the objectives pending completion of the hearing. Considering their historical involvement, the public interest in continuously implementing the objectives, their role as public entities managing vast quantities of the state's water supply, and the lack of any other means for setting interim requirements, it is reasonable to continue the responsibility of the DWR and the USBR until the SWRCB establishes other responsibilities to meet the objectives.
- [6] The stay and dismissal do not apply to the following proceedings related to the Bay-Delta Proceedings:
  - (a) Any proceedings necessary to respond to a writ of mandate or other court order, decision or opinion issued in connection with litigation to which the SWRCB is a party.
  - (b) An order necessary to implement new water quality objectives or amendments to the 1995 Bay-Delta Plan.
  - (c) A proceeding on an issue that is sufficiently unrelated [e.g. carriage water] to the subject of long term responsibility to meet the

flow-dependent objectives in the 1995 Bay-Delta Plan that the proceeding will not adversely affect any negotiations among the parties seeking to settle their responsibilities to meet the BayDelta objectives. The SWRCB shall hold a workshop to obtain input from the parties before initiating any such proceedings.

- (d) A proceeding relating to the implementation of the narrative salmon doubling objective set forth in Table 3 of the objectives in the 1995 Bay-Delta Plan. The existing D-1641 terms and conditions for fish and wildlife protection provide reasonable protection for a range of aquatic species in the Bay-Delta Estuary and help implement all of the objectives, including the narrative salmon doubling objective. Compliance with the existing flow objectives and other objectives in the 1995 Bay-Delta Plan may be sufficient to implement the salmon objective. Moreover, statutorily mandated non-flow fish restoration programs currently being implemented in other forums (e.g., CVPIA implementation and CALFED) will help implement the salmon objective. As other programs are implemented and monitored, the SWRCB will review the progress toward meeting the objective and may take additional action if needed.

  
Maureen Marché  
Administrative Assistant to the Board.



# **Sacramento Valley Water Management Agreement Signatories**

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